



**7N80**

Preliminary

*Power MOSFET*

**7A, 800V N-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

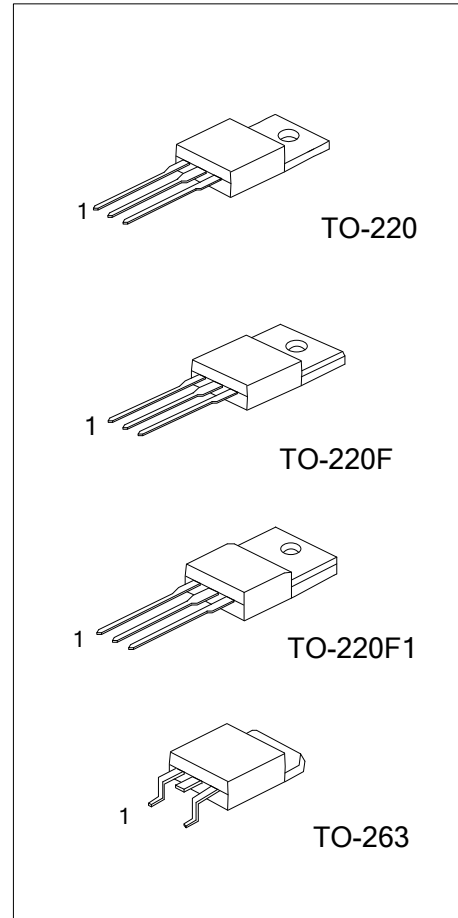
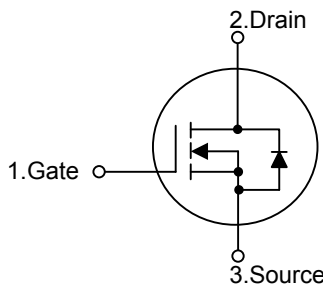
The UTC **7N80** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **7N80** is universally applied in high efficiency switch mode power supply.

■ FEATURES

- \*  $R_{DS(on)}=1.8\Omega@V_{GS}=10V$
- \* High switching speed
- \* 100% avalanche tested

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N80L-TA3-T	7N80G-TA3-T	TO-220	G	D	S	Tube
7N80L-TF3-T	7N80G-TF3-T	TO-220F	G	D	S	Tube
7N80L-TF1-T	7N80G-TF1-T	TO-220F1	G	D	S	Tube
7N80L-TQ2-R	7N80G-TQ2-R	TO-263	G	D	S	Tape Reel
7N80L-TQ2-T	7N80G-TQ2-T	TO-263	G	D	S	Tube

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

<p>7N80L - TA3 - T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F, TQ2: TO-263 (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	$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	7
	Pulsed (Note 1)	$I_{DM}$	26.4
Avalanche Energy	Single Pulsed (Note 2)	$E_{AS}$	580
	Repetitive (Note 1)	$E_{AR}$	16.7
Peak Diode Recovery $dv/dt$ (Note 3)	$dv/dt$	4.5	V/ns
Power Dissipation	TO-220 / TO-263	$P_D$	142
	TO-220F / TO-220F1		48
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.  $L=25\text{mH}$ ,  $I_{AS}=6.6\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

3.  $I_{SD} \leq 8\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , 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	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	$\theta_{JC}$	0.88
	TO-220F / TO-220F1		2.6

