

DATA SHEET

SKY77340 PA Module for Quad-Band GSM / EDGE

Applications

 Quad-band cellular handsets:

GMSK Modulation

- Class 4 GSM850/900
- Class 1 DCS1800/PCS1900
- Class 12 GPRS multi-slot operation

EDGE modulation

- Class E2 GSM850/900
- Class E2 DCS1800/ PCS1900

Features

- · High efficiency:
 - GSM850 54%
 - GSM900 53%
 - DCS 52%
 - PCS 52%
- Input/Output matching 50 Ω internal (with DC blocking)
- 16-pin MCM
- Small outline
 - 6 x 8 mm
- Low profile
 - 1.2 mm
- Gold-plated, lead-free contacts
- Low APC current
 - 10 uA



Skyworks offers lead (Pb)-free "environmentally friendly" packaging that is RoHS compliant (European Parliament for the Restriction of Hazardous Substances).

Description

The SKY77340 Power Amplifier Module (PAM) is designed in a compact form factor for quad-band cellular handsets comprising GSM850/900, DCS1800, PCS1900, supporting GMSK and linear EDGE modulation. Class 12 General Packet Radio Service (GPRS) multi-slot operation is also supported.

The module consists of a GSM850/900 PA block and a DCS1800/PCS1900 PA block, impedance-matching circuitry for 50 Ω input and output impedances, and a Multi-function Power Amplifier Control (MFC) block. A custom CMOS integrated circuit provides the internal MFC function and interface circuitry.

Two separate Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated onto InGaP die; one supports the GSM850/900 bands, the other supports the DCS1800 and PCS1900 bands. Both PA blocks share common power supply pins to distribute current. The InGaP die, the silicon die, and the passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold.

RF input and output ports are internally matched to 50 Ω to reduce the number of external components. Extremely low leakage current (2.5 μ A, typical) maximizes handset standby time. Band select (BS) circuitry selects GSM transmit frequency band (logic 0) and DCS/PCS transmit frequency band (logic 1). MODE circuitry selects GMSK modulation (logic 0) or EDGE modulation (logic 1). VRAMP controls the output power for GMSK modulation and provides bias optimization for EDGE modulation depending on the state of MODE control.

The integrated multi-function control (MFC) provides envelope amplitude control in GMSK mode, reducing sensitivity to input drive, temperature, power supply, and process variation. In EDGE mode, the MFC configures the PA for fixed gain, and provides the ability to optimize the PA bias operation at different power levels. This circuitry regulates PA bias conditions, reducing sensitivity to temperature, power supply, and process variation. The Enable input signal (pin 8) provides a standby state to minimize battery drain.

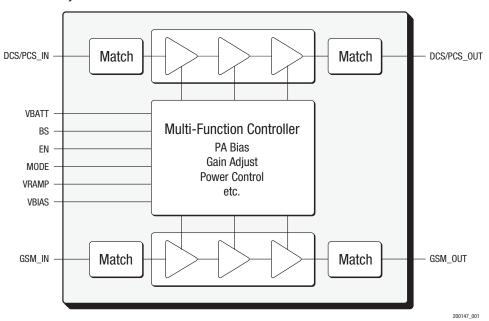


Figure 1. SKY77340 Functional Block Diagram

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Electrical Specifications

The absolute maximum ratings of the SKY77340 are provided in Table 1 and the recommended operating conditions are specified

in Table 2. Table 3 provides the control logic and Table 4 provides the electrical specifications.

Table 1. Absolute Maximum Ratings

Table II Theories Haziman Italiige								
Parameter	Symbol	Minimum	Typical	Maximum	Unit			
RF Input Power	Pin	_	_	12	dBm			
Case Storage Temperature	Tstg	- 55	_	150	°C			
Supply Voltage	VBATT	-0.3	_	7.0	V			
Power Control Voltage	VRAMP	-0.3	_	VBATT	V			
PA Bias Voltage	VBIAS	-0.3	_	VBATT	V			
Transmit enable	EN	-0.3	_	VBATT	V			
Band select	BS	-0.3	_	VBATT	V			
Mode select	MODE	-0.3	_	VBATT	V			

Table 2. SKY77340 Recommended Operating Conditions

		<u>.</u>			
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Transmit Duty Cycle ¹	Dтx	1/8	_	1/2	_
Case Operating Temperatures ¹ 1-Slot (12.5% duty cycle) 2-Slot (25% duty cycle) 3-Slot (37.5% duty cycle) 4-Slot (50% duty cycle)	(Trange)	-25 -25 -25 -25		100 100 85 85	°C
Voltage Operating Range	Vrange	3.0	3.5	4.8	V

 $^{^{1}}$ TFRAME = 4.615 mS

Table 3. SKY77340 Control Logic

Operational State	EN	BS	MODE	NOTES
Standby	0	Х	Х	X = don't care
Low band GMSK	1	0	0	VRAMP controls output power
Low band EDGE	1	0	1	VBIAS sets PA bias condition, fixed gain PA
High band GMSK	1	1	0	VRAMP controls output power
High band EDGE	1	1	1	VBIAS sets PA bias condition, fixed gain PA

Table 4. SKY77340 Electrical Specifications (1 of 17)

		General				
Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Units
Supply voltage	VBATT	_	3.0	3.5	4.8	V
Analog power control impedance	ZRAMP	_		200	_	kΩ
Analog PA bias control impedance	ZBIAS	_	_	200	_	kΩ
ENable Control voltage Control voltage	I V F N	_	0.0 1.5		0.5 Vbatt	V
ENable current	len	_		_	30	μΑ
Band select Control voltage Control voltage		-	0.0 1.5		0.5 Vbatt	V
Band select current	IBS	_		_	30	μА
MODE	VMODE	GMSK EDGE	0.0 1.5		0.5 Vbatt	V
	IMODE	$V_{\text{MODE}} \leq 2.7 \text{ V}$	_	_	30	μА
"Off" Current	loff	Sum Current on all pins $V_{BATT} = 3.5 \text{ V}$ $EN \leq 0.1 \text{ V}$ $V_{RAMP} \leq 0.1 \text{ V}$ $MODE \leq 0.1 \text{ V}$ $Temp = 25 \text{ °C}$	_	_	30	μА
"On" Current	IBATT MAX		_	_	2.2	Α

Table 4. SKY77340 Electrical Specifications (2 of 17)

