



## 12N80

Power MOSFET

### 12A, 800V N-CHANNEL POWER MOSFET

#### DESCRIPTION

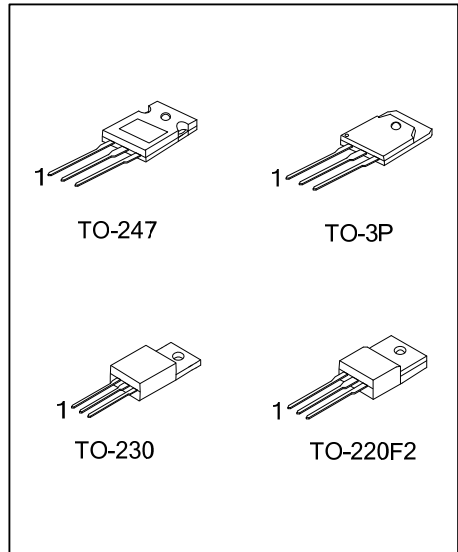
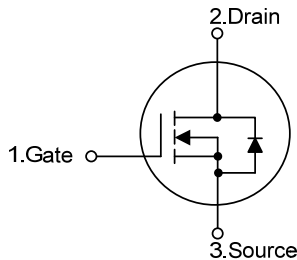
The UTC **12N80** is an N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **12N80** is universally applied in high efficiency switch mode power supply.

#### FEATURES

- \*  $R_{DS(on)} < 1.0 \Omega @ V_{GS}=10V$
- \* High switching speed
- \* Improved dv/dt capability
- \* 100% avalanche tested

#### SYMBOL



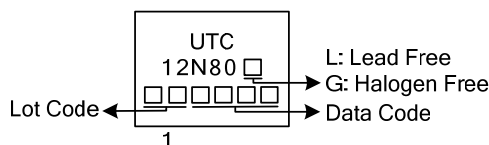
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
12N80L-T47-T	12N80G-T47-T	TO-247	G	D	S	Tube
12N80L-T3P-T	12N80G-T3P-T	TO-3P	G	D	S	Tube
12N80L-TC3-T	12N80G-TC3-T	TO-230	G	D	S	Tube
12N80L-TF2-T	12N80G-TF2-T	TO-220F2	G	D	S	Tube

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

<p>12N80L-T47-T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) T: Tube (2) T47: TO-247, T3P: TO-3P, TC3: TO-230, TF2: TO-220F2 (3) L: Lead Free, G: Halogen 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 ( $T_C=25^\circ\text{C}$ )	$I_D$	12	A
	Pulsed (Note 2)	$I_{DM}$	48	A
Avalanche Current (Note 2)		$I_{AR}$	12	A
Power Dissipation	TO-247	$P_D$	360	W
	TO-3P		390	W
	TO-230		167	W
	TO-220F2		51	W
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.