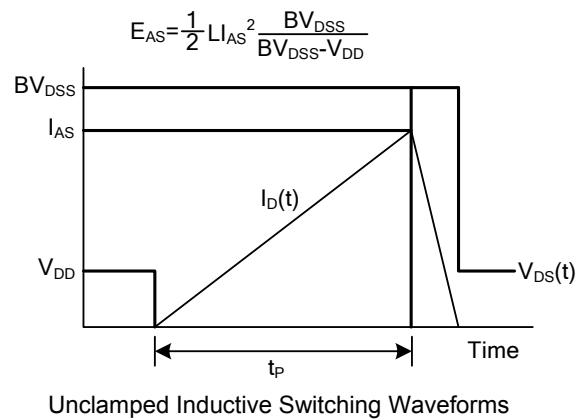
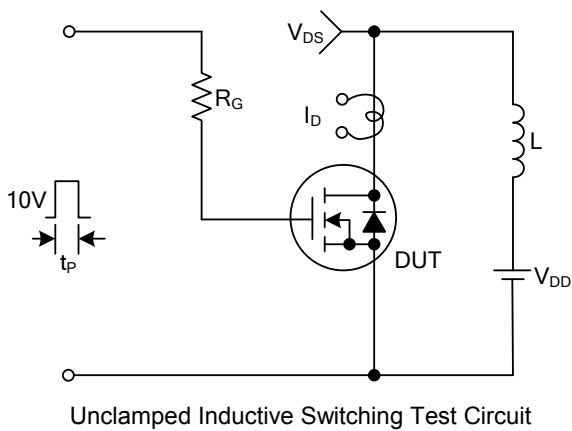
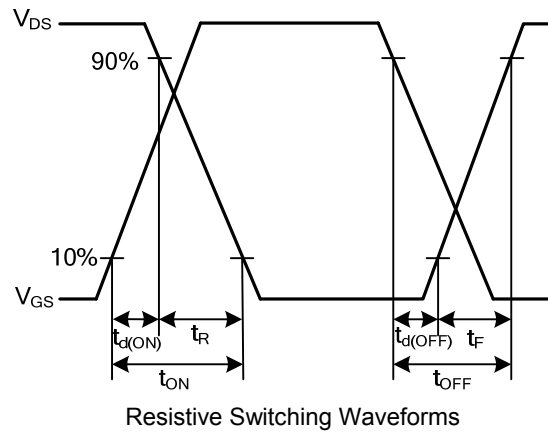
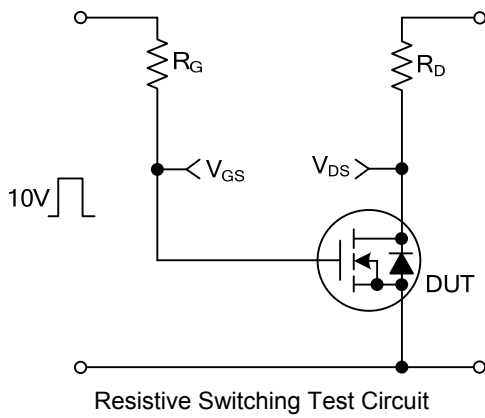
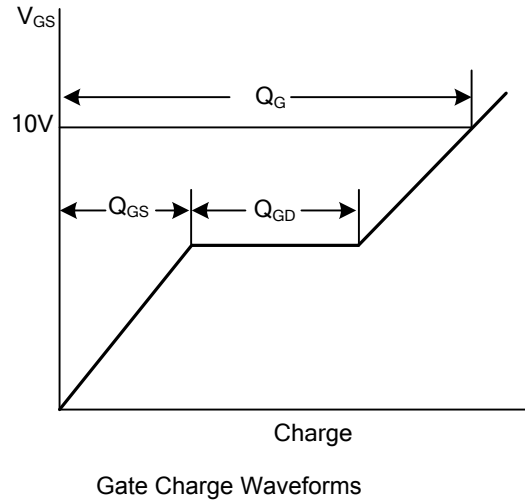
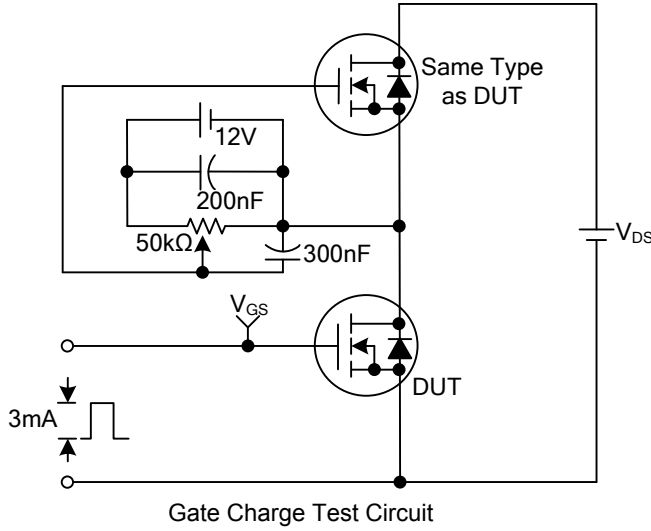
■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	800			V
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA, Referenced to 25°C		0.93		V/°C
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =0V			10	μA
		V <sub>DS</sub> =640V, T <sub>C</sub> =125°C			100	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>				100
	Reverse					
		V <sub>DS</sub> =0V, V <sub>GS</sub> =-30V			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	3.0		5.0	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.3A		1.4	1.8	Ω
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =3.3A (Note 1)		5.5		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		1290	1680	pF
Output Capacitance	C <sub>OSS</sub>			120	155	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			10	13	pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =640V, V <sub>GS</sub> =10V, I <sub>D</sub> =6.6A (Note 1,2)		27	35	nC
Gate-Source Charge	Q <sub>GS</sub>			8.2		nC
Gate-Drain Charge	Q <sub>GD</sub>			11		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =400V, I <sub>D</sub> =6.6A, R <sub>G</sub> =25Ω (Note 1,2)		35	80	ns
Turn-ON Rise Time	t <sub>R</sub>			100	210	ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			50	110	ns
Turn-OFF Fall Time	t <sub>F</sub>			60	130	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				6.6	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				26.4	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =6.6A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =6.6A, dI <sub>F</sub> /dt=100A/μs (Note 1)		650		ns
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>				7.0	

