



## 12N80

Preliminary

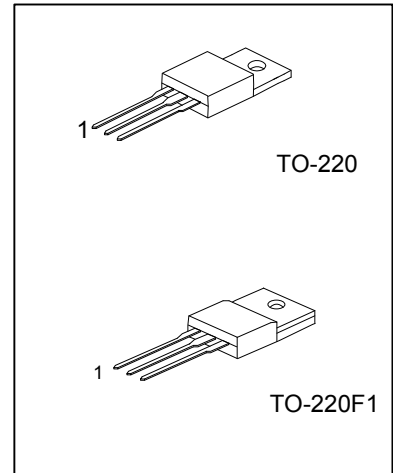
Power MOSFET

## 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.

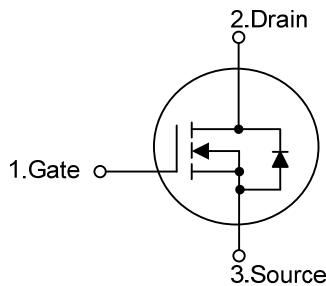
The UTC **12N80** is universally applied in high efficiency switch mode power supply.



### FEATURES

- \*  $R_{DS(on)} = 0.9\Omega @ V_{GS} = 10V$
- \* 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-TA3-T	12N80G-TA3-T	TO-220	G	D	S	Tube
12N80L-TF1-T	12N80G-TF1-T	TO-220F1	G	D	S	Tube

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

12N80L - TA3 - T	(1) Packing Type (2) Package Type (3) Lead Free	(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1 (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		$V_{DS}$	800	V
Gate-Source Voltage		$V_{GS}$	$\pm 30$	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-220	$P_D$	225	W
	TO-220F1		51	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55~+150	$^\circ\text{C}$

Note: 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		$\theta_{JA}$	62.5	$^\circ\text{C/W}$
Junction to Case	TO-220	$\theta_{JC}$	0.56	$^\circ\text{C/W}$
	TO-220F1		2.43	$^\circ\text{C/W}$

