



2N80

Preliminary

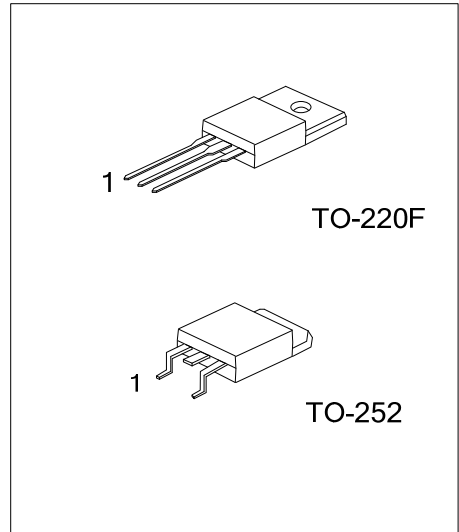
Power MOSFET

**2 Amps, 800 Volts
N-CHANNEL POWER MOSFET**

■ DESCRIPTION

The UTC **2N80** is an N-channel mode Power FET using UTC's advanced technology to provide costumers planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

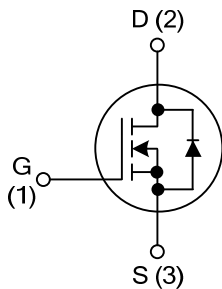
The UTC **2N80** is universally applied in high efficiency switch mode power supply.



■ FEATURES

- * 2.4A, 800V, $R_{DS(on)} = 6.3\Omega @ V_{GS} = 10 V$
- * High switching speed

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N80L-TF3-T	2N80G-TF3-T	TO-220F	G	D	S	Tube
2N80L-TN3-R	2N80G-TN3-R	TO-252	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>2N80L-TF3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TF3: TO-220F, TN3: TO-252</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 1)		I_{AR}	2.4	A
Drain Current	Continuous	I_D	2.4	A
	Pulsed (Note 1)	I_{DM}	9.6	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	180	mJ
	Repetitive (Note 1)	E_{AR}	8.5	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.0	V/ns
Power Dissipation	TO-220F	P_D	24	W
	TO-252		43	W/ $^\circ\text{C}$
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^\circ\text{C}$

Note : Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL CHARACTERISTICS

PARAMETER	PACKAGE	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-252		110	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F	θ_{JC}	5.2	$^\circ\text{C}/\text{W}$
	TO-252		2.85	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	800			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=250\mu\text{A}$		0.9		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800\text{V}$, $V_{GS}=0\text{V}$			10	μA
		$V_{DS}=640\text{V}$, $T_C=125^\circ\text{C}$			100	
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$, $V_{DS}=0\text{V}$			+100	nA
	Reverse	$V_{GS}=-30\text{V}$, $V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=1.2\text{A}$		4.9	6.3	Ω
Forward Transconductance (Note 4)	g_{FS}	$V_{DS}=50\text{V}$, $I_D=1.2\text{A}$		2.65		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		425	550	pF
Output Capacitance	C_{OSS}		45	60	pF	
Reverse Transfer Capacitance	C_{RSS}		5.5	7.0		
SWITCHING PARAMETERS						
Total Gate Charge (Note 4,5)	Q_G	$V_{GS}=10\text{V}$, $V_{DS}=640\text{V}$, $I_D=2.4\text{A}$		12	15	nC
Gate to Source Charge (Note 4,5)	Q_{GS}		2.6		nC	
Gate to Drain Charge (Note 4,5)	Q_{GD}		6.0			
Turn-ON Delay Time (Note 4,5)	$t_{D(ON)}$	$V_{DD}=400\text{V}$, $I_D=2.4\text{A}$, $R_G=25\Omega$		12	35	ns
Rise Time (Note 4,5)	t_R		30	70		
Turn-OFF Delay Time (Note 4,5)	$t_{D(OFF)}$		25	60		
Fall-Time (Note 4,5)	t_F		28	65		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				2.4	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				9.6	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=2.4\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time (Note 4)	t_{RR}	$I_S=2.4\text{A}$, $V_{GS}=0\text{V}$, $di_F/dt=100\text{A}/\mu\text{s}$		480		ns
Reverse Recovery Charge (Note 4)	Q_{RR}		2.0		μC	

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. $L = 59\text{mH}$, $I_{AS} = 2.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

