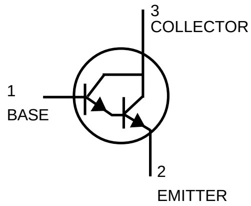
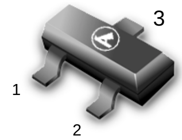
Darlington Transistors

NPN Silicon



MMBT6427LT1



CASE 318–08, STYLE 6
SOT–23 (TO–236AB)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	40	Vdc
Collector–Base Voltage	V_{CBO}	40	Vdc
Emitter–Base Voltage	V_{EBO}	12	Vdc
Collector Current — Continuous	I_C	500	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1) T_A = 25°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (2) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J , T_{stg}	–55 to +150	°C

DEVICE MARKING

MMBT6427LT1 = 1V

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage(3) (I_C = 10 mAdc, V_{BE} = 0)	$V_{(BR)CEO}$	40	—	Vdc
Collector–Base Breakdown Voltage (I_C = 100 µAdc, I_E = 0)	$V_{(BR)CBO}$	40	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 µAdc, I_C = 0)	$V_{(BR)EBO}$	12	—	Vdc
Collector Cutoff Current (V_{CE} = 25Vdc, I_B = 0)	I_{CES}	—	1.0	µAdc
Collector Cutoff Current (V_{CB} = 30Vdc, I_E = 0)	I_{CBO}	—	50	nAdc
Emitter Cutoff Current (V_{EB} = 10Vdc, I_C= 0)	I_{EBO}	—	50	nAdc

1. FR–5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain	h_{FE}			—
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)		10,000	100,000	
(I_C = 100 mAdc, V_{CE} = 5.0Vdc)		20,000	200,000	
(I_C = 500 mAdc, V_{CE} = 5.0Vdc)		14,000	140,000	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$(3)			Vdc
(I_C = 50 mAdc, I_B = 0.5 mAdc)		—	1.2	
(I_C = 500 mAdc, I_B = 0.5 mAdc)		—	1.5	
Base–Emitter Saturation Voltage (I_C = 500 mAdc, I_B = 0.5 mAdc)	$V_{BE(sat)}$	—	2.0	Vdc
Base–Emitter On Voltage (I_C = 50 mAdc, V_{CE} = 5.0Vdc)	$V_{BE(on)}$	—	1.75	Vdc
SMALL–SIGNAL CHARACTERISTICS				
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	7.0	pF
Input Capacitance (V_{EB}=0.5 Vdc, I_C = 0 , f = 1.0 MHz)	C_{ibo}	—	15	pF
Current Gain–High Frequency (V_{CE} = 5.0 Vdc, I_C = 10mAdc, f = 100 MHz)	$\|h_{fe}\|$	1.3	—	Vdc
Noise Finure (V_{CE}=5.0 Vdc, I_C = 1.0 mAdc , R_S =100 kΩ, f = 1.0 kHz)	NF	—	10	dB

3. **Pulse Tent:** Pulse Width = 300µs, Duty Cycle = 2.0%

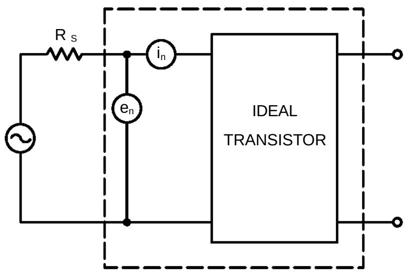

Figure 1. Transistor Noise Model

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NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)