■ THERMAL DATA

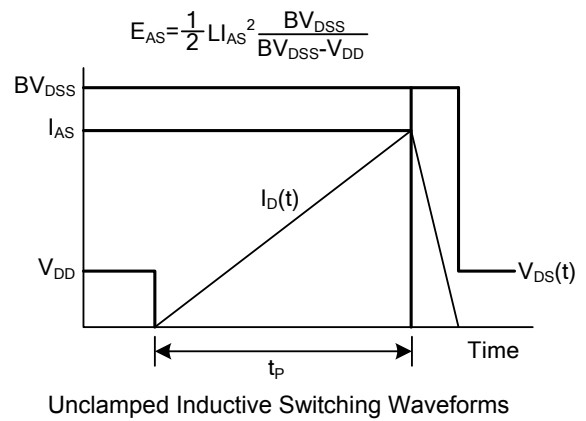
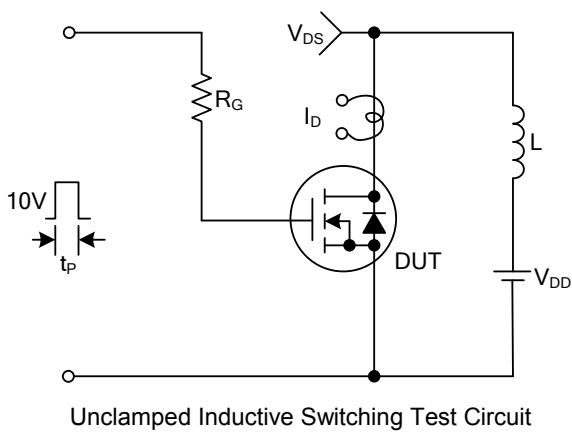
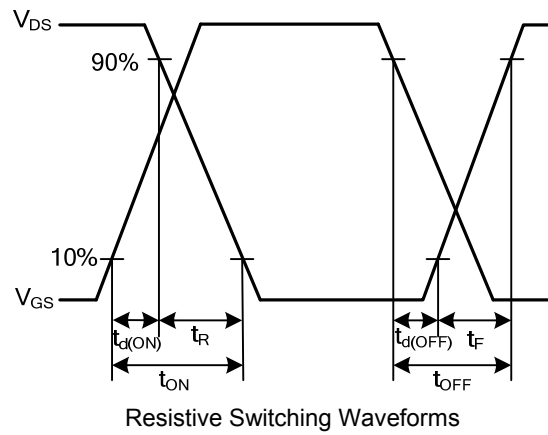
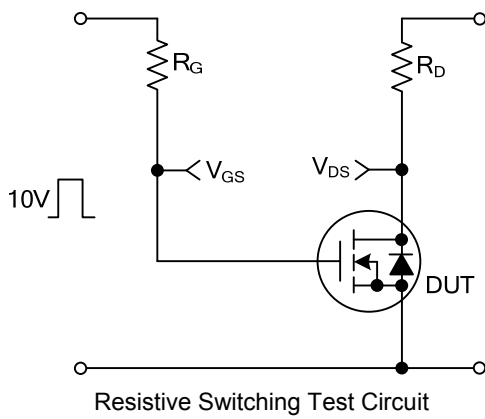
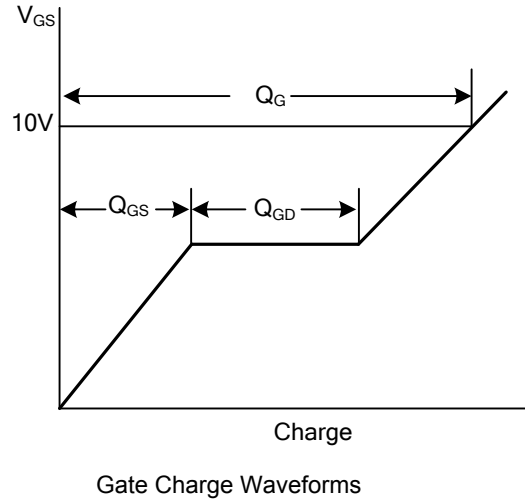
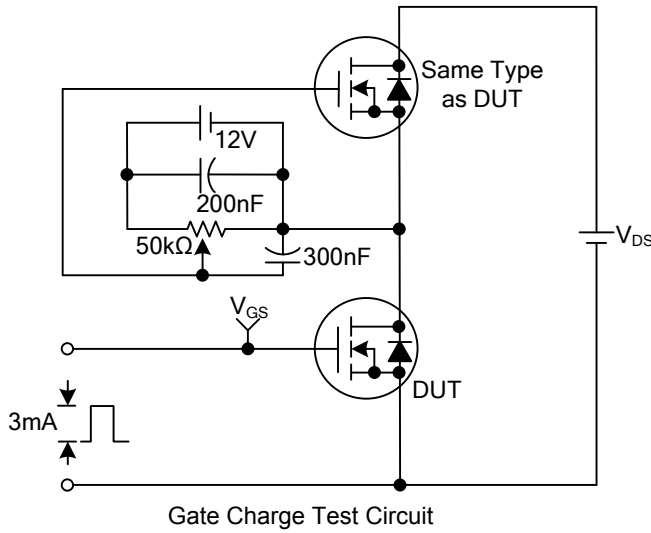
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-247	$\theta_{JA}$	50	$^\circ\text{C/W}$
	TO-3P		40	$^\circ\text{C/W}$
	TO-220F2/TO-230		62.5	$^\circ\text{C/W}$
Junction to Case	TO-247	$\theta_{JC}$	0.35	$^\circ\text{C/W}$
	TO-3P		0.32	$^\circ\text{C/W}$
	TO-230		0.75	$^\circ\text{C/W}$
	TO-220F2		2.43	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