	Mode: Ti	ransmit GMSK and EDGE ¹ Band: CEL							
		General Test Conditions							
Frequency = 824-849 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 mS Control States: EN = 1, BS = 0			RF Ports = GSM_IN, GSM_OUT				
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit			
	Pgsm	$Vcc = 3.5 V$ $Tcase = 25 °C$ $-1 dBm \le Pin \le 6 dBm$	34.5	35.1	_				
	PGSM_EX-L	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.0 \text{ V} \\ &\text{Tcase} = \text{Trange} \\ &-1 \text{ dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	32.0	33.7	_				
Output Power	Pgsm_ex-h	$\label{eq:VCC} $	34.5	35.9		dBm			
	PEDGE	$\begin{tabular}{ll} VCC = 3.5 V \\ TCASE = 25 °C \\ POUT = PIN + GEDGE \end{tabular}$	28.5	_					
	Pedge_ex	Vcc = Vrange Tcase = Trange	26.0	_	_				
	Gedge	Vcc = 3.5 V VBIAS = 1.4 V POUT = PEDGE TCASE = 25 °C MODE = HIGH Load = 50 ohms	31.5	33.0	34.5	dB			
Linear Gain	GLDGL	$\label{eq:VCC} \begin{array}{l} \text{VCC} = 3.0 \text{ V} < \text{VBATT} < 4.8 \text{ V} \\ \text{VBIAS} = 1.4 \text{ V} \\ \text{POUT} = \text{PEDGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{MODE} = \text{HIGH} \\ \text{Load VSWR} \leq 3.1 \text{ all phase angles} \\ \end{array}$	27.0	33.0	36.0	uБ			
	GVAR	Vcc = 3.5 V Tcase = Trange MODE = HIGH	_	-0.034	_	dB/C			
Power Added Efficiency	PAEGSM	$\label{eq:VCC} \begin{array}{l} \text{VCC} = 3.5 \text{ V} \\ \text{TCASE} = 25 \text{ °C} \\ \text{VRAMP} = 1.6 \text{ V} \\ \text{PIN} = 3 \text{ dBm} \end{array}$	49	54	_	%			
	PAEEDGE	Vcc = 3.5 V TCASE = 25 °C POUT = 28.5 dBm	20	23	_				
	IGSM_LOW_POWER	Vcc = 3.5 V TCASE = 25 °C POUT = 6.5 dBm		116	130				
Low Power Current Consumption	ledge_low_power	Vcc = 3.5 V Vbias = 0.3 V Tcase = 25 °C Pout = 6.5 dBm	_	120	_	mA			

Table 4. SKY77340 Electrical Specifications (3 of 17)

			GMSK and EDGE ¹ Band: CEL [continu					
			General Test Conditions					
Frequency = 824-849 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 mS Control States: EN = 1, BS = 0		RF Ports = GS	RF Ports = GSM_IN, GSM_OUT			
Parameter	•	Symbol	Condition	Minimum	Typical	Maximum	Unit	
	20 MHz Offset	NxSat	$\label{eq:VCC} \begin{split} \text{Vcc} &= 3.5 \text{ V} \\ \text{Tcase} &= 25 \text{ °C} \\ \text{Pout} &\leq \text{PGSM} \\ \text{RBW} &= 100 \text{ kHz} \end{split}$	_	-85.0	-83.5		
Noise Power -	ZU WINZ UNSEL	NxLin	$Vcc = 3.5 V$ $Tcase = 25 °C$ $Pout \le Pedge$ $RBW = 100 kHz$	_	-84.0	-83.5	dBm	
	1930 to 1990 MHz	NxSat _PCS	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{PGsm} \\ &\text{RBW} = 100 \text{ kHz} \end{split}$	_	-100.0	-84.0	ubili	
	1550 to 1550 Miliz	NxLin _PCS	$Vcc = 3.5 \text{ V}$ $Tcase = 25 \text{ °C}$ $Pout \leq Pedge$ $RBW = 100 \text{ kHz}$	_	-100.0	-84.0		
Forward Isolation		Iso	$\label{eq:CC} \begin{split} &\text{VCC} = \text{VRANGE} \\ &\text{TCASE} = \text{TRANGE} \\ &\text{Pin} \leq 6 \text{ dBm} \\ &\text{EN} = 0 \end{split}$	_	-40	-30	dBm	
Crossover legistics	Fundamental	Iso_CEL	VCC = VRANGE TCASE = TRANGE	_	-10	0	dDm	
Crossover Isolation	2 nd Harmonic	Iso_DCS	Vcc = Vrange Tcase = Trange	_	-30	-20	dBm	
Input VSWR		VSWR_SAT	6.5 dBm ≤ Pout ≤ Pgsm Vcc = Vrange Tcase = Trange	_	1.8	2.25	Ratio	
iliput vown		VSWR_Lin	$V_{CC} = V_{RANGE}$ $T_{CASE} = T_{RANGE}$ $P_{OUT} \le P_{EDGE}$	_	1.2	2.0	nauo	
Harmonics	2fo		Measured at GSM_OUT POUT ≤ PGSM VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-25	-10	dPm	
TIGITIUIIUS		3fo to 15fo	Measured at GSM_OUT POUT ≤ PGSM VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-25	-17	dBm	

Table 4. SKY77340 Electrical Specifications (4 of 17)

	-		GMSK and EDGE ¹ Band: CEL [continue					
			General Test Conditions					
Frequency = 824-849 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 n Control States: El		RF Ports = GSM_IN, GSM_OUT				
Parameter		Symbol	Condition	Minimum	Typical	Maximum	Unit	
	ACPR1		RBW = 30 kHz POUT \leq PEDGE VCC = 3.5 V TCASE = 25 °C MODE = HIGH Offset = \pm 200 kHz Load = 50 0hms RBW = 30 kHz	_	-37	-33		
			POUT \(\leftarrow \text{PEDGE_EX} \) VCC = VRANGE TCASE = TRANGE MODE = HIGH Offset = \(\pm \) Load VSWR \(\leftarrow \) 3:1, all phase angles	_	– 35	_		
	40000		RBW = 30 kHz POUT \leq PEDGE VCC = 3.5 V TCASE = 25 °C MODE = HIGH Offset = ± 400 kHz Load = 50 0hms	_	-60	-58		
	ACPR2		RBW = 30 kHz POUT ≤ PEDGE_EX VCC = VRANGE TCASE = TRANGE MODE = HIGH Offset = ±400 kHz Load VSWR ≤ 3:1, all phase angles	_	-57	_	dDa	
Adjacent Channel Leakage	ACRICA		RBW = 30 kHz POUT \leq PEDGE VCC = 3.5 V TCASE = 25 °C MODE = HIGH Offset = \pm 600 kHz Load = 50 Ohms	_	-77	-63	dBc	
	ACPR3		RBW = 30 kHz POUT ≤ PEDGE_EX VCC = VRANGE TCASE = TRANGE MODE = HIGH Offset = ±600 kHz Load VSWR ≤ 3:1, all phase angles	_	-65	_		
	ACPR4		RBW = 100 kHz POUT \leq PEDGE VCC = 3.5 V TCASE = 25 °C MODE = HIGH Offset = ± 1.8 MHz Load = 50 0hms	_	-81	-66		
	AUPK4		$\label{eq:RBW} RBW = 100 \text{ kHz} \\ POUT \leq PEDGE_EX \\ VCC = VRANGE \\ TCASE = TRANGE \\ MODE = HIGH \\ Offset = \pm 1.8 \text{ MHz} \\ Load VSWR \leq 3:1, all phase angles$	_	-75	_		

Table 4. SKY77340 Electrical Specifications (5 of 17)

	Mode: Transmi	t GMSK and EDGE ¹ Band: CEL [continued	d}							
General Test Conditions										
Frequency = 824-849 MHz Pulse Rate = 12.5% Duty Cycle	TFRAME = 4.615 Control States:	mS EN = 1, BS = 0	RF Ports = GS	SM_IN, GSM_0	DUT					
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit				
Error Vector Magnitude	EVM1	$\label{eq:VCC} \begin{aligned} &\text{VCC} = 3.5 \text{ V} \\ &\text{TCASE} = 25 \text{ °C} \\ &\text{RBW} = 30 \text{ kHz} \\ &\text{Pout} \leq \text{Pedge} \\ &\text{Load} = 50 \Omega \end{aligned}$	_	1.5	5.0	%				
	EVM2	Vcc = Vrange Tcase = Trange RBW = 30 kHz Pout ≤ Pedge_ex Load VSWR ≤ 3:1 , all phase angles	_	3.0	9.0	70				
Stability (all spurious)		$\label{eq:VCC} \begin{aligned} &\text{VCC} = \text{VRANGE} \\ &\text{TCASE} = \text{TRANGE} \\ &6.5 \text{ dBm} \leq \text{Pout} \leq \text{PGSM} \\ &\text{Load VSWR} = 8.1, \text{ all phase angles} \end{aligned}$	_	_	-36	dBm				
Ruggedness		Vcc = 4.8 V TCASE = TRANGE POUT = PGSM PIN = 6 dBm Load VSWR = 10:1, all phase angles		No degr						
Mode Switching Time (Time does not include loop lock time [pedestal] for GMSK PAC operation.)	TMODE	Vcc = Vrange Tcase = Trange		2	4	μS				

¹ All specifications related to modulated waveforms are for the EDGE waveform (i.e., EVM/ ACPR).