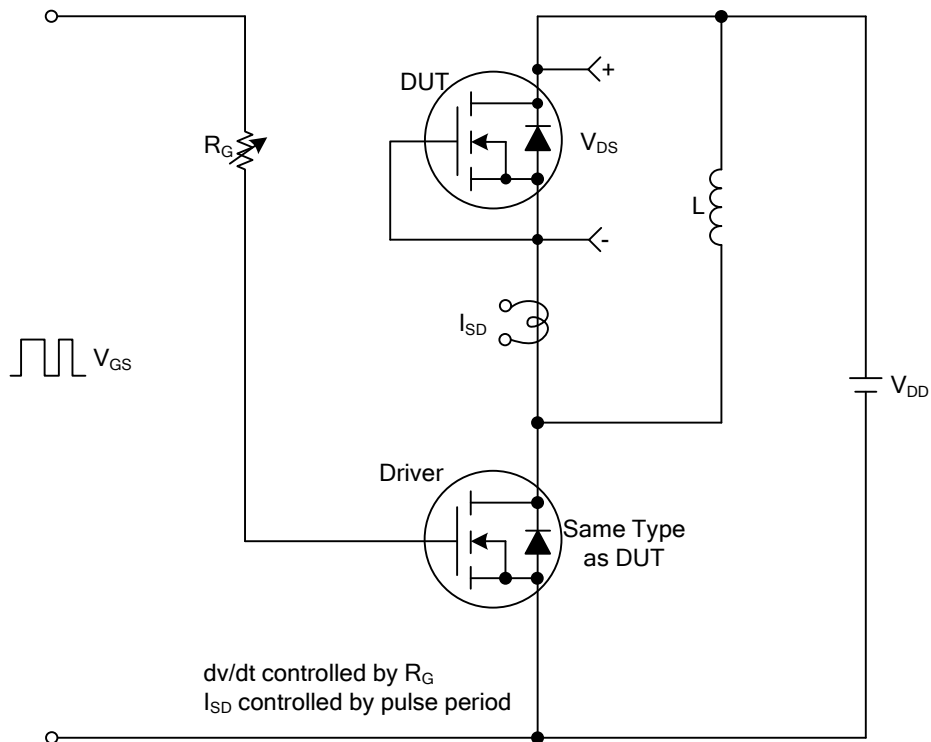
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

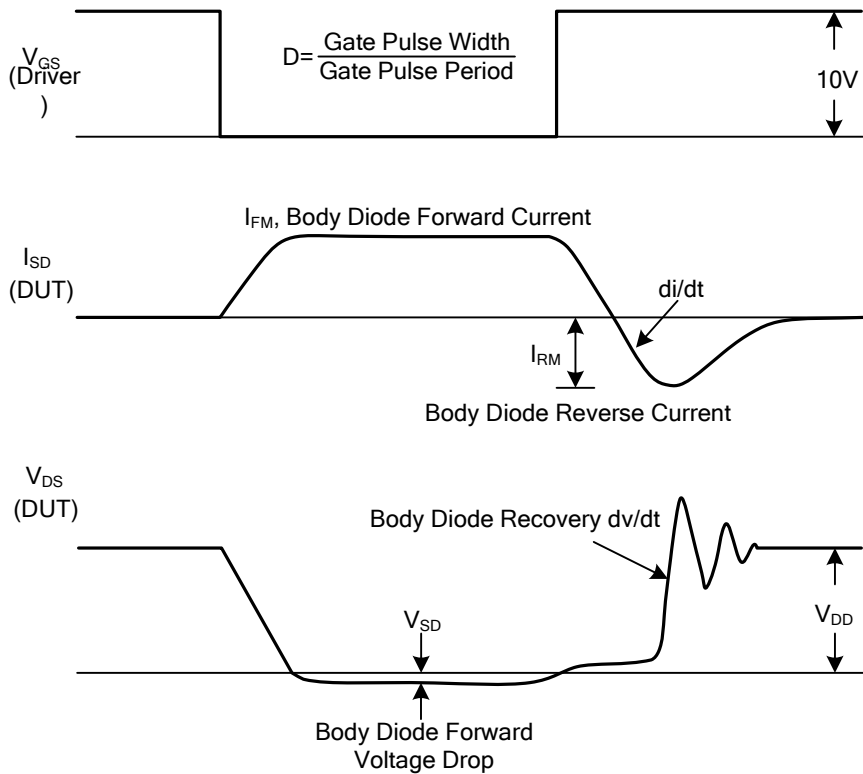
■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit & Waveforms



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