



# 7N80

**Power MOSFET**

## 7.0A, 800V N-CHANNEL POWER MOSFET

■ DESCRIPTION

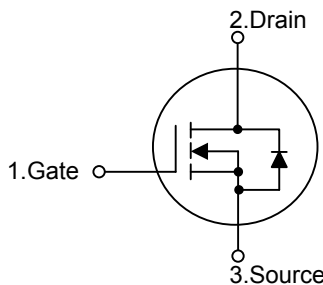
The UTC **7N80** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche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

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

■ FEATURES

- \*  $R_{DS(on)} < 1.5\Omega @ V_{GS}=10V, I_D=3.3A$
- \* High switching speed
- \* 100% avalanche tested

■ SYMBOL

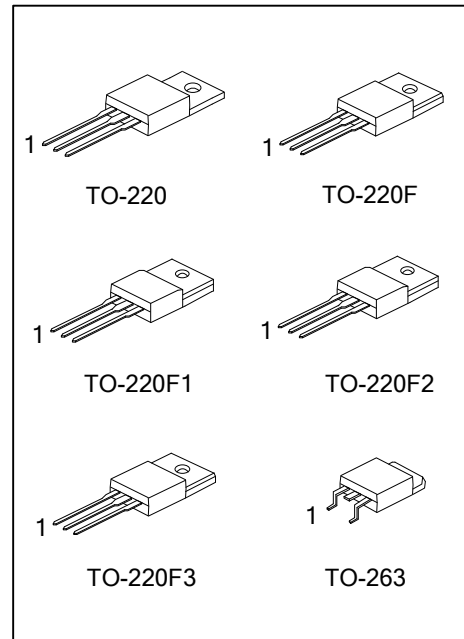


■ ORDERING INFORMATION

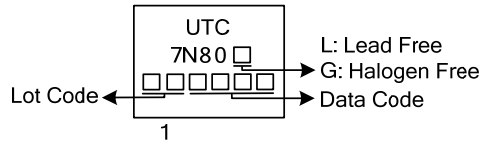
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N80L-TA3-T	7N80G-TA3-T	TO-220	G	D	S	Tube
7N80L-TF3-T	7N80G-TF3-T	TO-220F	G	D	S	Tube
7N80L-TF1-T	7N80G-TF1-T	TO-220F1	G	D	S	Tube
7N80L-TF2-T	7N80G-TF2-T	TO-220F2	G	D	S	Tube
7N80L-TF3T-T	7N80G-TF3T-T	TO-220F3	G	D	S	Tube
7N80L-TQ2-T	7N80G-TQ2-T	TO-263	G	D	S	Tube
7N80L-TQ2-R	7N80G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>7N80L-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel                  (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2                  TF3: TO-220F, TF3T: TO-220F3, TQ2: TO-263                  (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



■ 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	$I_D$	7.0	A
	Pulsed (Note 2)	$I_{DM}$	26.4	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	670	mJ
	Repetitive (Note 2)	$E_{AR}$	16.7	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	4.5	V/ns
Power Dissipation	TO-220 /TO-263	$P_D$	142	W
	TO-220F/ TO-220F1		52	
	TO-220F3		54	
	TO-220F2			
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Notes: 1. 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.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3.  $L=27.5\text{mH}$ ,  $I_{AS}=7\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD} \leq 8\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ 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	$^\circ\text{C}/\text{W}$
	TO-220F/ TO-220F1		2.4	
	TO-220F3			
	TO-220F2		2.31	