Table 4. SKY77340 Electrical Specifications (6 of 17)

		340 Electrical Specifications (6 nsmit GMSK and EDGE 1 Band: EGSM						
		General Test Conditions						
Frequency = 880-915 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 mS Control States: EN = 1, BS = 0			RF Ports = GSM_IN, GSM_OUT			
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit		
	PGSM	$\label{eq:VCC} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &-1 \text{ dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	34.5	34.9	_			
	PGSM_EX-L	$\label{eq:VCC} \begin{split} &\text{VCC} = 3.0 \text{ V} \\ &\text{TCASE} = \text{TRANGE} \\ &-1 \text{ dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	32.0	33.4	_			
Output Power	PGSM_EX-H	$\label{eq:VCC} \begin{split} &\text{VCC} = 4.8 \text{ V} \\ &\text{TCASE} = \text{TRANGE} \\ &-1 \text{ dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	34.5	35.5	_	dBm		
	PEDGE	VCC = 3.5 V TCASE = 25 °C POUT = PIN + GEDGE	28.5	_	_			
	PEDGE_EX	Vcc = Vrange Tcase = Trange	26.0	_	_			
	Gedge	Vcc = 3.5 V Vbias = 1.4 V Pout = Pedge Tcase = 25 °C MODE = HIGH Load = 50 ohms	31.5	33.0	34.5	dB		
Linear Gain	also.	$\label{eq:VCC} \begin{array}{l} \text{VCC} = 3.0 \text{ V} < \text{VBATT} < 4.8 \text{ V} \\ \text{VBIAS} = 1.4 \text{ V} \\ \text{POUT} = \text{PEDGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{MODE} = \text{HIGH} \\ \text{Load VSWR} \leq 3:1 \text{ all phase angles} \\ \end{array}$	27.0	33.0	36.0	ub		
	GVAR	Vcc = 3.5 V Tcase = Trange MODE = HIGH	_	-0.034	_	dB/C		
Power Added Efficiency	PAEGSM	$\label{eq:VCC} \begin{split} &\text{VCC} = 3.5 \text{ V} \\ &\text{TCASE} = 25 \text{ °C} \\ &\text{VRAMP} = 1.6 \text{ V} \\ &\text{PIN} = 3 \text{ dBm} \end{split}$	49	53	_	%		
	PAEEDGE	Vcc = 3.5 V TCASE = 25 °C POUT = 28.5 dBm	20	23	_			
	IGSM_LOW_POWER	Vcc = 3.5 V TCASE = 25 °C POUT = 6.5 dBm	_	110	130			
Low Power Current Consumption	ledge_low_power	Vcc = 3.5 V VBIAS = 0.3 V TCASE = 25 °C POUT = 6.5 dBm	_	120	_	mA		

Table 4. SKY77340 Electrical Specifications (7 of 17)

			GMSK and EDGE ¹ Band: EGSM [c	· /			
			General Test Conditions				
Frequency = 880-915 MHz Pulse Rate = 12.5% Duty (TFRAME = 4.615 r Control States: E		RF Ports = GSM	M_IN, GSM_O	JT	
Para	meter	Symbol	Condition	Minimum	Typical	Maximum	Unit
	20 MHz Offset	NxSat	$Vcc = 3.5 V$ $Tcase = 25 °C$ $Pout \le Pgsm$ $RBW = 100 kHz$	_	-86.0	-83.5	
Noise Power	20 MHZ 011000	NxLin	$Vcc = 3.5 V$ $Tcase = 25 °C$ $Pout \le Pedge$ $RBW = 100 kHz$	_	-84.0	-83.5	
	10 MHz Offset	NxSat_10 MHz	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{Pgsm} \\ &\text{RBW} = 100 \text{ kHz} \end{split}$	_	-86.0	-76.0	dBm
	TO WITZ OTISEL	NxLin _10 MHz	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{Pedge} \\ &\text{RBW} = 100 \text{ kHz} \end{split}$	_	-84.0	-78.0	ubili
	1805 to 1880 MHz	NxSat _DCS	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{Pgsm} \\ &\text{RBW} = 100 \text{ kHz} \end{split}$	_	-100.0	-84.0	
	1003 to 1000 WHZ	NxLin _DCS	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{Pedge} \\ &\text{RBW} = 100 \text{ kHz} \end{split}$	_	-100.0	-84.0	
Forward Isolation		Iso	$\label{eq:Vcc} $	_	-40	-30	dBm
Crossover Isolation	Fundamental	Iso_EGSM-DCS	Vcc = Vrange Tcase = Trange	_	_	0	dBm
Oroccover isolation	2 nd Harmonic	TIOU_LUOIVI DOO	Vcc = Vrange Tcase = Trange	_	_	-20	UDIII
Input VSWR		VSWR_SAT	$\label{eq:Vcc} $	_	1.7	2.25	Ratio
mpat romit		VSWR_LIN	Vcc = Vrange Tcase = Trange Pout ≤ Pedge	_	1.5	2.0	Tiulio

Table 4. SKY77340 Electrical Specifications (8 of 17)

	<u>'</u>		it GMSK and EDGE ¹ Band: EGSM [contin				
			General Test Conditions				
Frequency = 880-915 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 Control States:	mS EN = 1, BS = 0	RF Ports = GS	M_IN, GSM_O	JT	
Parameter		Symbol	Condition	Minimum	Typical	Maximum	Unit
Harmonics		2fo	Measured at GSM_OUT POUT ≤ PGSM VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-20	-10	dBm
		3fo to 15fo	Measured at GSM_OUT POUT ≤ PGSM VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-25	-17	иын
	ACPR1		$\label{eq:bounds} \begin{array}{l} \text{RBW} = 30 \text{ kHz} \\ \text{Pout} \leq \text{Pedge} \\ \text{MODE} = \text{HIGH} \\ \text{Vcc} = 3.5 \text{ V} \\ \text{Tcase} = 25 \text{ °C} \\ \text{Offset} = \pm 200 \text{ kHz} \\ \text{Load} = 50 \text{ Ohms} \\ \end{array}$	_	-36	-33	
Adjacent Chennel Leglage	AUFNI		RBW = 30 kHz Pout ≤ Pedge_ex MODE = HIGH Vcc = Vrange Tcase = Trange Offset = ±200 kHz Load VSWR ≤ 3:1, all phase angles	_	-35	_	dBc
Adjacent Channel Leakage	ACPR2		RBW = 30 kHz POUT \leq PEDGE MODE = HIGH Vcc = 3.5 V TCASE = 25 °C Offset = \pm 400 kHz Load = 50 0hms	_	-60	-60 -58	авс
	AUI 112		RBW = 30 kHz POUT ≤ PEDGE_EX MODE = HIGH VCC = VRANGE TCASE = TRANGE Offset = ±400 kHz Load VSWR ≤ 3:1, all phase angles	_	-57	_	

