



**7N80**

**Power MOSFET**

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

■ DESCRIPTION

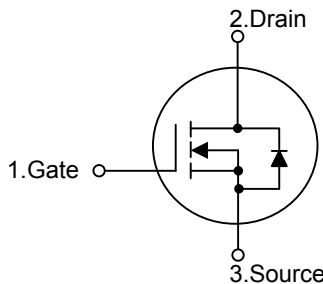
The UTC **7N80** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche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

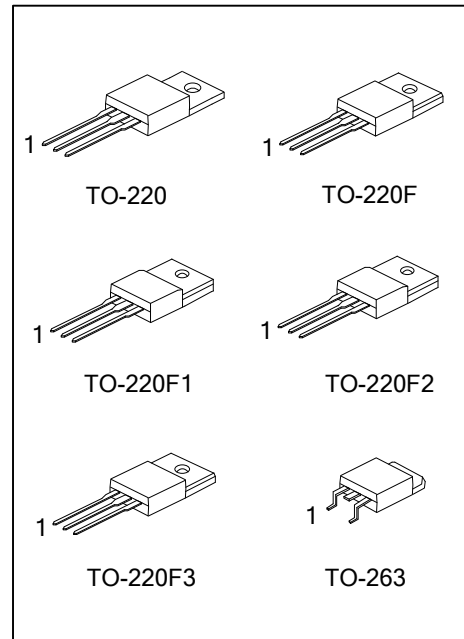


■ ORDERING INFORMATION

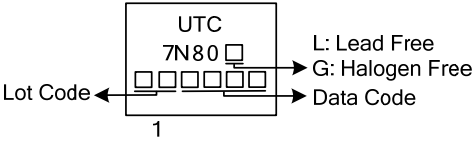
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N80L-TA3-T	7N80G-TA3-T	TO-220	G	D	S	Tube
7N80L-TF3-T	7N80G-TF3-T	TO-220F	G	D	S	Tube
7N80L-TF1-T	7N80G-TF1-T	TO-220F1	G	D	S	Tube
7N80L-TF2-T	7N80G-TF2-T	TO-220F2	G	D	S	Tube
7N80L-TF3T-T	7N80G-TF3T-T	TO-220F3	G	D	S	Tube
7N80L-TQ2-T	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) Packing Type (2) Package Type (3) Lead Free</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</p>
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■ MARKING INFORMATION

PACKAGE	MARKING
TO-220 TO-220F TO-220F1 TO-220F2 TO-220F3 TO-263	 <p>             UTC              7N80              Lot Code ← □ □ □ □ □ → Data Code              L: Lead Free              G: Halogen Free              1           </p>

■ 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	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	