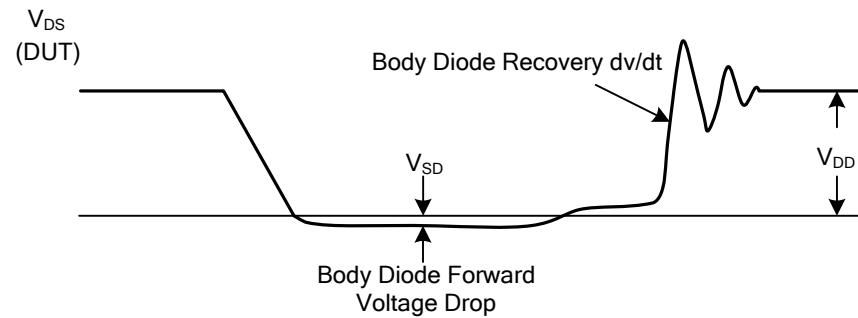
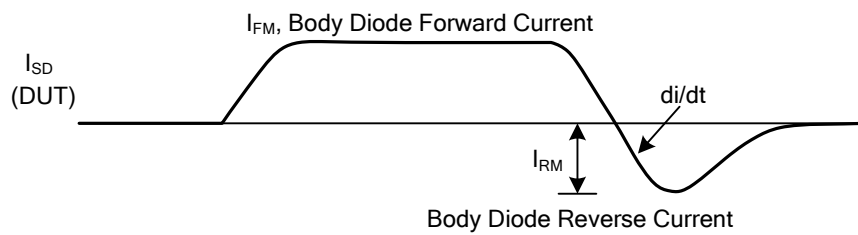
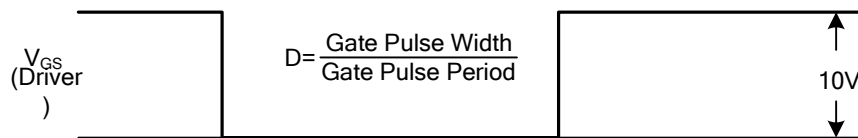
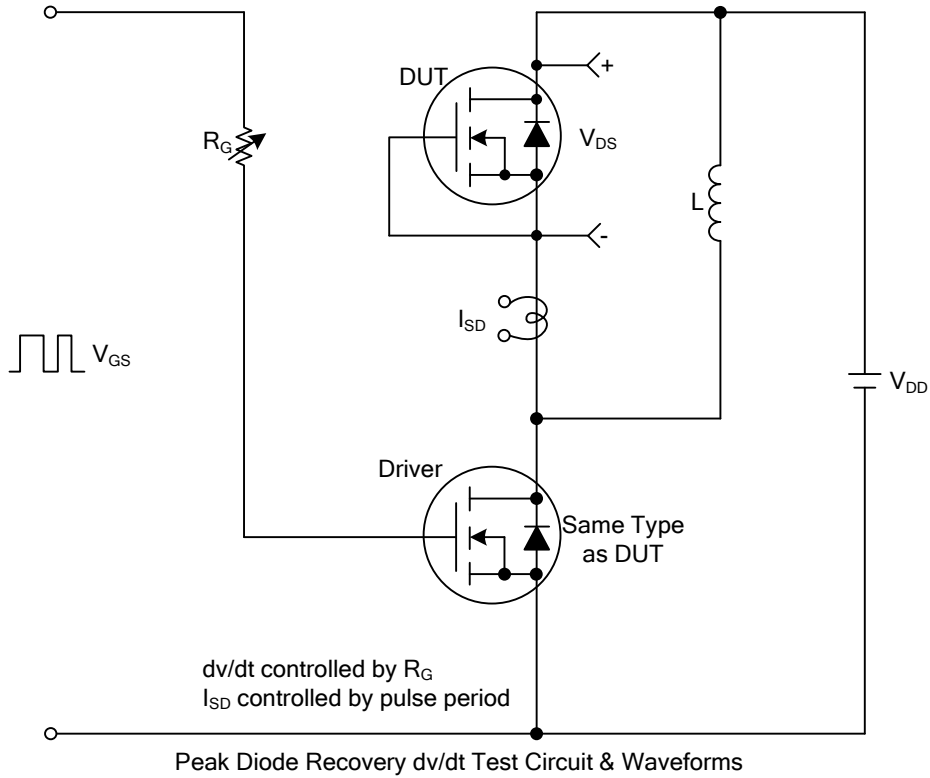
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	800			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$ , Referenced to $25^\circ\text{C}$		1.0		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=800\text{V}, V_{GS}=0\text{V}$			10	$\mu\text{A}$
		$V_{DS}=640\text{V}, T_C=125^\circ\text{C}$			100	
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}, V_{DS}=0\text{V}$			100	nA
	Reverse	$V_{GS}=-30\text{V}, V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=6\text{A}$		0.75	1.0	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		4200		pF
Output Capacitance	$C_{OSS}$			315		pF
Reverse Transfer Capacitance	$C_{RSS}$			90		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}, V_{DS}=640\text{V}, I_D=12\text{A}$ (Note 1, 2)		123	155	nC
Gate to Source Charge	$Q_{GS}$			27	45	nC
Gate to Drain Charge	$Q_{GD}$			49	80	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=400\text{V}, I_D=12\text{A}, R_G=25\Omega$ (Note 1, 2)		100	120	ns
Rise Time	$t_R$			198	220	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			340	360	ns
Fall-Time	$t_F$			180	200	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				12	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				48	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=12\text{A}, V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time	$t_{rr}$	$V_{GS}=0\text{V}, I_S=12\text{A}, dI_F/dt=100\text{A}/\mu\text{s}$		1000		ns
Body Diode Reverse Recovery Charge	$Q_{RR}$	(Note 1)		17.0		$\mu\text{C}$