Table 4. SKY77340 Electrical Specifications (9 of 17)

		Mode: Transmit	GMSK and EDGE ¹ Band: EGSM [contin	nued}			
			General Test Conditions				
Frequency = 880-915 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 r Control States: E		RF Ports = GSM_IN, GSM_C			
Parameter		Symbol	Condition	Minimum	Typical	Maximum	Unit
			RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 600 kHz Load = 50 Ohms	_	-77	-63	
Adjacent Channel Leakage [continued]	ACPR3		$\label{eq:RBW} RBW = 30 \text{ kHz}$ $\label{eq:RBW} POUT \leq PEDGE_EX$ $\label{eq:RBW} MODE = HIGH$ $\label{eq:VCC} VCC = VRANGE$ $\label{eq:RBW} TCASE = TRANGE$ $\label{eq:CGW} Offset = \pm 600 \text{ kHz}$ $\label{eq:Load} Load VSWR \leq 3:1, \text{ all phase angles}$	_	-65	_	
	ACPR4		RBW = 100 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = ± 1.8 MHz Load = 50 0hms	_	-81	-66	
	AUPN4	$\label{eq:RBW} \begin{array}{l} RBW = 100 \text{ kHz} \\ POUT \leq PEDGE_EX \\ MODE = HIGH \\ VCC = VRANGE \\ TCASE = TRANGE \\ Offset = \pm 1.8 \text{ MHz} \\ Load VSWR \leq 3:1, \text{ all phase angles} \\ \end{array}$	_	-75			
Error Vector Magnitude		EVM1	RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Load = 50 Ω	_	1.5	5.0	%
2 vocci magnitudo		EVM2	$\label{eq:RBW} \begin{array}{l} \text{RBW} = 30 \text{ kHz} \\ \text{POUT} \leq \text{PEDGE_EX} \\ \text{MODE} = \text{HIGH} \\ \text{Vcc} = \text{VRANGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{Load VSWR} \leq 3:1 \text{ , all phase angles} \\ \end{array}$	_	3.0	9.0	70
Stability (all spurious)			$ 6.5 \text{ dBm} \leq \text{Pout} \leq \text{Pgsm} $ $ \text{Vcc} = \text{Vrange} $ $ \text{Tcase} = \text{Trange} $ $ \text{Load VSWR} = 8:1, \text{ all phase angles} $	_	_	-36	dBm
Ruggedness			POUT = PGSM PIN = 6 dBm Vcc = 4.8 V TCASE = TRANGE		No degradation		
			Load VSWR = 10:1, all phase angles		No dar	nage 	
Mode Switching Time (Time does not include loop lock time [p GMSK PAC operation.)	edestal] for	тморе	Vcc = Vrange Tcase = Trange		2	4	μS

 $^{^{\}rm 1}$ All specifications related to modulated waveforms are for the EDGE waveform (i.e., EVM/ ACPR).

Table 4. SKY77340 Electrical Specifications (10 of 17)

	Mode: Tra	ansmit GMSK and EDGE ¹ Band: DCS						
		General Test Conditions						
Frequency = 1710-1785 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 mS Control States: EN = 1, BS = 1		RF Ports = DCS/PCS_IN, DCS/PCS_OUT				
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit		
	PgsM	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{0 dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	32.5	33.5	_			
Output Power	PGSM_EX-L	$\label{eq:VCC} \begin{split} &\text{Vcc} = 3.0 \text{ V} \\ &\text{Tcase} = \text{Trange} \\ &\text{0 dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	29.0	32.0	_			
	Pgsm_ex-h	$\label{eq:VCC} \begin{split} &\text{VCC} = 4.8 \text{ V} \\ &\text{TCASE} = \text{TRANGE} \\ &\text{0 dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	29.0	34.2	_	dBm		
	PEDGE	$\label{eq:VCC} \begin{split} &\text{VCC} = 3.5 \text{ V} \\ &\text{TCASE} = 25 \text{ °C} \\ &\text{Pout} = \text{PIN} + \text{GEDGE} \end{split}$	27.3	-	_			
	Pedge_ex	Vcc = Vrange Tcase = Trange	25.0	_	_			
	Gedge	VCC = 3.5 V VBIAS = 1.3 V POUT = PEDGE TCASE = 25 °C MODE = HIGH Load = 50 ohms	33.0	34.8	36.0	dB		
Linear Gain	GLOCE	$\label{eq:VCC} \begin{array}{l} \text{VCC} = 3.0 \text{ V} < \text{VBATT} < 4.8 \text{ V} \\ \text{VBIAS} = 1.3 \text{ V} \\ \text{POUT} = \text{PEDGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{MODE} = \text{HIGH} \\ \text{Load VSWR} \leq 3.1 \text{ all phase angles} \\ \end{array}$	28.0	34.8	38.0	ub		
	GVAR	Vcc = 3.5 V Tcase = Trange MODE = HIGH	_	-0.025	_	dB/C		
Power Added Efficiency	PAEGSM	$\label{eq:VCC} \begin{split} &\text{VCC} = 3.5 \text{ V} \\ &\text{TCASE} = 25 \text{ °C} \\ &\text{VRAMP} = 1.6 \text{ V} \\ &\text{Pin} = 3 \text{ dBm} \end{split}$	48	52	_	%		
,	PAEEDGE	VCC = 3.5 V $TCASE = 25 °C$ $POUT = 27.3 dBm$	20	25				
	IGSM_LOW_POWER	Vcc = 3.5 V TCASE = 25 °C POUT = 1.5 dBm	_	80	100			
Low Power Current Consumption	ledge_low_power	Vcc = 3.5 V VBIAS = 0.4 V TCASE = 25 °C POUT = 1.5 dBm	_	110	_	mA		

Table 4. SKY77340 Electrical Specifications (11 of 17)

			t GMSK and EDGE ¹ Band: DCS [con					
			General Test Conditions					
Frequency = 1710-1785 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 r Control States: E		RF Ports = DC	RF Ports = DCS/PCS_IN, DCS/PCS_OUT			
Paramete	r	Symbol	Condition	Minimum	Typical	Maximum	Unit	
	20 MHz Offset	NxSat	$\begin{tabular}{ll} VCC &= 3.5 \ V \\ TCASE &= 25 \ ^{\circ}C \\ POUT &\le PGSM \\ RBW &= 100 \ \text{kHz} \end{tabular}$		-82	-80		
Noise Power	25 11112 011000	NxLin	$\label{eq:vcc} \begin{split} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{Pedge} \\ &\text{RBW} = 100 \text{ kHz} \end{split}$	_	-82	-80	dBm	
	925 to 960 MHz	NxSat_EGSM	$\label{eq:vcc} \begin{aligned} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = 25 \text{ °C} \\ &\text{Pout} \leq \text{Pgsm} \\ &\text{RBW} = 100 \text{ kHz} \end{aligned}$		-88	-84	ubili	
		NxLin_EGSM	VCC = 3.5 V TCASE = 25 °C POUT \leq PEDGE RBW = 100 kHz	_	-86	-84		
Forward Isolation		Iso	$\label{eq:VCC} \begin{split} &VCC = V_{RANGE} \\ &T_{CASE} = T_{RANGE} \\ &P_{IN} \leq 6 \ dBm \\ &EN = 0 \end{split}$	_	-33	-30	dBm	
Crossover Isolation	Fundamental	Iso_DCS-EGSM	Vcc = Vrange Tcase = Trange	_	-17	-10	dBm	
Input VSWR		VSWR_SAT	$\label{eq:VCC} \begin{split} &\text{VCC} = \text{VRANGE} \\ &\text{TCASE} = \text{TRANGE} \\ &1.5 \text{ dBm} \leq \text{Pout} \leq \text{PGSM} \end{split}$	_	1.5	2.25	Ratio	
input vowit		VSWR_LIN	VCC = VRANGE TCASE = TRANGE POUT ≤ PEDGE	_	1.2	2.0	riatio	
Harmonics		2fo to 4fo	Measured at GSM_OUT POUT ≤ PGSM VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-25	-10	dBm	
		5fo to 7fo	Measured at GSM_OUT POUT ≤ PGSMVcc = VRANGE TCASE = TRANGE Load = 50 ohms	_	_	-17		