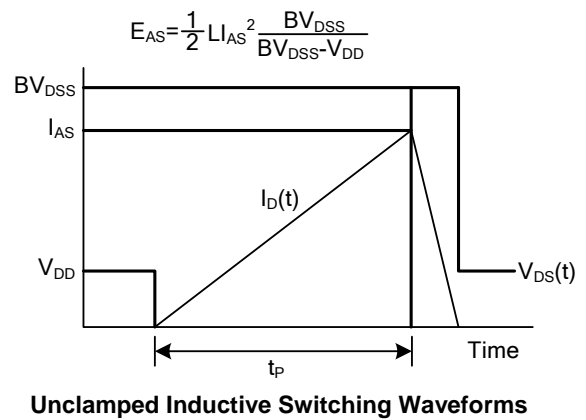
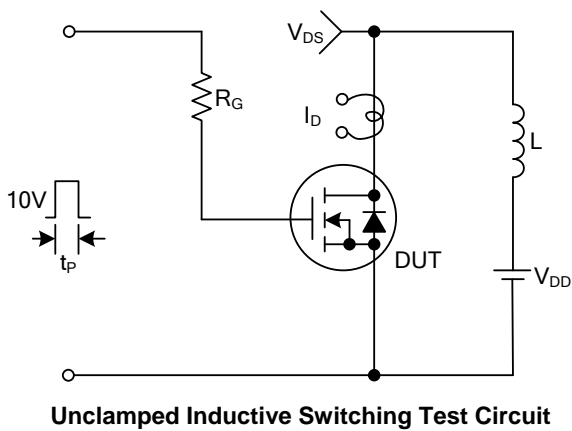
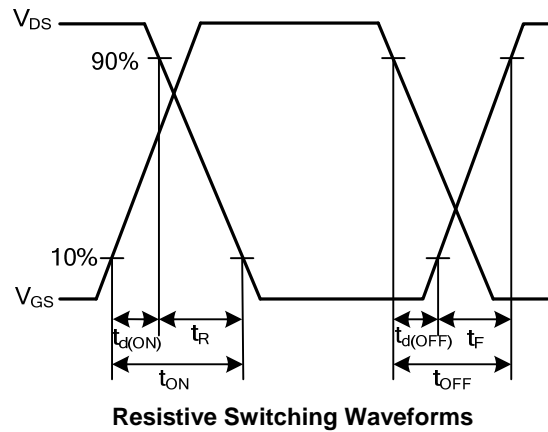
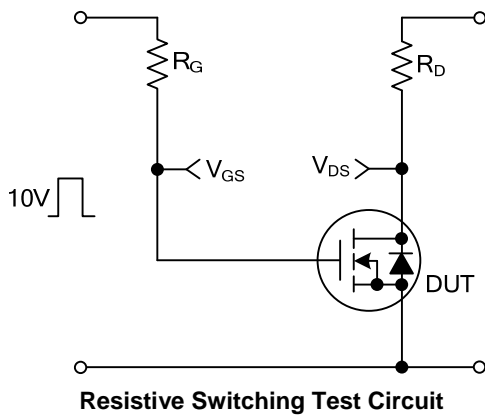
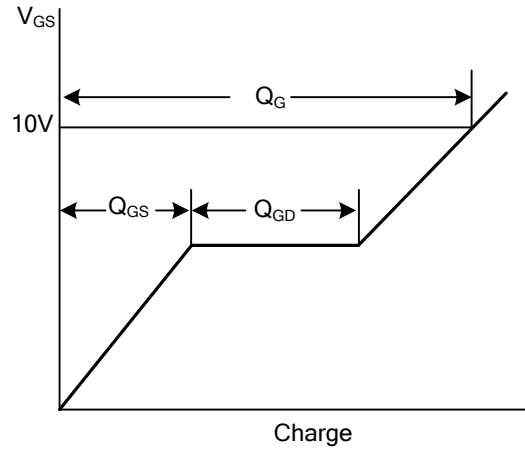
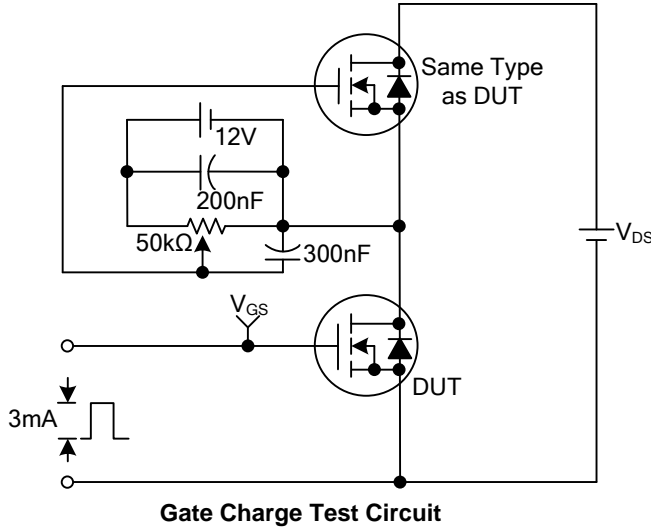
■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise specified)