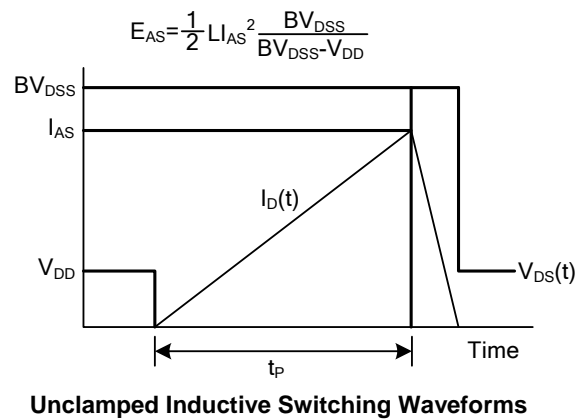
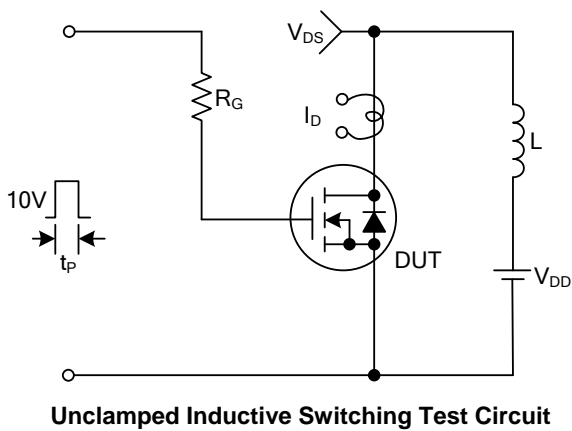
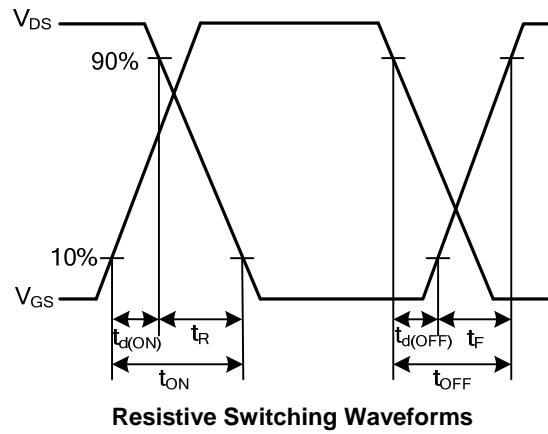
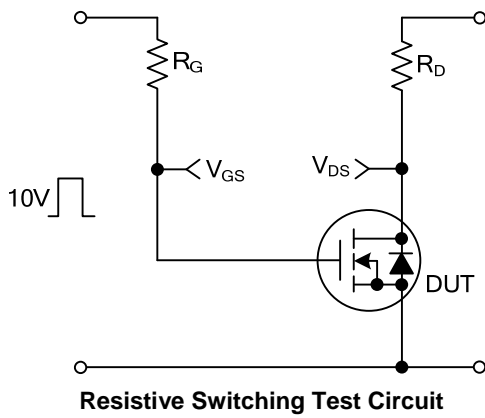
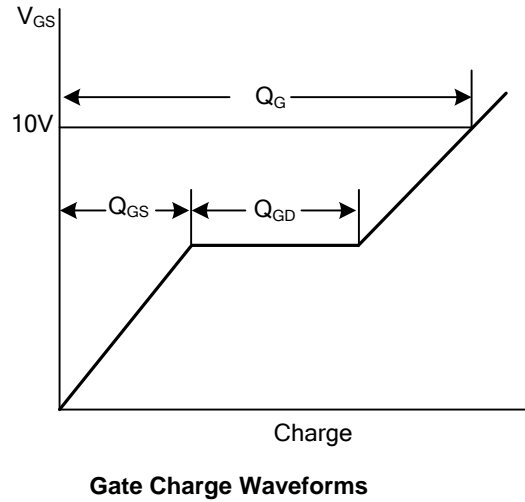
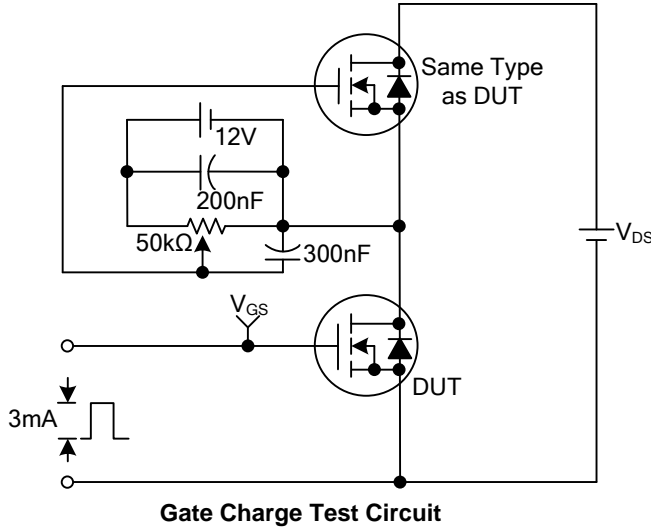
■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise specified)

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
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	V <sub>DS</sub> =0V, V <sub>GS</sub> =30V			100	nA
	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		1.3	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		1200	1680	pF
Output Capacitance	C <sub>OSS</sub>			120	155	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			17	22	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	160	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	80	ns
Turn-ON Rise Time	t <sub>R</sub>			100	140	ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			300	320	ns
Turn-OFF Fall Time	t <sub>F</sub>			125	150	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