Table 4. SKY77340 Electrical Specifications (12 of 17)

			t GMSK and EDGE ¹ Band: DCS [continu				
			General Test Conditions				
Frequency = 1710-1785 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 r Control States: E		RF Ports = DCS	S/PCS_IN, DCS	S/PCS _OUT	
Parameter		Symbol	Condition	Minimum	Typical	Maximum	Unit
			RBW = 30 kHz POUT \leq PEDGE VCC = 3.5 V TCASE = 25 °C Offset = \pm 200 kHz Load = 50 Ohms	_	-36	-33	
	ACPR1		RBW = 30 kHz POUT ≤ PEDGE_EX MODE = HIGH VCC = VRANGE TCASE = TRANGE Offset = ±200 kHz Load VSWR ≤ 3:1, all phase angles	_	-30	_	
	ACPR2		RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 400 kHz Load = 50 Ohms	_	-60	-57	
	AUPH2		$\label{eq:RBW} \begin{array}{l} RBW = 30 \text{ kHz} \\ POUT \leq PEDGE_EX \\ MODE = HIGH \\ VCC = VRANGE \\ TCASE = TRANGE \\ Offset = \pm 400 \text{ kHz} \\ Load VSWR \leq 3:1, \text{ all phase angles} \end{array}$	_	-55	_	
Adjacent Channel Leakage	ACPR3		RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 600 kHz Load = 50 0hms	_	- 75	-63	dBc
	AUPRIS		$\label{eq:RBW} \begin{array}{l} RBW = 30 \text{ kHz} \\ POUT \leq PEDGE_EX \\ MODE = HIGH \\ VCC = VRANGE \\ TCASE = TRANGE \\ Offset = \pm 600 \text{ kHz} \\ Load VSWR \leq 3:1, \text{ all phase angles} \end{array}$	_	-65	_	
	ACPR4		RBW = 100 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 1.8 MHz Load = 50 Ohms	_	-77	-66	
	AUI N4		$\label{eq:RBW} \begin{array}{l} \text{RBW} = 100 \text{ kHz} \\ \text{POUT} \leq \text{PEDGE_EX} \\ \text{MODE} = \text{HIGH} \\ \text{Vcc} = \text{VRANGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{Offset} = \pm 1.8 \text{ MHz} \\ \text{Load VSWR} \leq 3:1, \text{ all phase angles} \\ \end{array}$	_	-77	_	

Table 4. SKY77340 Electrical Specifications (13 of 17)

	Mode: Transm	it GMSK and EDGE ¹ Band: DCS [continu	ed}							
General Test Conditions										
Frequency = 1710-1785 MHz Pulse Rate = 12.5% Duty Cycle		TFRAME = 4.615 mS Control States: EN = 1, BS = 1		S/PCS_IN, DCS	/PCS _OUT					
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit				
Error Vector Magnitude	EVM1	$\label{eq:BW} \begin{array}{l} \text{RBW} = 30 \text{ kHz} \\ \text{Pout} \leq \text{Pedge} \\ \text{MODE} = \text{HIGH} \\ \text{Vcc} = 3.5 \text{ V} \\ \text{Tcase} = 25 \text{ °C} \\ \text{Load} = 50 \ \Omega \\ \end{array}$	_	1.9	5.0					
	EVM2	$\label{eq:RBW} \begin{split} &\text{RBW} = 30 \text{ kHz} \\ &\text{Pout} \leq \text{Pedge_ex} \\ &\text{MODE} = \text{HIGH} \\ &\text{Vcc} = \text{Vrange} \\ &\text{Tcase} = \text{Trange} \\ &\text{Load VSWR} \leq 2.5:1 \text{, all phase angles} \end{split}$	_	6.0	9.0	%				
Stability (all spurious)		1.5 dBm ≤ Pout ≤ Pgsm Vcc = Vrange Tcase = Trange Load VSWR = 8:1, all phase angles	_	_	-36	dBm				
Ruggedness		POUT = PGSM PIN = 6 dBm Vcc = 4.8 V TCASE = TRANGE Load VSWR = 10:1, all phase angles	No degradation No damage							
Mode Switching Time (Time does not include loop lock time [pedestal] for GMSK PAC operation.)	TMODE	VCC = VRANGE TCASE = TRANGE		2	4	μS				

¹ All specifications related to modulated waveforms are for the EDGE waveform (i.e., EVM/ACPR).

Table 4. SKY77340 Electric3al Specifications (14 of 17)

	Mode: Tra	ansmit GMSK and EDGE ¹ Band: PCS					
		General Test Conditions					
Frequency = 1850-1910 MHz Pulse Rate = 12.5% Duty Cycle	TFRAME = 4.615 Control States: E		RF Ports = DCS/PCS_IN, DCS/PCS_OUT				
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit	
	Pgsm	$Vcc = 3.5 V$ $Tcase = 25 °C$ $0 dBm \le PiN \le 6 dBm$	32.5	33.2	_		
Output Power	PGSM_EX-L	$\label{eq:VCC} \begin{split} &\text{VCC} = 3.0 \text{ V} \\ &\text{TCASE} = \text{TRANGE} \\ &\text{0 dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	29.0	32.0	_		
	PGSM_EX-H	$\label{eq:Vcc} \begin{split} &\text{Vcc} = 4.8 \text{ V} \\ &\text{Tcase} = \text{Trange} \\ &\text{0 dBm} \leq \text{Pin} \leq 6 \text{ dBm} \end{split}$	29.0	34.0	_	dBm	
	PEDGE	$\label{eq:VCC} \begin{split} \text{Vcc} &= 3.5 \text{ V} \\ \text{Tcase} &= 25 \text{ °C} \\ \text{Pout} &= \text{Pin} + \text{Gedge} \end{split}$	27.3	l			
	Pedge_ex	Vcc = Vrange Tcase = Trange	25.0		_		
	Gedge	Vcc = 3.5 V Vbias = 1.3 V Pout = Pedge Tcase = 25 °C MODE = HIGH Load = 50 ohms	33.0	35.0	36.0	dB	
Linear Gain	CLUC	$\label{eq:VCC} \begin{array}{l} \text{VCC} = 3.0 \text{ V} < \text{VBATT} < 4.8 \text{ V} \\ \text{VBIAS} = 1.3 \text{ V} \\ \text{POUT} = \text{PEDGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{MODE} = \text{HIGH} \\ \text{Load VSWR} \leq 3:1 \text{ all phase angles} \\ \end{array}$	28.0	35.0	38.0	ub	
	Gvar	Vcc = 3.5 V Tcase = Trange MODE = HIGH	_	-0.025	_	dB/C	
Power Added Efficiency	PAEgsm	VCC = 3.5 V $TCASE = 25 °C$ $VRAMP = 1.6 V$ $PIN = 3 dBm$	48	52	_	%	
·	PAEEDGE	Vcc = 3.5 V TCASE = 25 °C POUT = 27.3 dBm	20	25	_		
	IGSM_LOW_POWER	Vcc = 3.5 V TCASE = 25 °C POUT = 1.5 dBm	_	80	100		
ow Power Current Consumption	ledge_low_power	Vcc = 3.5 V Vbias = 0.4 V Tcase = 25 °C Pout = 1.5 dBm	_	110	_	mA	