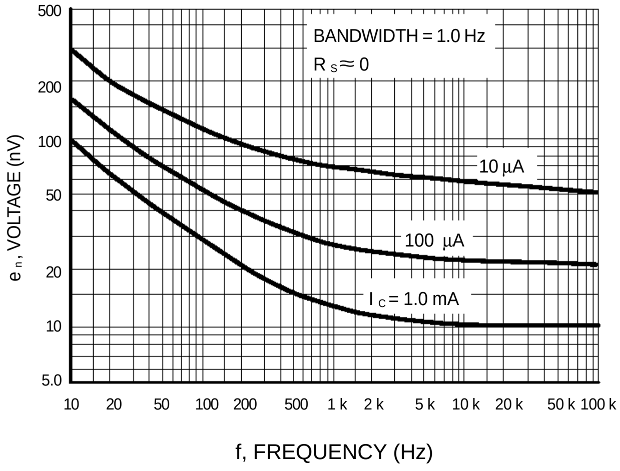

Figure 2. Noise Voltage

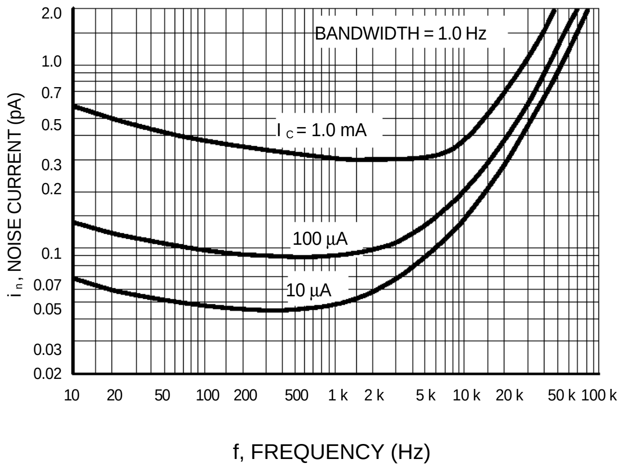

Figure 3. Noise Current

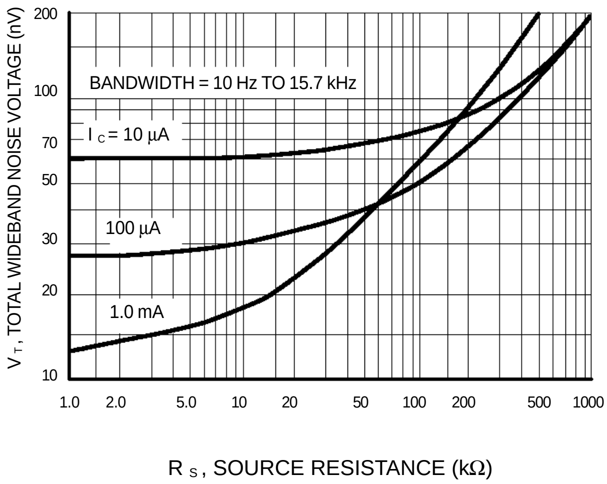

Figure 4. Total Wideband Noise Voltage

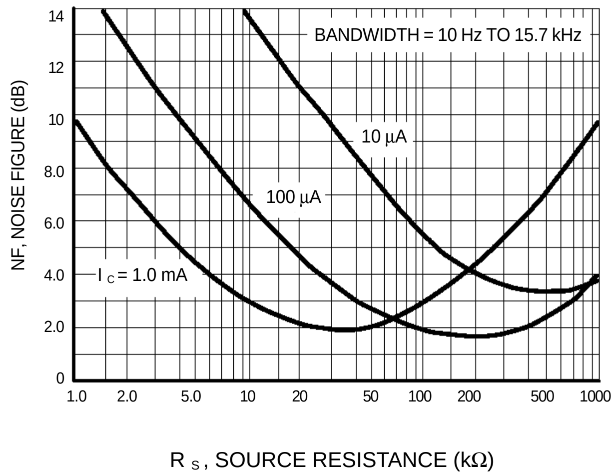

Figure 5. Wideband Noise Figure

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SMALL–SIGNAL CHARACTERISTICS