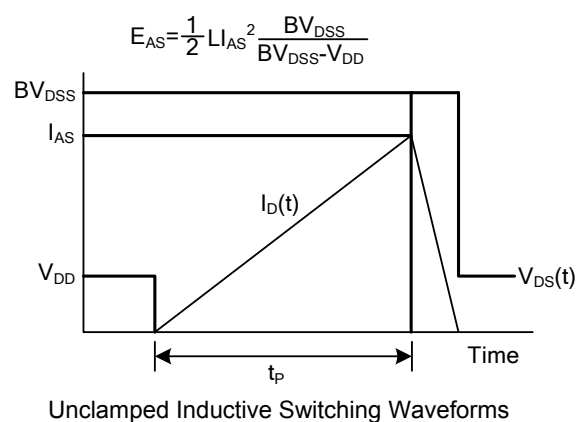
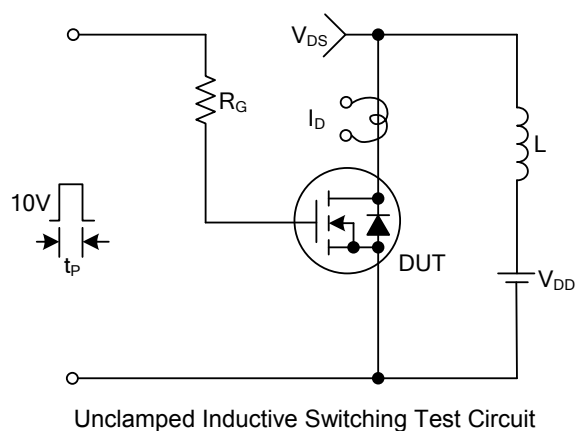
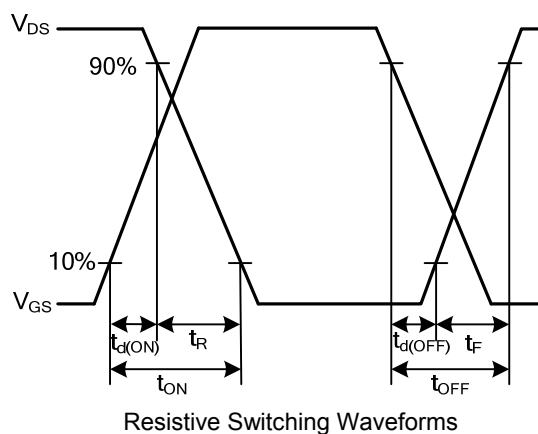
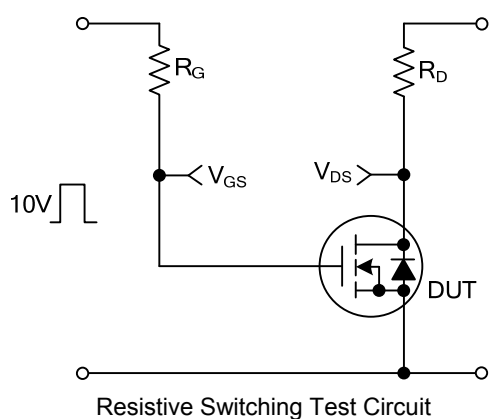
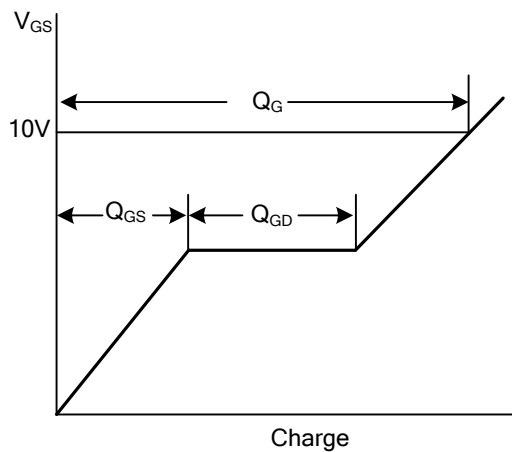
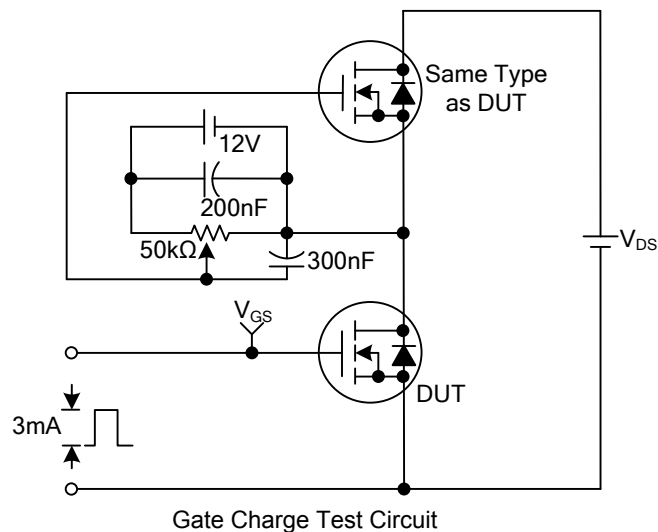
■ ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	800			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$ , Referenced to 25°C		1.0		V/°C
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=800V, V_{GS}=0V$			10	$\mu A$
			$V_{DS}=640V, T_C=125^\circ C$			100	
Gate- Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=+30V, V_{DS}=0V$			100	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0		5.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$		0.75	0.9	$\Omega$
DYNAMIC PARAMETERS							
Input Capacitance		$C_{ISS}$	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		4200		pF
Output Capacitance		$C_{OSS}$			315		pF
Reverse Transfer Capacitance		$C_{RSS}$			90		pF
SWITCHING PARAMETERS							
Total Gate Charge		$Q_G$	$V_{GS}=10V, V_{DS}=640V, I_D=12A$ (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		$t_{D(ON)}$	$V_{DD}=400V, I_D=12A, R_G=25\Omega$ (Note 1, 2)		18	50	ns
Rise Time		$t_R$			12	50	ns
Turn-OFF Delay Time		$t_{D(OFF)}$			51	100	ns
Fall-Time		$t_F$			18	50	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		$I_S$				12	A
Maximum Body-Diode Pulsed Current		$I_{SM}$				48	A
Drain-Source Diode Forward Voltage		$V_{SD}$	$I_S=12A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time		$t_{rr}$	$V_{GS}=0V, I_S=12A, dI_F/dt=100A/\mu s$		1000		ns
Body Diode Reverse Recovery Charge		$Q_{RR}$	(Note 1)		17.0		$\mu C$

