



1N80

Power MOSFET

**1A, 800V N-CHANNEL
POWER MOSFET**

■ **DESCRIPTION**

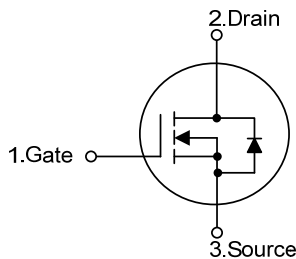
The UTC **1N80** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **1N80** is universally applied in high efficiency switch mode power supply.

■ **FEATURES**

- * $R_{DS(on)}=13.5\Omega @V_{GS}=10V$
- * High switching speed
- * Improved dv/dt capability
- * 100% avalanche tested

■ **SYMBOL**

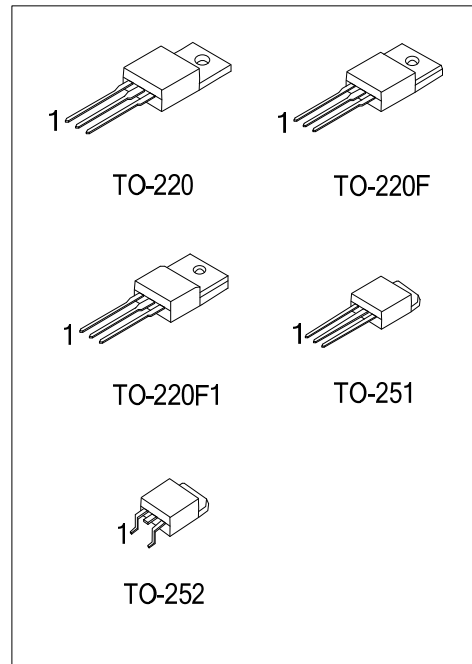


■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1N80L-TA3-T	1N80G-TA3-T	TO-220	G	D	S	Tube
1N80L-TF3-T	1N80G-TF3-T	TO-220F	G	D	S	Tube
1N80L-TF1-T	1N80G-TF1-T	TO-220F1	G	D	S	Tube
1N80L-TM3-T	1N80G-TM3-T	TO-251	G	D	S	Tube
1N80L-TN3-T	1N80G-TN3-T	TO-252	G	D	S	Tube
1N80L-TN3-R	1N80G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>1N80L-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TM3: TO-251, TN3: TO-252 (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}	1.0	A
Drain Current	Continuous	I_D	1.0	A
	Pulsed (Note 1)	I_{DM}	4.0	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	90	mJ
	Repetitive (Note 1)	E_{AR}	4.5	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.0	V/ns
Power Dissipation	TO-220	P_D	39	W
	TO-220F/TO-220F1		23	
	TO-251/TO-252		27	
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^\circ\text{C}$

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

2. $L=170\text{mH}$, $I_{AS}=1.0\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

3. $I_{SD}\leq 1.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

4. 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 DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F/TO-220F1	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		110	
Junction to Case	TO-220	θ_{JC}	3.13	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		5.35	
	TO-251/TO-252		4.53	