Table 4. SKY77340 Electrical Specifications (15 of 17)

			t GMSK and EDGE ¹ Band: PCS [con						
			General Test Conditions						
Frequency = 1850-1910 Mi Pulse Rate = 12.5% Duty C		TFRAME = 4.615 mS Control States: EN = 1, BS = 1		RF Ports = DCS	RF Ports = DCS/PCS_IN, DCS/PCS_OUT				
Param	•	Symbol	Condition	Minimum	Typical	Maximum	Unit		
	20 MHz Offset	NxSat	Vcc = 3.5 V TCASE = 25 °C POUT \leq PGSM RBW = 100 kHz	_	-82	-80			
Noise Power	20 WIII2 OII36t	NxLin	$\begin{tabular}{ll} Vcc = 3.5 \ V \\ Tcase = 25 \ ^{\circ}C \\ Pout \le Pedge \\ RBW = 100 \ kHz \\ \end{tabular}$		-82	-80	dBm		
NOISE FOWEI	869 to 894 MHz	NxSat_CEL	Vcc = 3.5 V TCASE = 25 °C POUT \leq PGSM RBW = 100 kHz		-88	-84	ubili		
869 1	009 to 094 WINZ	NxLin_CEL	Vcc = 3.5 V TCASE = 25 °C POUT \leq PEDGE RBW = 100 kHz	_	-86	-84			
Forward Isolation		Iso	$\label{eq:Vcc} $	_	-33	-30	dBm		
Crossover Isolation	Fundamental	Iso_PCS-EGSM	Vcc = Vrange Tcase = Trange	_	_	-10	dBm		
Input VSWR		VSWR_SAT	$\label{eq:Vcc} $	_	2.1	2.25	Ratio		
iliput vown		VSWR_LIN	$\begin{aligned} &\text{Vcc} = \text{Vrange} \\ &\text{Tcase} = \text{Trange} \\ &\text{Pout} \leq \text{Pedge} \end{aligned}$	_	1.5	2.0	natio		
Harmonics		2fo to 3fo	Measured at DCS/PCS_OUT POUT_RANGE VCC = VRANGE TCASE = TRANGE Load = 50 ohms		-10	-7			
		4 fo	Measured at DCS/PCS_OUT POUT_RANGE VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-11	-5	dBm		
		5fo to 7fo	Measured at DCS/PCS _OUT POUT_RANGE VCC = VRANGE TCASE = TRANGE Load = 50 ohms	_	-30	-17			

Table 4. SKY77340 Electrical Specifications (16 of 17)

		GMSK and EDGE ¹ Band: PCS [contin					
		General Test Conditions					
Frequency = 1850-1910 MHz Pulse Rate = 12.5% Duty Cycle	TFRAME = 4.615 n Control States: Ef		RF Ports = DCS/PCS_IN, DCS/PCS_OUT				
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit	
ACPR1		RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 200 kHz Load = 50 0hms RBW = 30 kHz POUT \leq PEDGE EX	_	-36	-33		
		$\label{eq:mode} \begin{split} \text{MODE} &= \text{HIGH} \\ \text{Vcc} &= \text{Vrange} \\ \text{Tcase} &= \text{Trange} \\ \text{Offset} &= \pm 200 \text{ kHz} \\ \text{Load VSWR} &\leq 3.1, \text{ all phase angles} \end{split}$	_	-30	_		
ACPR2		RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 400 kHz Load = 50 0hms	_	-60	-57		
		RBW = 30 kHz POUT ≤ PEDGE_EX MODE = HIGH VCC = VRANGE TCASE = TRANGE Offset = ±400 kHz Load VSWR ≤ 3:1, all phase angles	_	-55	_	dBc	
Adjacent Channel Leakage ACPR3		RBW = 30 kHz POUT \leq PEDGE MODE = HIGH VCC = 3.5 V TCASE = 25 °C Offset = \pm 600 kHz Load = 50 0hms	_	-75	-63	ubc	
AUFNS		RBW = 30 kHz POUT ≤ PEDGE_EX MODE = HIGH VCC = VRANGE TCASE = TRANGE Offset = ±600 kHz Load VSWR ≤ 3:1, all phase angles		-65	_		
		RBW = 100 kHz POUT \leq PEDGE MODE = HIGH Vcc = 3.5 V TCASE = 25 ° C Offset = ± 1.8 MHz Load = 50 0hms	_	-77	-66		
ACPR4		$\label{eq:RBW} \begin{array}{l} \text{RBW} = 100 \text{ kHz} \\ \text{POUT} \leq \text{PEDGE_EX} \\ \text{MODE} = \text{HIGH} \\ \text{Vcc} = \text{VRANGE} \\ \text{TCASE} = \text{TRANGE} \\ \text{Offset} = \pm 1.8 \text{ MHz} \\ \text{Load VSWR} \leq 3:1, \text{ all phase angles} \\ \end{array}$	_	-77	_		

Table 4. SKY77340 Electrical Specifications (17 of 17)

	Mode: Transm	nit GMSK and EDGE ¹ Band: PCS [continu	ed}			
		General Test Conditions				
Frequency = 1850-1910 MHz Pulse Rate = 12.5% Duty Cycle TFRAME = 4 Control St		mS EN = 1, BS = 1	RF Ports = DCS/PCS_IN, DCS/PCS_OUT			
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
Error Vector Magnitude	EVM1	$\label{eq:BW} \begin{array}{l} \text{RBW} = 30 \text{ kHz} \\ \text{Pout} \leq \text{Pedge} \\ \text{MODE} = \text{HIGH} \\ \text{Vcc} = 3.5 \text{ V} \\ \text{Tcase} = 25 \text{ C} \\ \text{Load} = 50 \Omega \end{array}$	_	1.9	5.0	%
	EVM2	$RBW = 30 \text{ kHz}$ $Pout \leq Pedge_ex$ $MODE = HIGH$ $Vcc = VRANGE$ $TCASE = TRANGE$ $Load VSWR \leq 2.5:1 \text{ , all phase angles}$	_	6.0	9.0	70
Stability (all spurious)		1.5 dBm ≤ Pout ≤ Pgsm MODE = HIGH Vcc = VRANGE TCASE = TRANGE Load VSWR = 8:1, all phase angles	_	_	-36	dBm
Ruggedness		POUT = PGSM PIN = 6 dBm Vcc = 4.8 V TCASE = TRANGE Load VSWR = 10:1, all phase angles	No degradation No damage			
Mode Switching Time (Time does not include loop lock time [pedestal] for GMSK PAC operation.)	TMODE	Vcc = Vrange Tcase = Trange		2	4	μS

 $^{^{\}rm 1}$ All specifications related to modulated waveforms are for the EDGE waveform (i.e., EVM/ACPR).