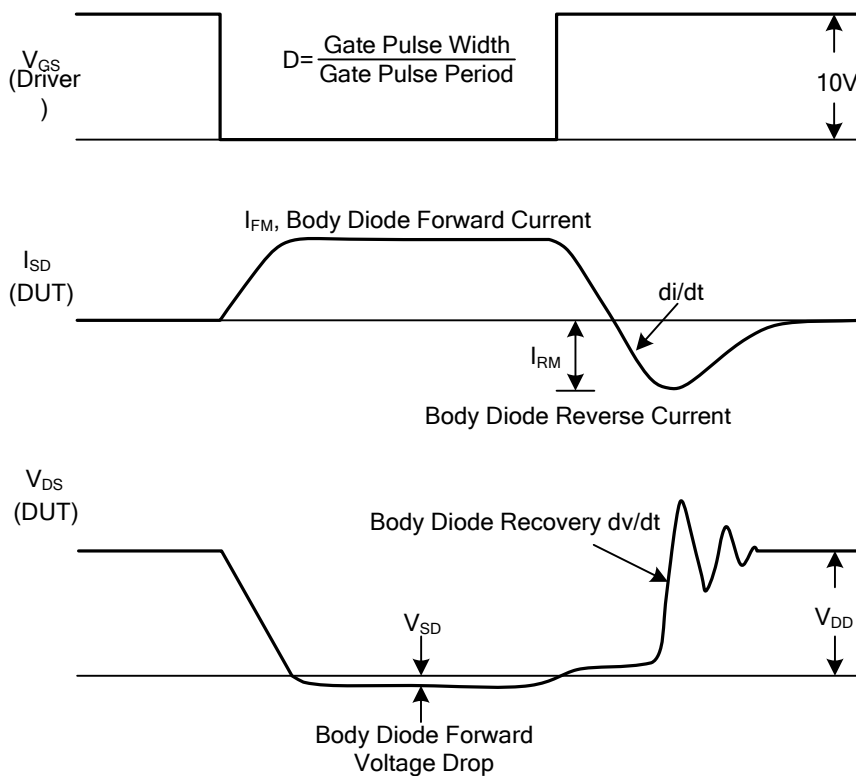
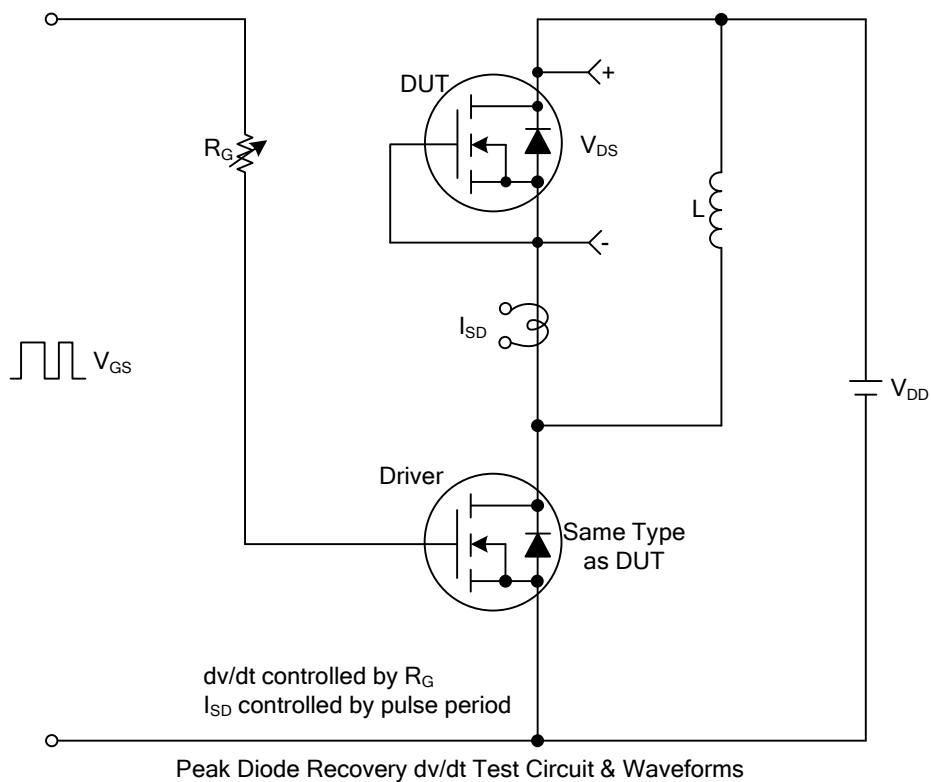
Note: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$

2. Essentially independent of operating temperature

# ■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



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