

**7N80**

Preliminary

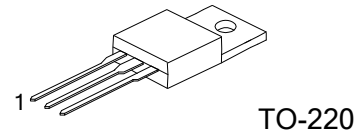
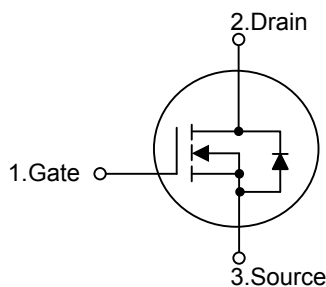
Power MOSFET**7.0 Amps, 800 Volts
N-CHANNEL POWER MOSFET****DESCRIPTION**

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.

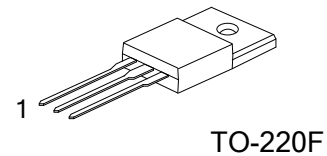
The UTC **7N80** is universally applied in high efficiency switch mode power supply.

FEATURES

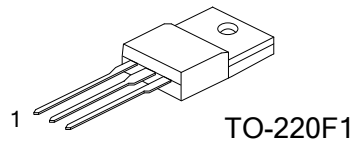
- * 7A, 800V, $R_{DS(on)}=1.9\Omega@V_{GS}=10V$
- * High switching speed
- * 100% avalanche tested

SYMBOL

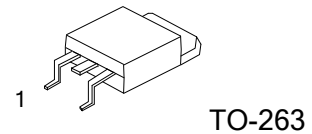
TO-220



TO-220F



TO-220F1



TO-263

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

7N80L - TA3 - T (1) Packing Type (2) Package Type (3) Lead Free	(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
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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
Drain Current	Continuous	I_D	7	A
	Pulsed (Note 1)	I_{DM}	26.4	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	580	mJ
	Repetitive (Note 1)	E_{AR}	16.7	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Power Dissipation	TO-220 /TO-263	P_D	142	W
	TO-220F/ TO-220F1		48	W
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.

* Drain current limited by maximum junction temperature.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-220F /TO-220F1		62.5	$^{\circ}\text{C/W}$
Junction to Case	TO-220/TO-263	θ_{JC}	0.88	$^{\circ}\text{C/W}$
	TO-220F / TO-220F1		2.6	$^{\circ}\text{C/W}$

■ 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}	V _{GS} =0V, I _D =250μA	800			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.93		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}	V _{DS} =0V , V _{GS} =30V			100	nA
	Reverse		V _{DS} =0V , V _{GS} =-30V			-100	nA
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 =3.3A		1.4	1.9	Ω
Forward Transconductance		g _{FS}	V _{DS} =50V, I _D =3.3A (Note 4)		5.5		S
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1290	1680	pF
Output Capacitance		C _{OSS}			120	155	pF
Reverse Transfer Capacitance		C _{RSS}			10	13	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =640V, V _{GS} =10V, I _D =6.6A (Note 4,5)		27	35	nC
Gate-Source Charge		Q _{GS}			8.2		nC
Gate-Drain Charge		Q _{GD}			11		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =400V, I _D =6.6A, R _G =25Ω (Note 4,5)		35	80	ns
Turn-ON Rise Time		t _R			100	210	ns
Turn-OFF Delay Time		t _{D(OFF)}			50	110	ns
Turn-OFF Fall Time		t _F			60	130	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				6.6	A
Maximum Body-Diode Pulsed Current		I _{SM}				26.4	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S = 6.6A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{RR}	V _{GS} =0V, I _S =6.6A,		650		ns
Body Diode Reverse Recovery Charge		Q _{RR}	dl _F /dt=100A/μs (Note 4)		7.0		μC