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
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =800V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	Forward	V <sub>DS</sub> =0V, V <sub>GS</sub> =30V			100	nA
	Reverse		V <sub>DS</sub> =0V, V <sub>GS</sub> =-30V			-100
<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			1.5	Ω
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		1200		pF
Output Capacitance	C <sub>OSS</sub>			120		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			17		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> =120V, V <sub>GS</sub> =10V, I <sub>D</sub> =6.6A I <sub>G</sub> =3.3mA (Note 1,2)		155		nC
Gate-Source Charge	Q <sub>GS</sub>			11		nC
Gate-Drain Charge	Q <sub>GD</sub>			23		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)		65		ns
Turn-ON Rise Time	t <sub>R</sub>			100		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			300		ns
Turn-OFF Fall Time	t <sub>F</sub>			125		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,		650		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/μs (Note 1)		7.0		μC

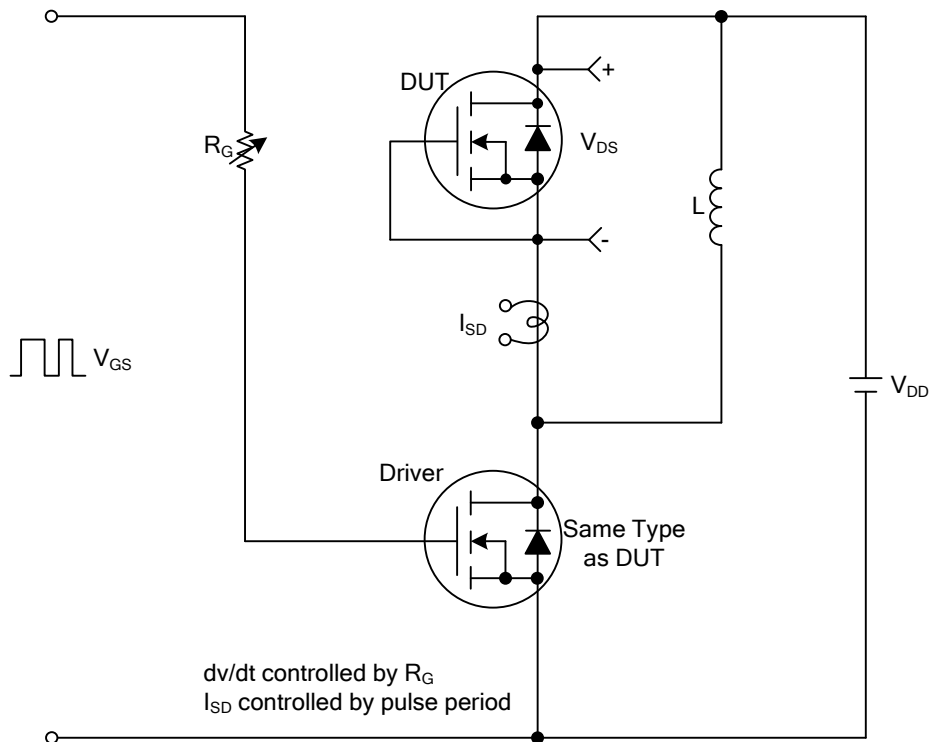
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