Table 5. SKY77340 Functional Specifications – GMSK PA Control Operation (1 of 4)

	Mode: Closed Loo	p PA Control (GMSK Mode) Band: CEL	& EGSM								
	General Test Conditions										
Frequency = 824-849 MHz & 880-915 MHz	Pulse Rate = 12	2.5% Duty Cycle, TFRAME = 4.615 mS	Control States EN = 1,MODE VBIAS = don't of								
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit					
VRAMP Input Voltage	Vramp	$\label{eq:Vcc} \begin{aligned} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = \text{Trange} \\ &6.5 \text{ dBm} \leq \text{Pout} \leq 34.5 \text{ dBm} \end{aligned}$	0.2	_	1.6	٧					
Dynamic Range		VCC = VRANGE TCASE = TRANGE	37.0	40.0	_	dB					
Tolerance		VCC = VRANGE TCASE = TRANGE POUT = 6.5 dBm	-4.0	_	3.0	dB					
Tolerance		VCC = VRANGE TCASE = TRANGE POUT = 34.5 dBm	-3.0	_	2.0	ив					
Power Control Slope	Pcs		_	_	250.0	dB/V					
PAC Loop Enable Time	TEN	VCC = VRANGE TCASE = TRANGE After EN transitions LOW ≥ HIGH	_	1	2	μS					
Minimum Pedestal Duration	TPED		_	2	_	μS					

Note:

Response is monotonic over frequency, temperature, and POUT

Table 5. SKY77340 Functional Specifications – EDGE PA Control Operation (2 of 4)

Mode: Open Loop, Fixed PA Gain (EDGE Mode) Band: CEL & EGSM									
General Test Conditions									
Frequency = 824-849 MHz & 880-915 MHz	Pulse Rate = 12.	5% Duty Cycle, TFRAME = 4.615 mS	Control States: EN = 1, MODE = 1, BS = 0, VRAMP = don't care, VBIAS = active						
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit			
VBIAS Input Voltage	VBIAS	$\begin{tabular}{ll} VCC &= 3.5 \ V \\ TCASE &= TRANGE \\ POUT &= 28.5 \ dBm \\ EVM1 &\le 5\% \\ ACPR2 &\le 58 \ dBc \\ Gain &= GEDGE \end{tabular}$	_	1.4	1.6	V			

Table 5. SKY77340 Functional Specifications – GMSK PA Control Operation (3 of 4)

	Mode: Closed Lo	op PA Control (GMSK Mode) Band: DC	S & PCS									
	General Test Conditions											
Frequency = 1710-1785 MHz & 1850-1910 MHz	Pulse Rate = 25	e Rate = 25% Duty Cycle, TFRAME = 4.615 mS		Control States: EN = 1,MODE = 0, BS = 1, VBIAS = don't care, VRAMP = active								
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit						
VRAMP Input Voltage	VRAMP	$\label{eq:Vcc} \begin{aligned} &\text{Vcc} = 3.5 \text{ V} \\ &\text{Tcase} = &\text{Trange} \\ &1.5 \text{ dBm} \leq &\text{Pout} \leq 32.5 \text{ dBm} \end{aligned}$	0.2	_	1.6	٧						
Dynamic Range		VCC = VRANGE TCASE = TRANGE	32.0	35.0	_	dB						
Tolerance		VCC = VRANGE TCASE = TRANGE POUT = 1.5 dBm	-5.0	_	4.0	dB						
Tolerance		VCC = VRANGE TCASE = TRANGE POUT = 32.5 dBm	-3.0	_	2.0	ив						
Power Control Slope	Pcs	$\label{eq:Vcc} \begin{aligned} &\text{Vcc} = \text{Vrange} \\ &\text{Tcase} = \text{Trange} \\ &1.5 \text{ dBm} \leq \text{Pout} \leq 32.5 \text{ dBm} \end{aligned}$	_	_	250	dB/V						
PAC Loop Enable Time	TEN	Vcc = Vrange Tcase = Trange After EN transitions LOW ≥ HIGH	_	1	2	μS						
Minimum Pedestal Duration	TPED	$\label{eq:Vcc} \begin{aligned} &\text{Vcc} = \text{Vrange} \\ &\text{Tcase} = \text{Trange} \\ &1.5 \text{ dBm} \leq \text{Pout} \leq 32.5 \text{ dBm} \end{aligned}$	_	2.0	_	μS						

Note:

Response is monotonic over frequency, temperature, and POUT

Table 5. SKY77340 Functional Specifications – EDGE PA Control Operation (4 of 4)

Mode: Open Loop, Fixed PA Gain (EDGE Mode) Band: DCS & PCS										
General Test Conditions										
Frequency = 1710-1785 MHz & 1850-1910 MHz	Pulse Rate = 25%	6 Duty Cycle, Тғғаме = 4.615 mS	Control States: EN = 1, MODE = 1, BS = 1, VRAMP = don't care, VBIAS = active							
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit				
VBIAS Input Voltage	VBIAS	$\begin{tabular}{lll} VCC &= 3.5 \ V \\ TCASE &= TRANGE \\ POUT &= 27.3 \ dBm \\ EVM1 &\le 5\% \\ ACPR2 &\le 58 \ dBc \\ Gain &= GEDGE \end{tabular}$	_	1.3	1.6	V				

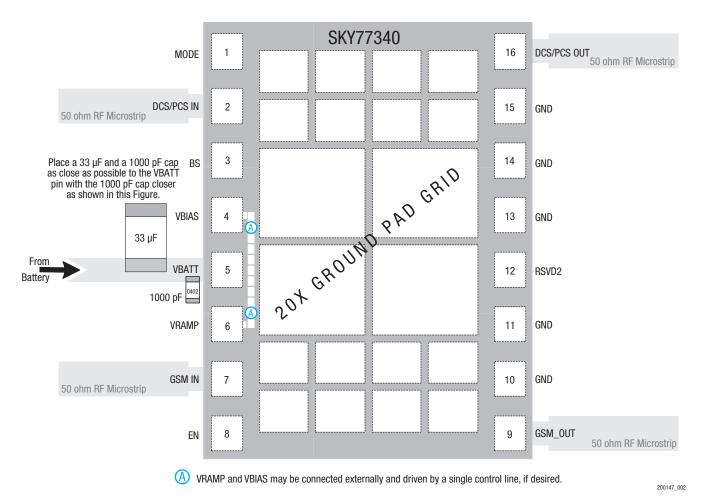
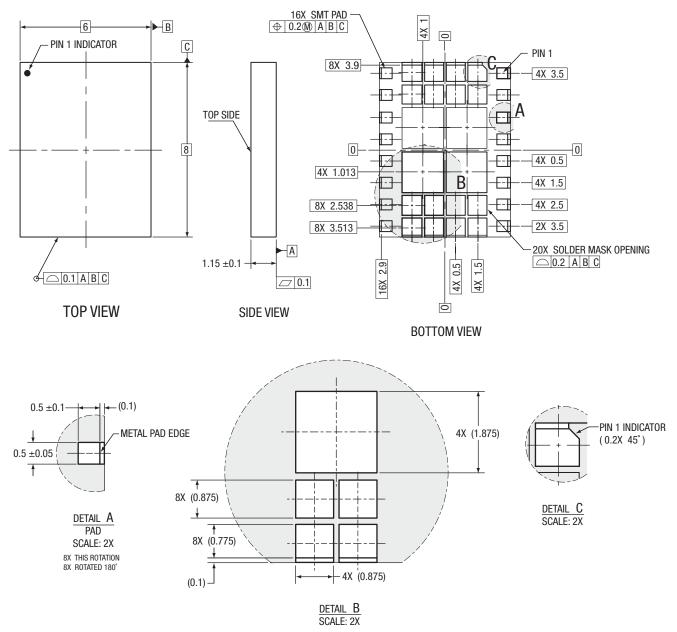


Figure 2. Typical SKY77340 Application Circuit

Package Dimensions and Pin Descriptions

Figure 3 is a mechanical diagram of the pad layout for the SKY77340, a 16-pin leadless quad-band PA module. Figure 4 provides a recommended phone board layout footprint for the PAM to help the designer attain optimum thermal conductivity, good grounding, and minimum RF discontinuity for the 50-ohm terminals.