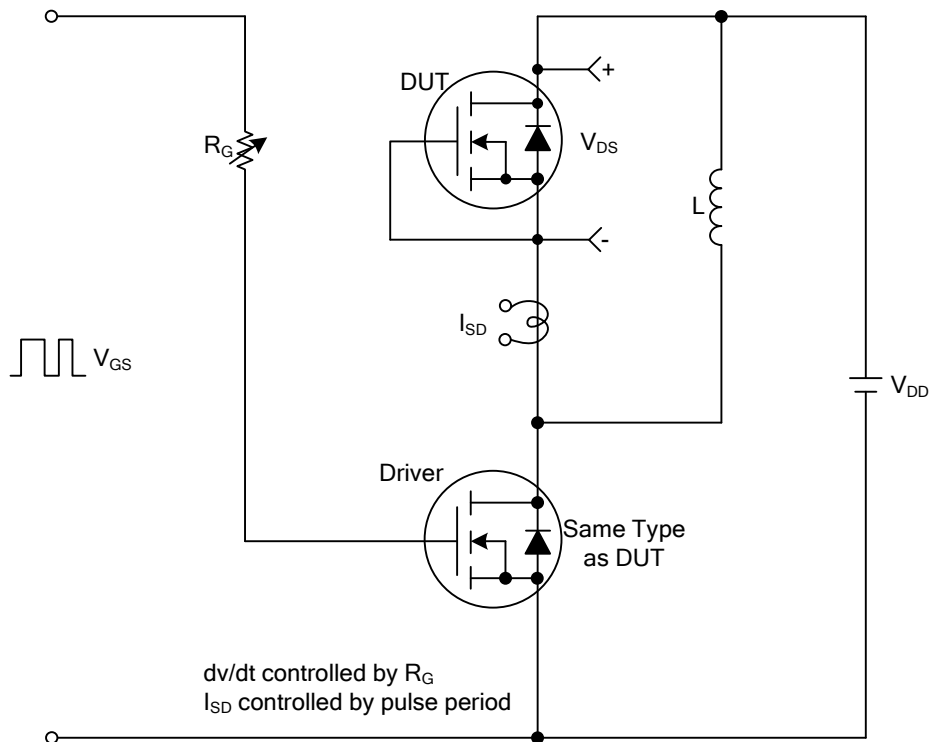
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