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

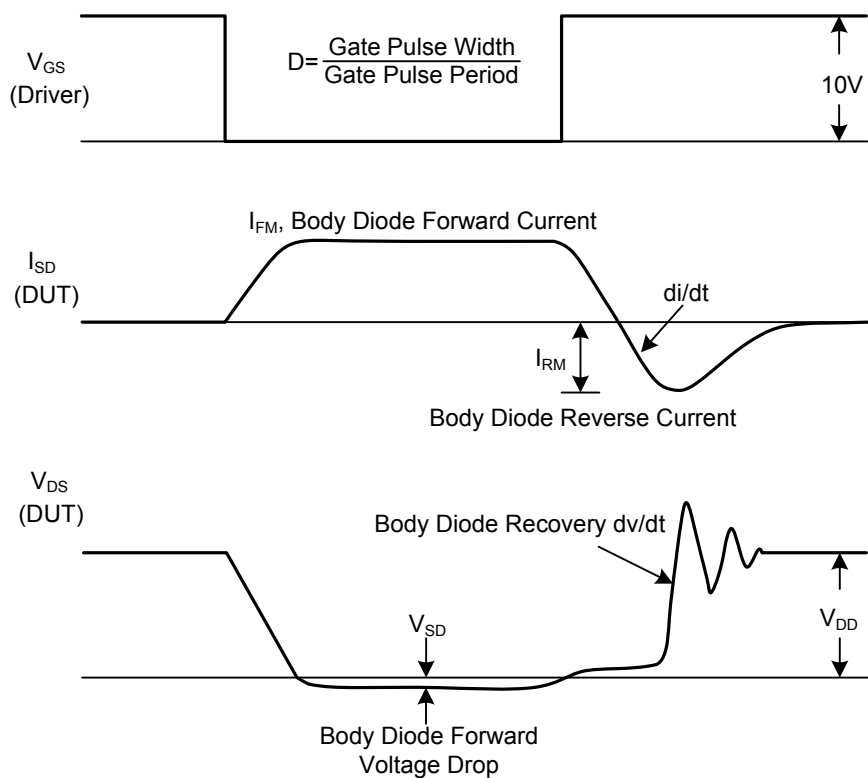
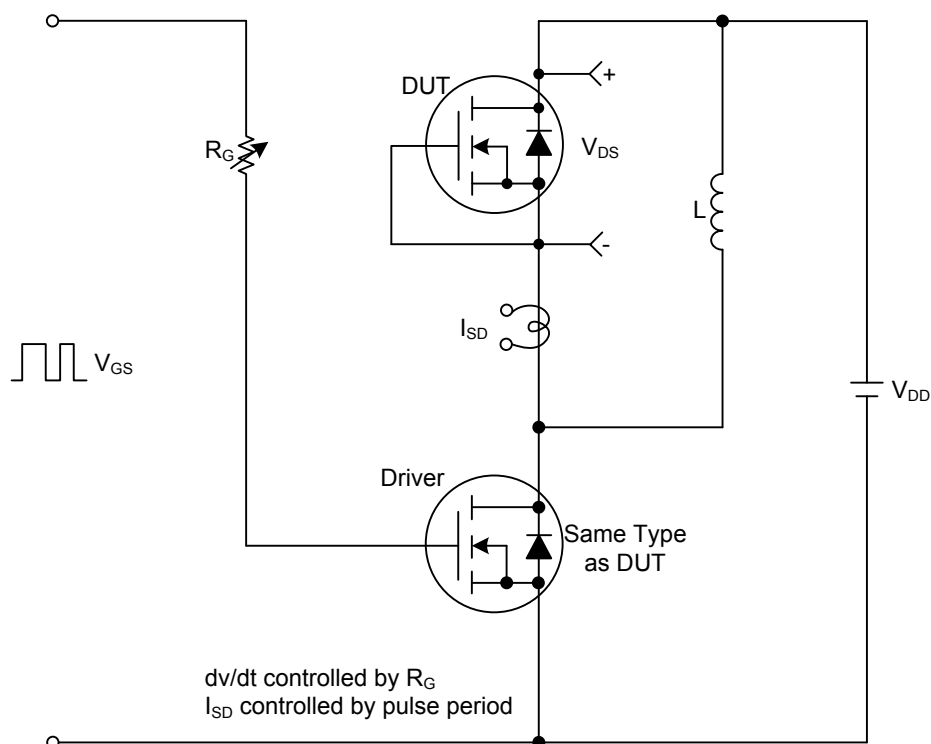
2. $L=25\text{mH}$, $I_{AS}=6.6A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

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

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

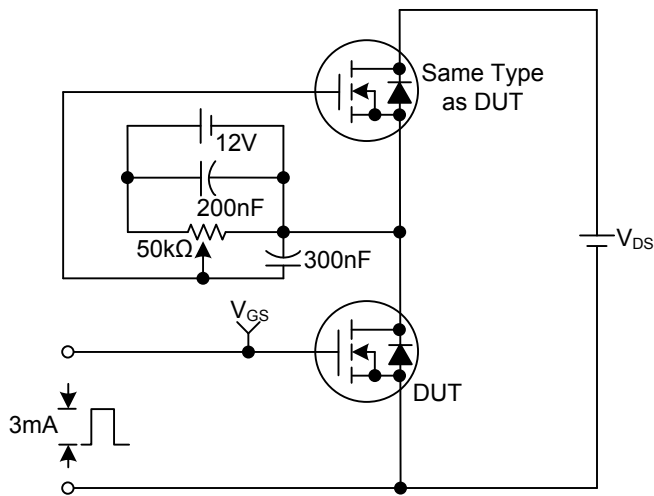
5. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