Figure 5 shows the device pin configuration and numbering convention, which starts with pin 1 at the upper left, as indicated, and increments counter-clockwise around the package. Table 6 lists the pin names and signal descriptions. Figure 6 interprets typical Case Markings.

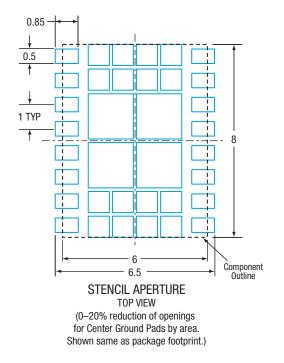


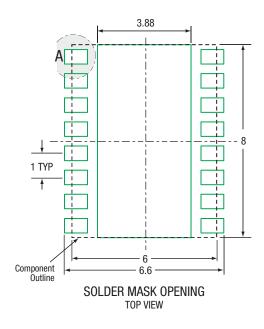
NOTES: Unless otherwise specified.

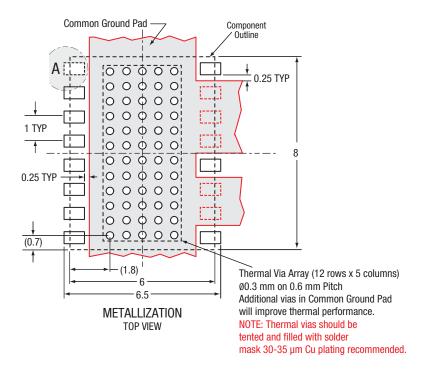
- 1. Dimensioning and Tolerancing in accordance with ASME Y14.5M-1994.
- 2. Pads are solder mask defined on 3 edges.

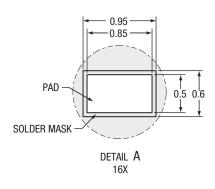
200147_003

Figure 3. SKY77340 16-Pin MCM Package Dimensional Drawing









ALL DIMENSIONS IN MILLIMETERS

Figure 4. Phone Board Layout Footprint for 6 x 8 mm Package - SKY77340 Specific

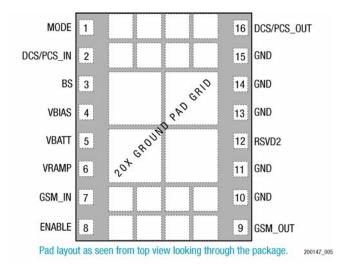


Figure 5. SKY77340 Pin Configuration (Top View)

Table 6. SKY77340 Pin Names and Signal Descriptions

Pad	Name	Description	
1	MODE	GMSK/EDGE Power Control Mode: Low = GMSK, High = EDGE	
2	DCS/PCS_IN	RF Input (DCS / PCS Bands) DC Blocked	
3	BS	Band Select	
4	VBIAS	Analog PA Bias Control (ALL BANDS, EDGE MODE)	
5	VBATT	DC Supply	
6	VRAMP	Analog Output Power Control (ALL BANDS, GMSK MODE)	
7	GSM_IN	RF Input (CEL / EGSM Bands) DC Blocked	
8	EN	Transmit Enable / Disable. Low = Disable	
9	GSM_OUT	RF Output (CEL / EGSM Bands) DC Blocked	
*12	RSVD2	Reserved	
*16	DCS/PCS_OUT	RF Output (DCS / PCS Bands) DC Blocked	
*10, 11, 13–15	GND	Ground	
Pad	GND PAD GRID	Ground pad grid is device underside.	

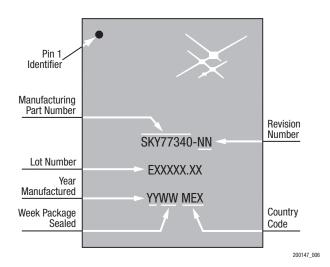


Figure 6. Typical Case Markings

Package and Handling Information

Because of its sensitivity to moisture absorption, this device package is baked and vacuum-packed prior to shipment in accordance with IPC J-STD 033 guidelines. Instructions on the shipping container label are in accordance with IPC J-STD 020B regarding exposure to moisture after the container seal is broken. These instructions must be followed; otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The SKY77340 is capable of withstanding an MSL3/250 °C solder reflow. Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. If the part is attached in a reflow oven, the temperature ramp rate should not exceed 3 °C per second; maximum temperature should not exceed 250 °C. If the part is manually attached, precaution should be taken to insure that the part is not subjected to temperatures exceeding 250 °C for more than 10 seconds. For details on attachment techniques, precautions, and handling procedures recommended by Skyworks, please refer to Skyworks Application Note: *PCB Design and SMT Assembly/Rework*, Document Number 101752. Additional information on standard SMT reflow profiles can also be found in the *JEDEC Standard J-STD-020*.

Production quantities of this product are shipped in the standard tape-and-reel format. For packaging details, refer to Skyworks Application Note: *Tape and Reel Information – RF Modules*, Document Number 101568.

Electrostatic Discharge Sensitivity

The SKY77340 is a Class 1 device. ESD testing was performed in compliance with JEDEC standards JESD22-A114 (Human Body Model), JESD22-A115 (Machine Model), and JESD22-C101 (Charged Device Model).

Various failure criteria can be utilized when performing ESD testing. Many vendors employ relaxed ESD failure standards, which fail devices only after "the pin fails the electrical specification limits" or "the pin becomes completely nonfunctional". Skyworks' most stringent criteria fail devices as soon as the pin begins to show any degradation on a curve tracer. To avoid ESD damage, both latent and visible, it is very important that the product assembly and test areas follow the Class-1 ESD handling precautions listed in Table 7.

Table 7. Precautions for Handling GaAs IC-based Products to Avoid ESD-Induced Damage

Alloid 202 illadood 2diilago				
	Wrist Straps			
Personnel	Conductive Smocks			
Grounding	Gloves and Finger Cots			
	Antistatic ID Badges			
Facility	Relative Humidity Control and Air Ionizers			
racility	Dissipative Floors (less than $10^9 \Omega$ to GND)			
	Dissipative Table Tops			
Protective	Protective Test Equipment (Properly Grounded)			
Workstation	Grounded Tip Soldering Irons			
WUIKSLALIUII	Conductive Solder Suckers			
	Static Sensors			
	Bags and Pouches (Faraday Shield)			
Protective Packaging	Protective Tote Boxes (Conductive Static Shielding)			
and	Protective Trays			
Transportation	Grounded Carts			
	Protective Work Order Holders			

Ordering Information

Model Number	Manufacturing Part Number	Product Revision	Package	Operating Temperature
SKY77340	SKY77340		6 x 8 x 1.2 mm	−25 °C to 85 °C

Revision History

Revision	Level	Date	Description
Α		October 17, 2006	Initial Release

References

Application Note: Tape and Reel Information – RF Modules, Document Number 101568 Application Note: PCB Design and SMT Assembly/Rework, Document Number 101752

JEDEC JESD22-A114 (Human Body Model) JEDEC JESD22-A115 (Machine Model)

JEDEC JESD22-C101 (Charged Device Model)

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