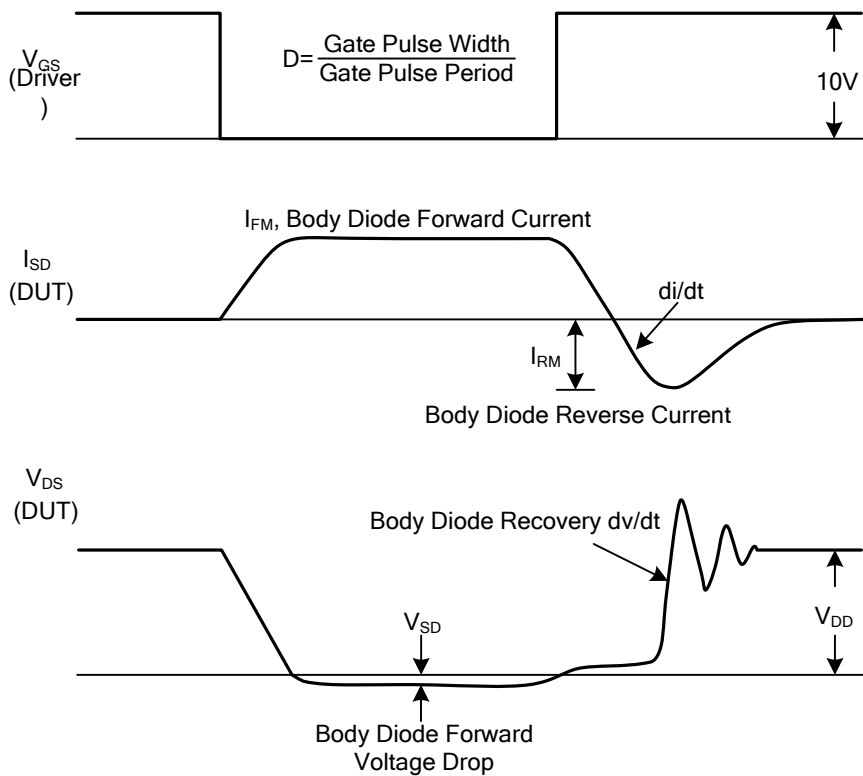
■ TEST CIRCUITS AND WAVEFORMS



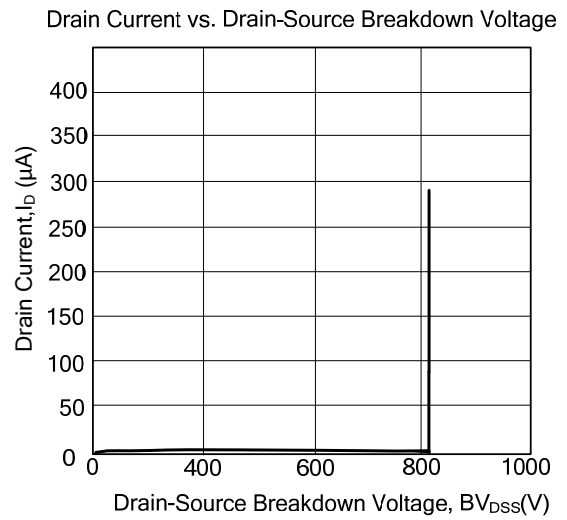
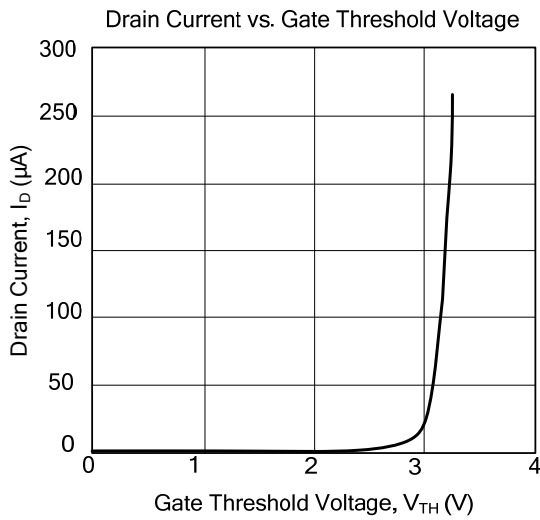
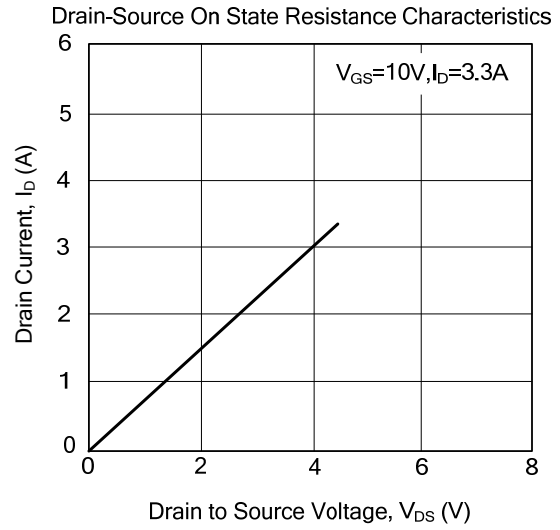
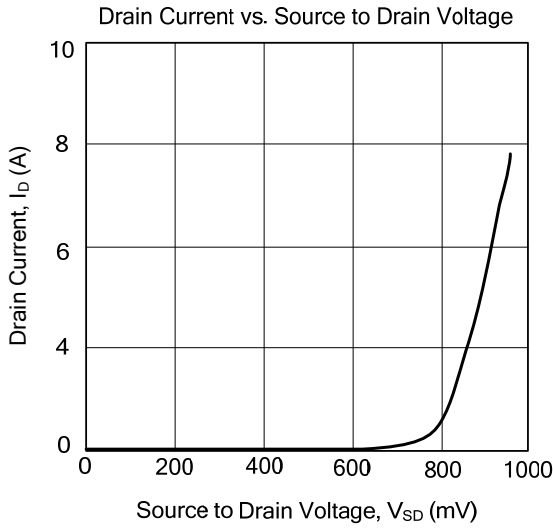
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit & Waveforms



■ TYPICAL CHARACTERISTICS



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