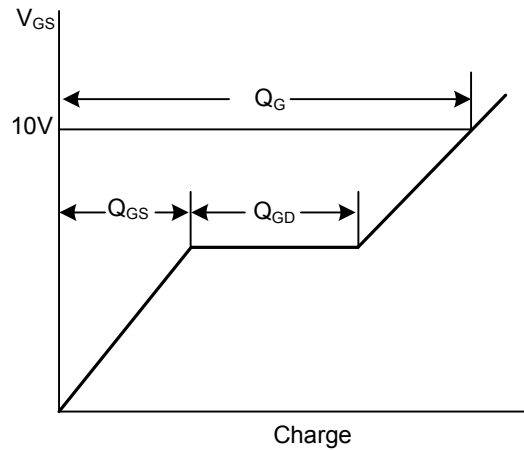
Peak Diode Recovery dv/dt Test Circuit & Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)

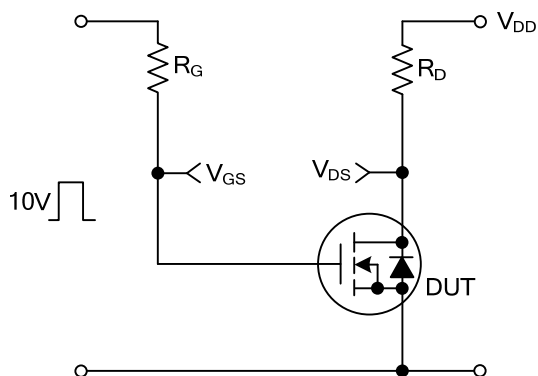
Gate Charge Test Circuit



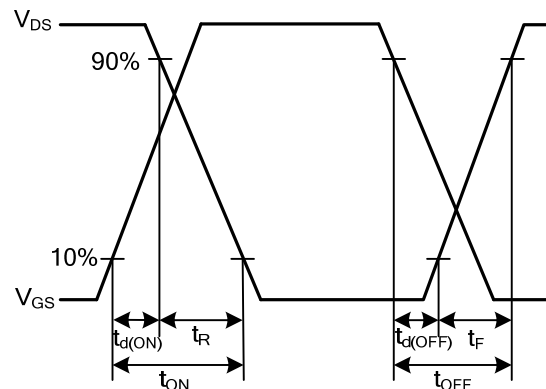
Gate Charge Waveforms



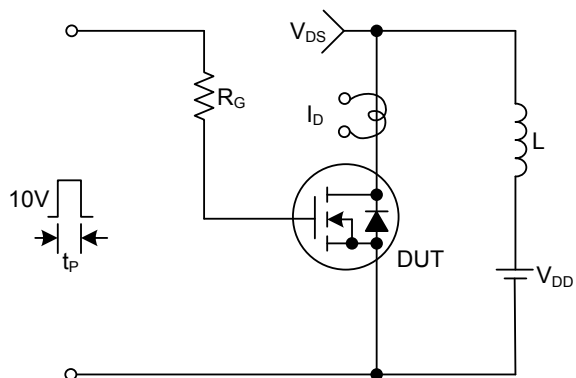
Resistive Switching Test Circuit



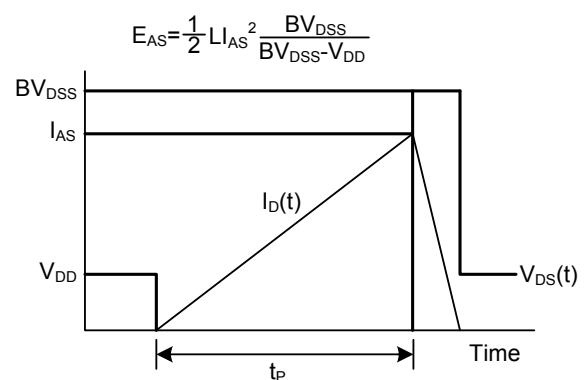
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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