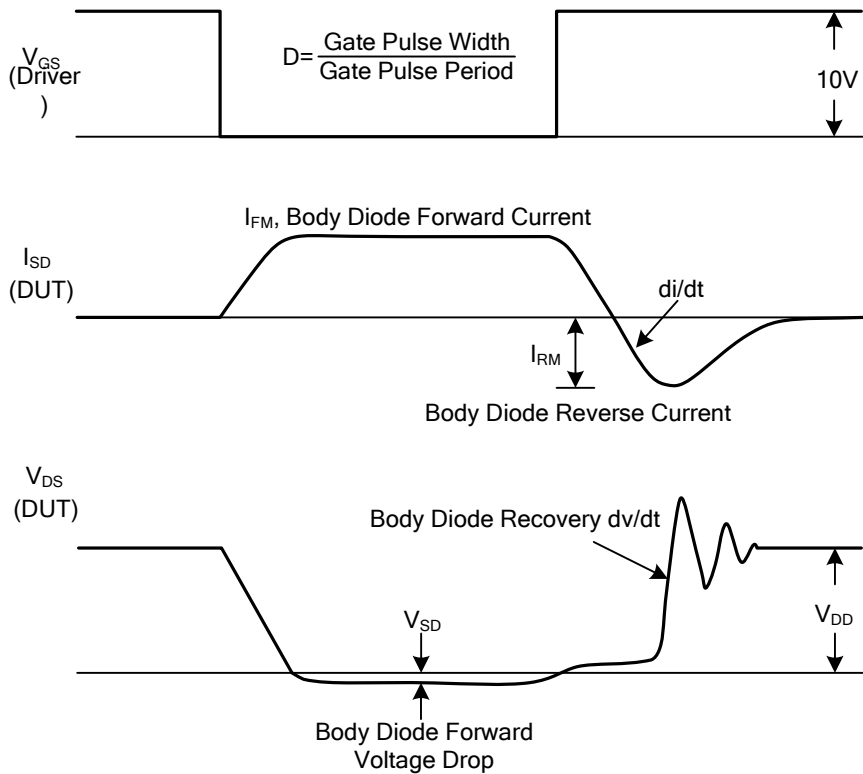
■ TEST CIRCUITS AND WAVEFORMS



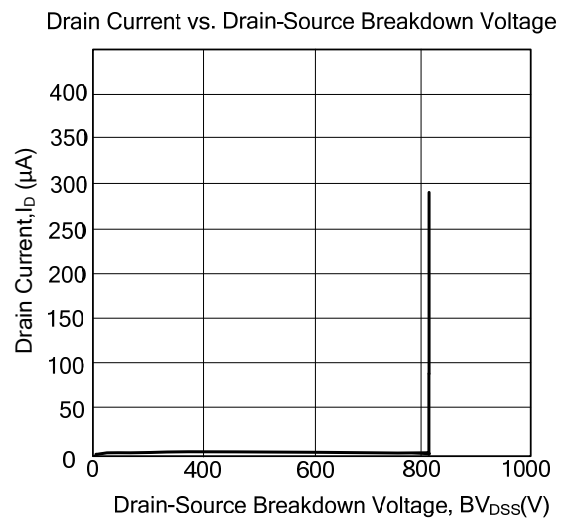
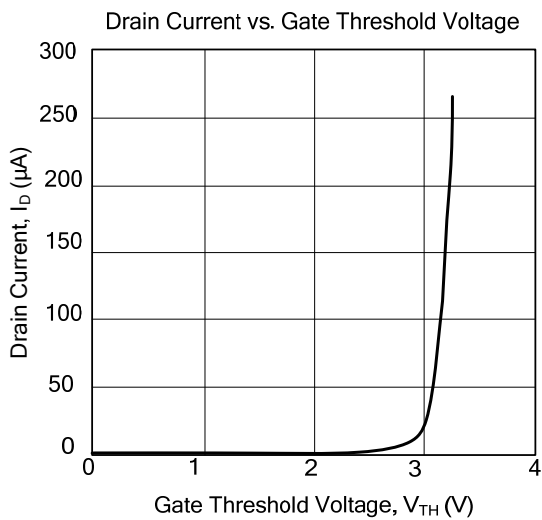
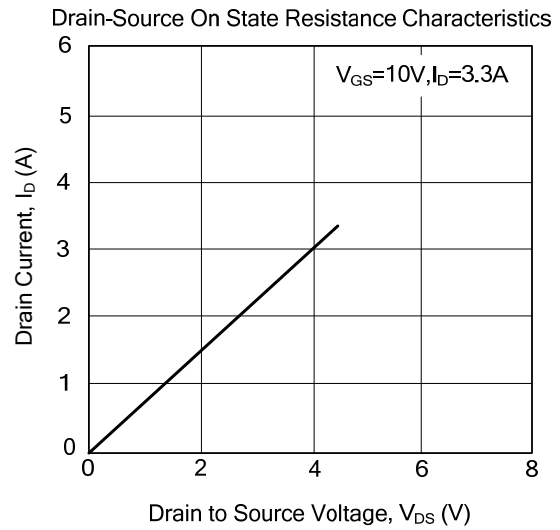
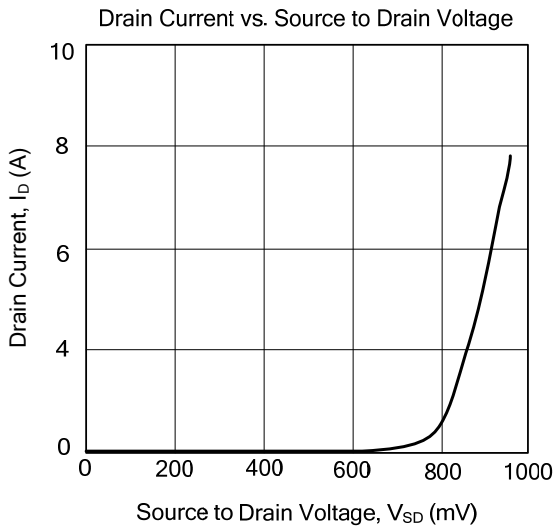
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit & Waveforms



■ TYPICAL CHARACTERISTICS



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