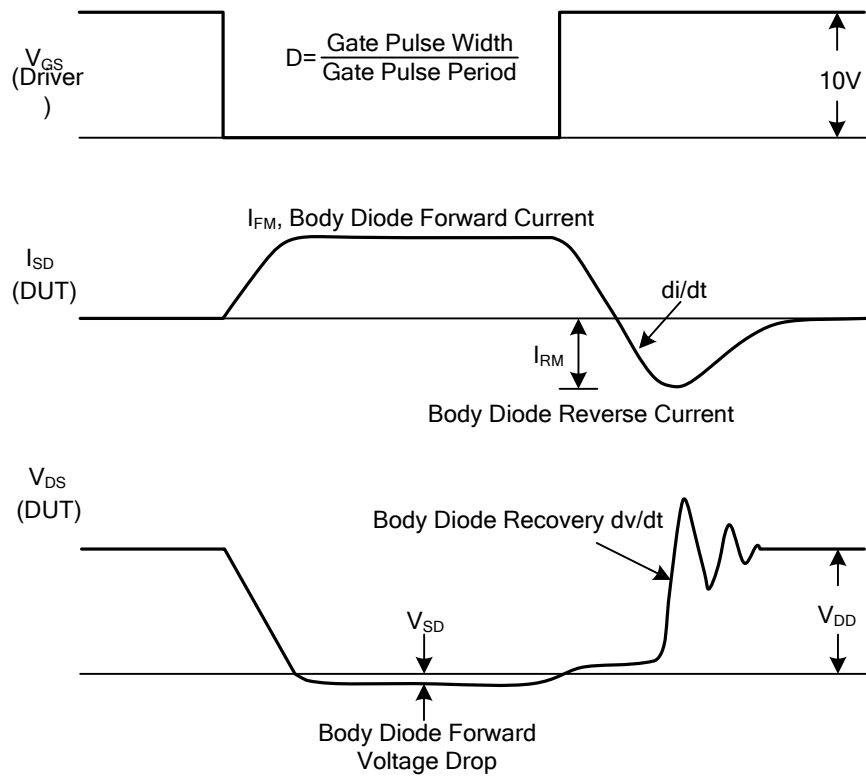
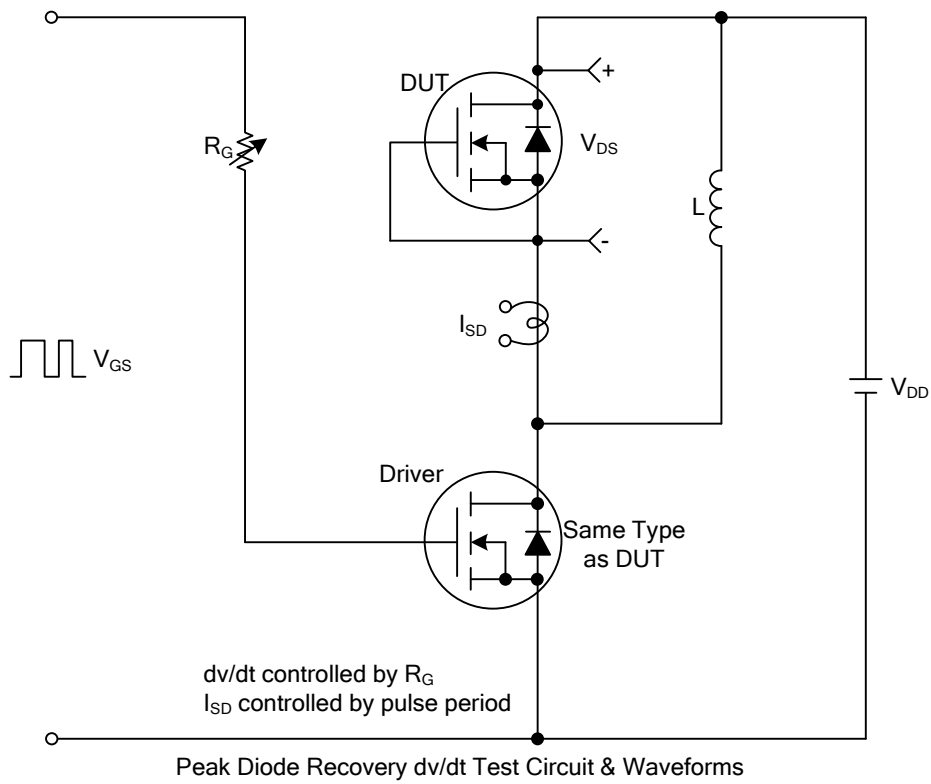
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	800			V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		1.0		V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =800V, V _{GS} =0V			10	μA
		V _{DS} =640V, T _C =125°C			100	μA
Gate-Source Leakage Current	Forward	I _{GSS}			100	nA
	Reverse					
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =0.5A		11	13.5	Ω
Forward Transconductance	g _{FS}	V _{DS} =50V, I _D =0.5A (Note 1)		0.75		S
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		150	195	pF
Output Capacitance	C _{OSS}			20	26	pF
Reverse Transfer Capacitance	C _{RSS}			2.7	3.5	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =640V, V _{GS} =10V, I _D =1.0A (Note 1,2)		5.5	7.2	nC
Gate-Source Charge	Q _{GS}			1.1		nC
Gate-Drain Charge	Q _{GD}			3.3		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =400V, I _D =1.0A, R _G =25Ω (Note 1,2)		10	30	ns
Turn-ON Rise Time	t _R			25	60	ns
Turn-OFF Delay Time	t _{D(OFF)}			15	40	ns
Turn-OFF Fall Time	t _F			25	60	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				1.0	A
Maximum Body-Diode Pulsed Current	I _{SM}				4.0	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =1.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{RR}	V _{GS} =0V, I _S =1.0A, dI _F /dt=100A/μs (Note 1)		300		ns
Body Diode Reverse Recovery Charge	Q _{RR}			0.6		μC