Note: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$   
 2. Essentially independent of operating temperature

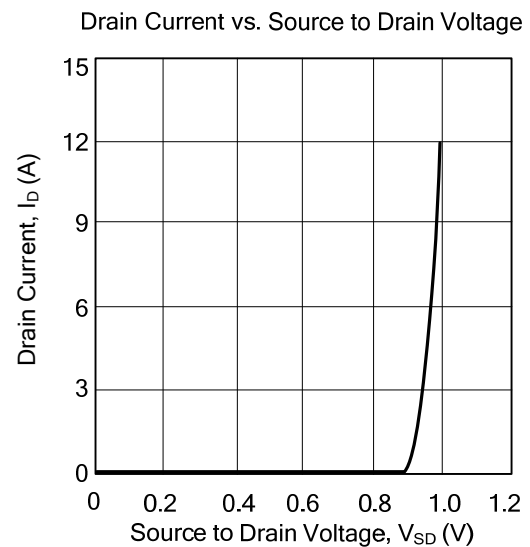
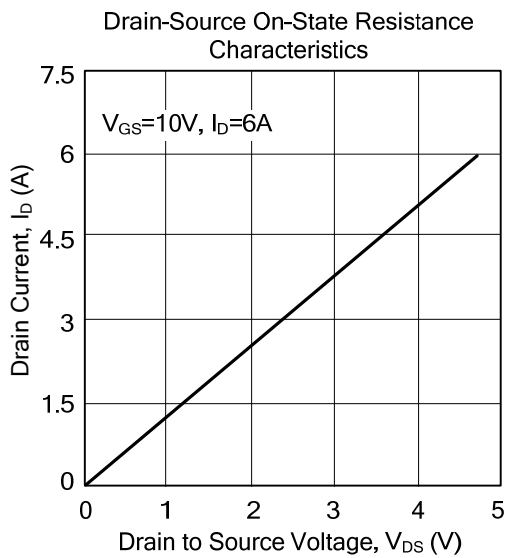
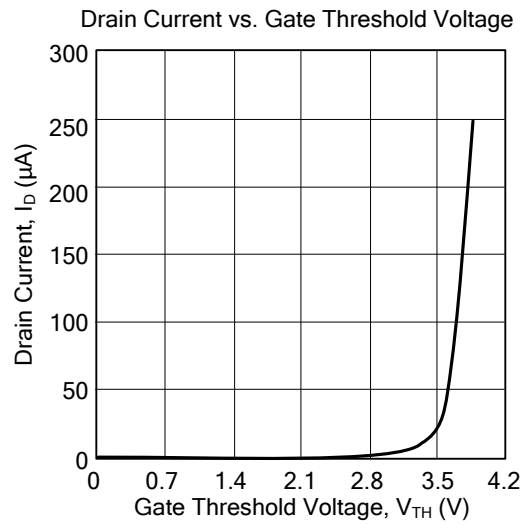
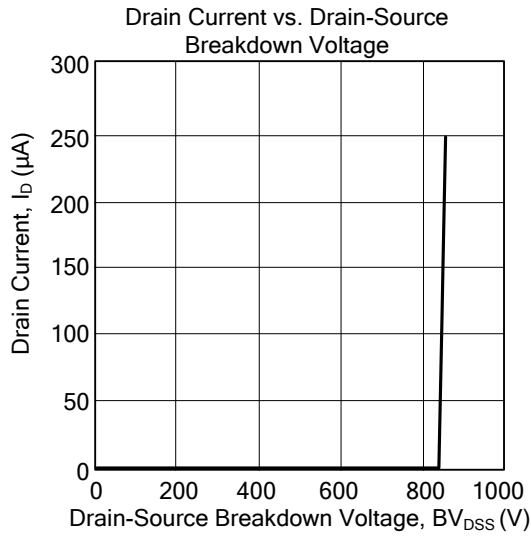
## TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



### TYPICAL CHARACTERISTICS



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