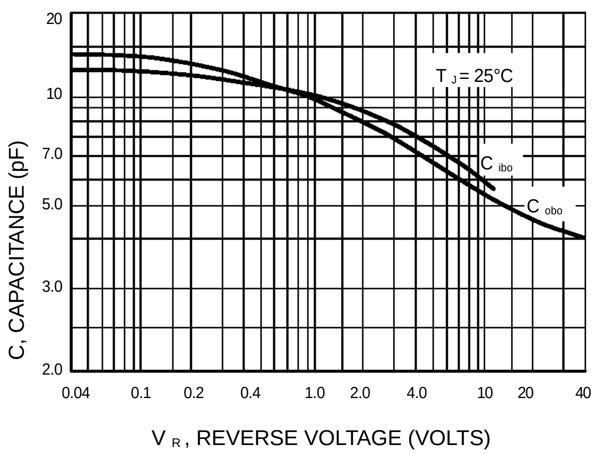

Figure 6. Capacitance

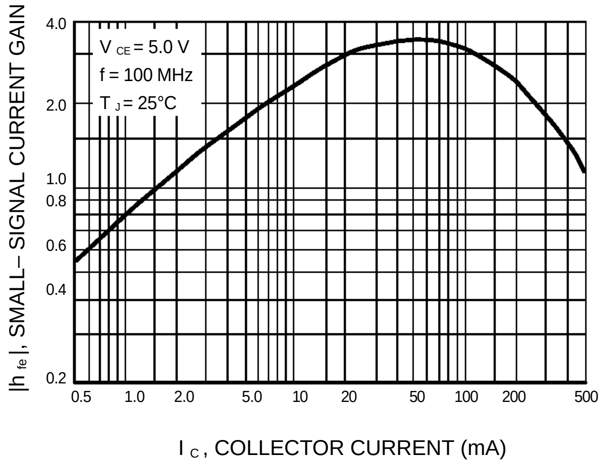

Figure 7. High Frequency Current Gain

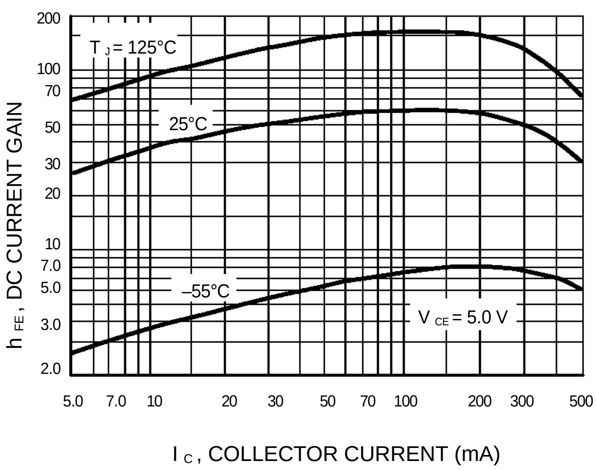

Figure 8. DC Current Gain

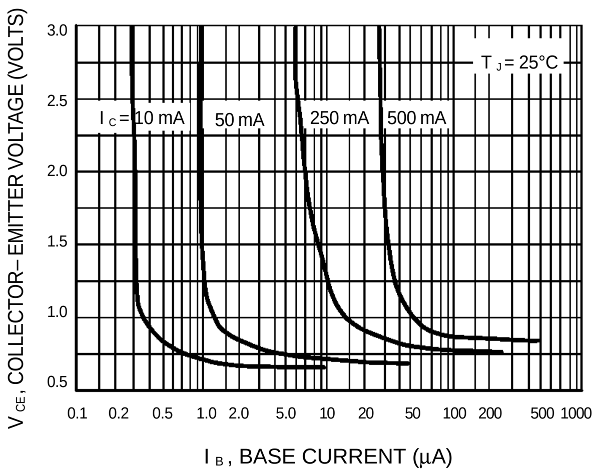

Figure 9. Collector Saturation Region

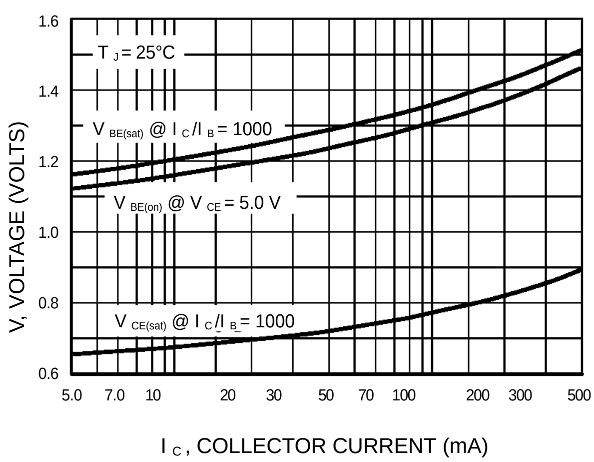