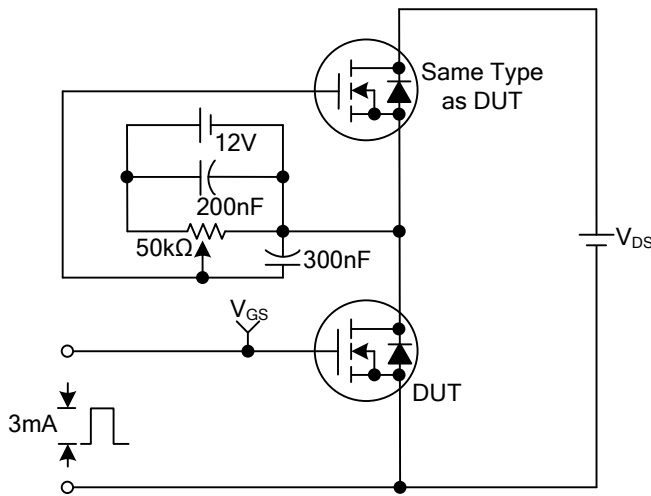
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

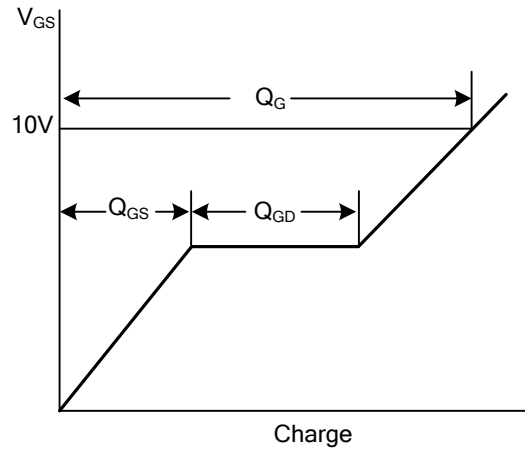
■ TEST CIRCUITS AND WAVEFORMS



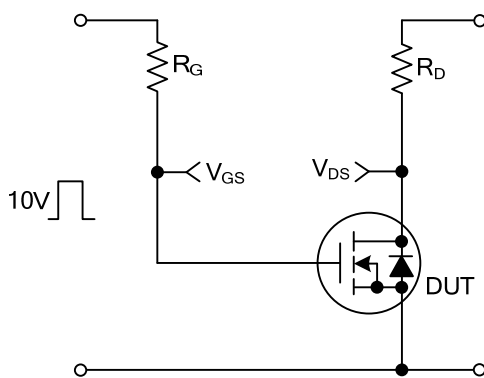
TEST CIRCUITS AND WAVEFORMS(Cont.)