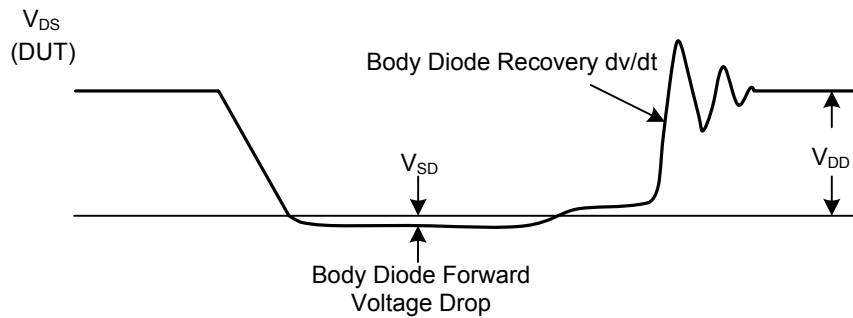
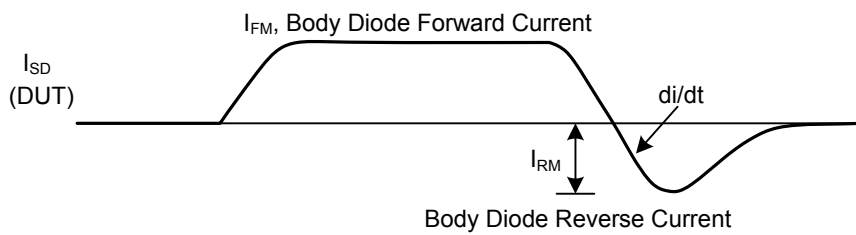
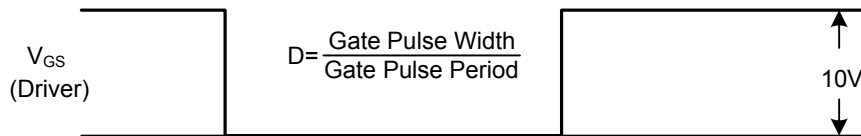
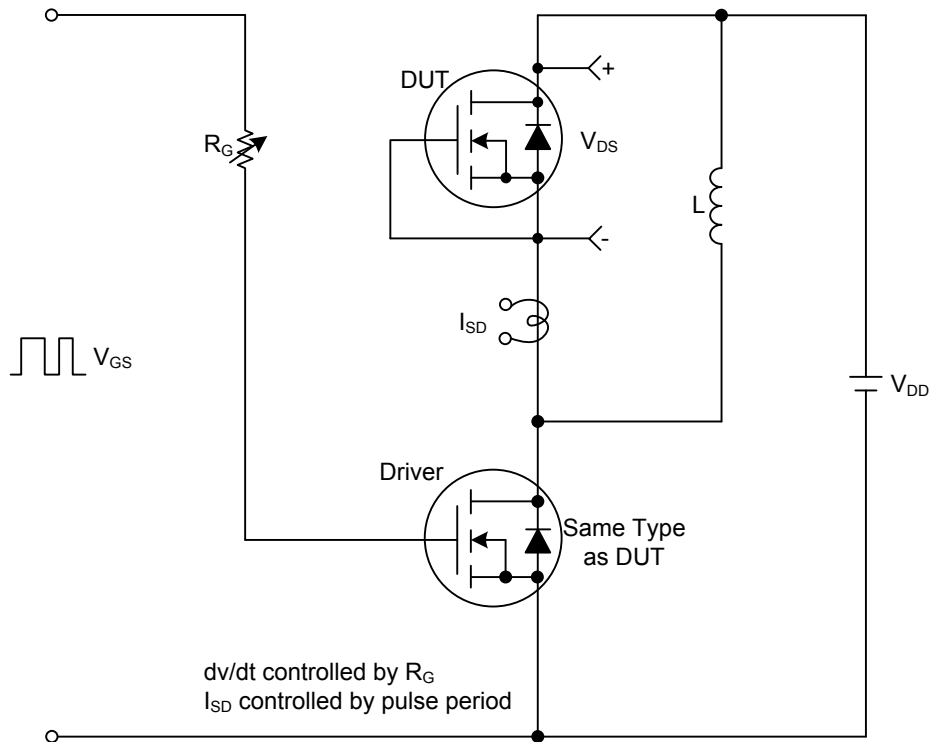
3. $I_{SD} \leq 2.4\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

4. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

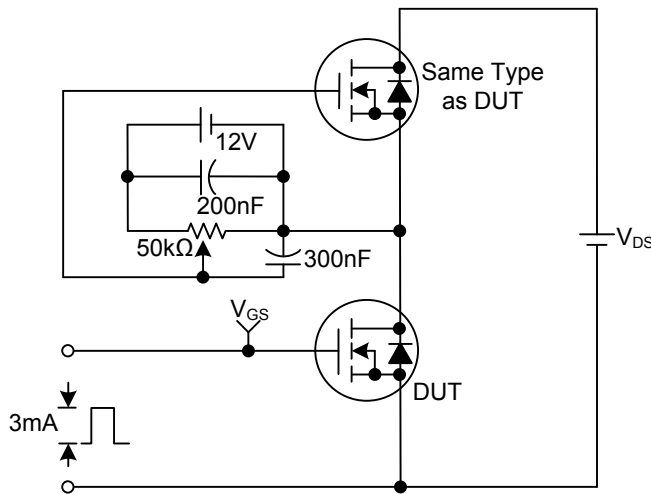
5. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

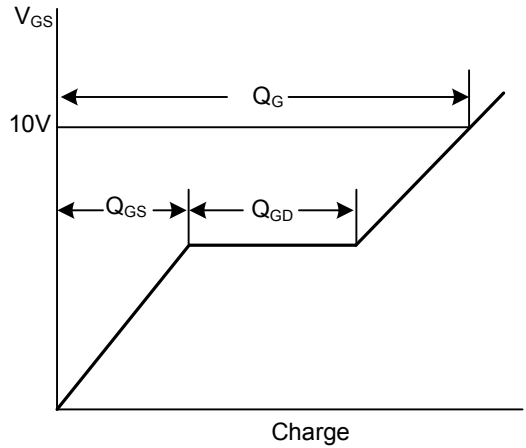
Peak Diode Recovery dv/dt Test Circuit & Waveforms



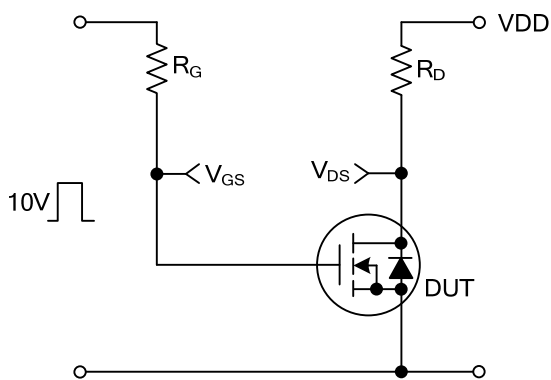
Gate Charge Test Circuit



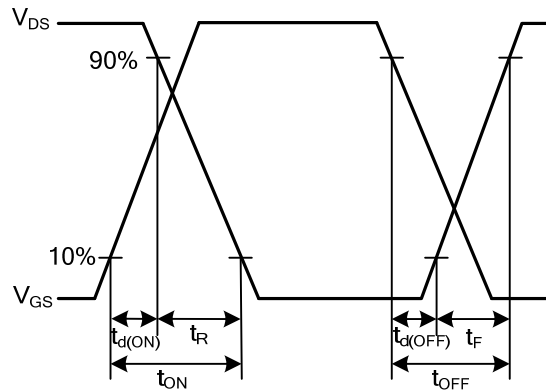
Gate Charge Waveforms



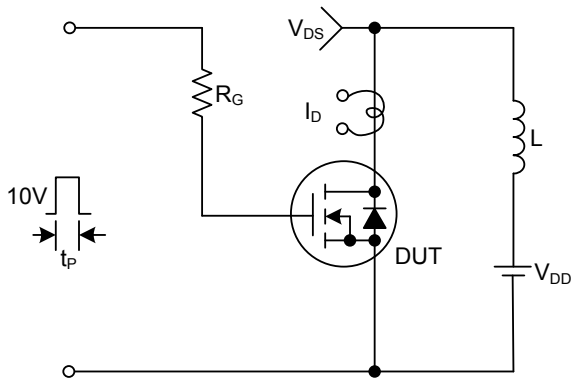
Resistive Switching Test Circuit



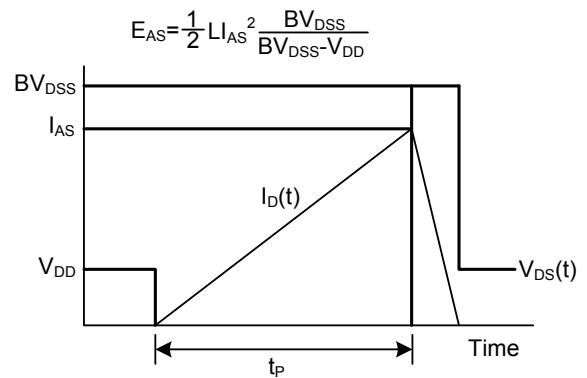
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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