Figure 10. “On” Voltages

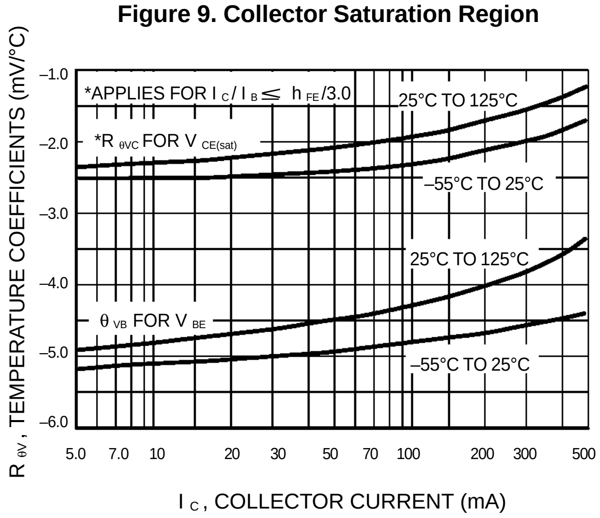

Figure 11. Temperature Coefficients

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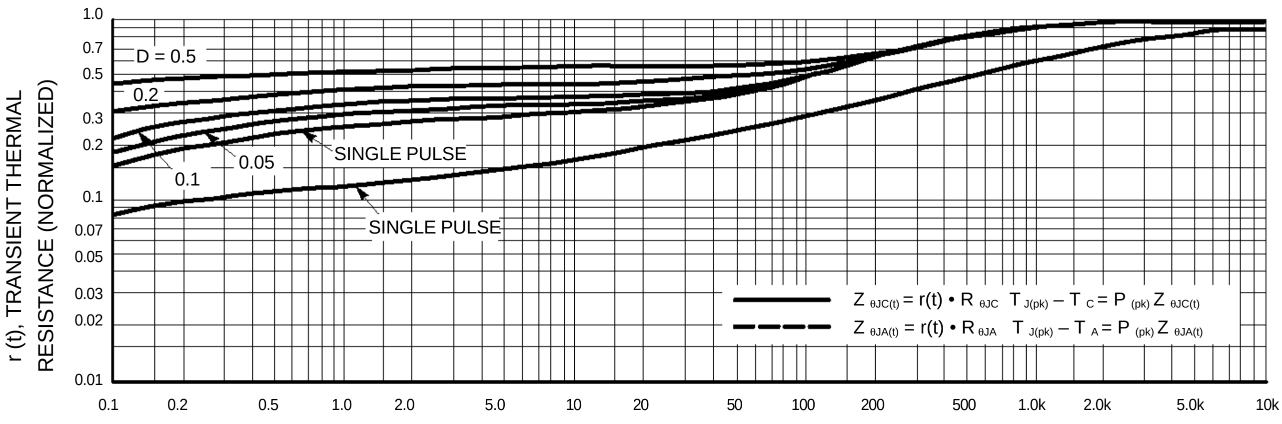
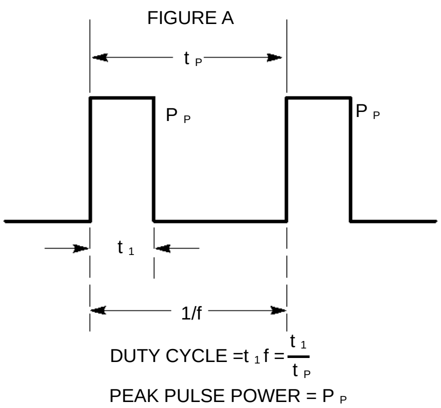


Figure 12. Thermal Response



Design Note: Use of Transient Thermal Resistance Data