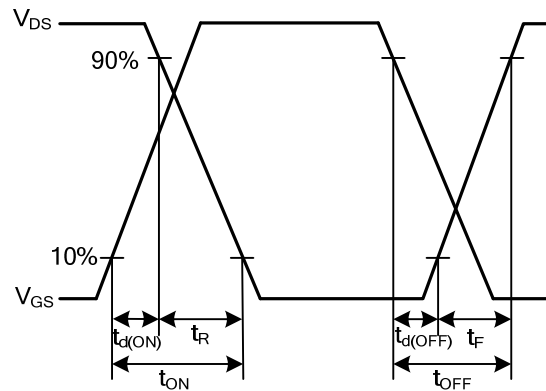
Gate Charge Test Circuit



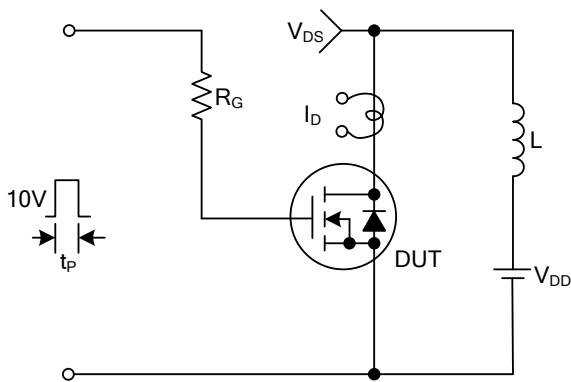
Gate Charge Waveforms



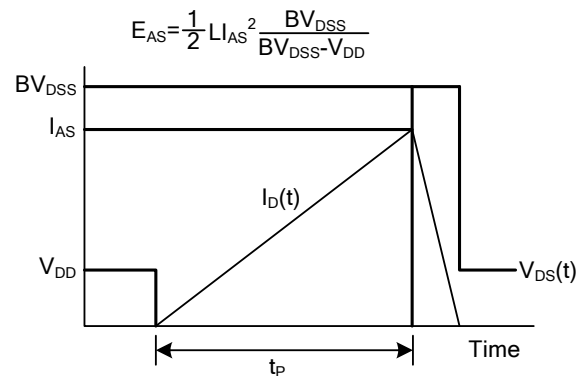
Resistive Switching Test Circuit



Resistive Switching Waveforms

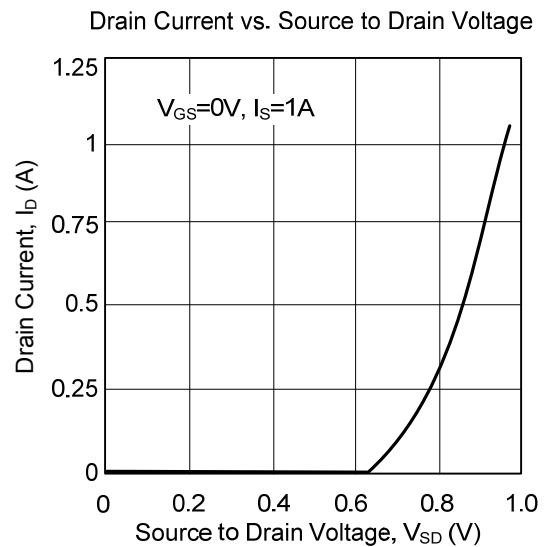
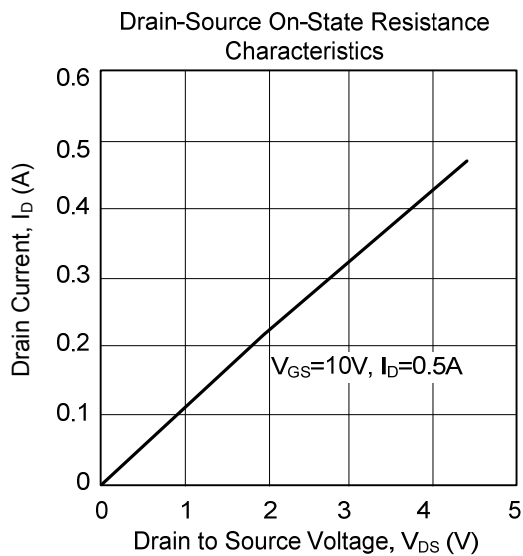
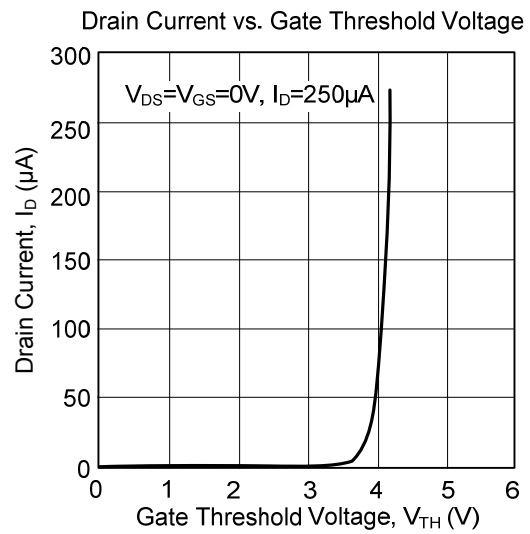
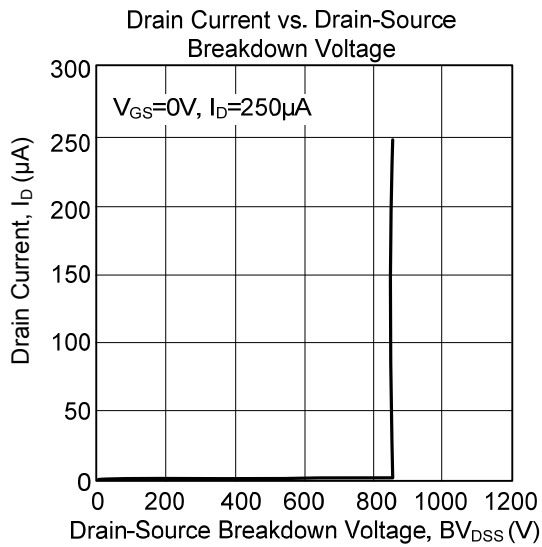


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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