

**8N90**

Preliminary

Power MOSFET

8 Amps, 900 Volts

N-CHANNEL POWER MOSFET

■ DESCRIPTION

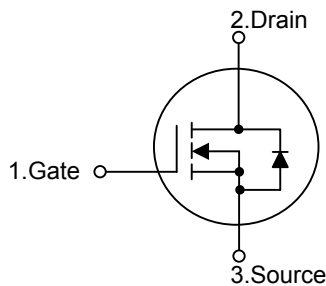
The UTC **8N90** is an N-channel mode power MOSFET, using UTC's advanced technology to provide customers planar stripe and DMOS technology. This technology allows a minimum on-state resistance, superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **8N90** is generally applied in high efficiency switch mode power supplies.

■ FEATURES

- * 8A, 900V, $R_{DS(ON)}=1.55\Omega$ @ $V_{GS}=10V$
- * Fast Switching Speed
- * 100% Avalanche Tested
- * Improved dv/dt Capability

■ SYMBOL

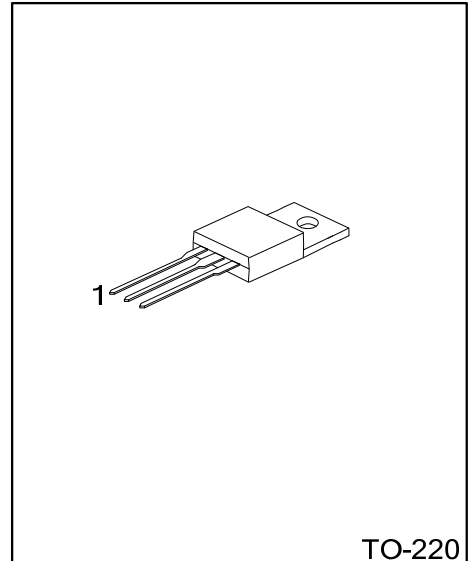


■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N90L-TA3-T	8N90G-TA3-T	TO-220	G	D	S	Tube

Note: G: GND, D: Drain, S: Source

8N90G-TA3-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TA3: TO-220
	(3)Halogen Free	(3) G: Halogen Free, L: Lead Free



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage	V_{DS}	900	V
Gate to Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	8	A
Pulsed Drain Current (Note 1)	I_{DM}	25	A
Avalanche Current (Note 1)	I_{AR}	6.3	A
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	850	mJ
Repetitive Avalanche Energy (Note 1)	E_{AR}	17.1	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.0	V/ns
Total Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	147	W
Linear Derating Factor above $T_C=25^\circ\text{C}$		1.17	W/ $^\circ\text{C}$
Junction Temperature	T_J	+150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~+150	$^\circ\text{C}$

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

2. $L=40\text{mH}$, $I_{AS}=6.3\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

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

4. 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.85	$^\circ\text{C}/\text{W}$

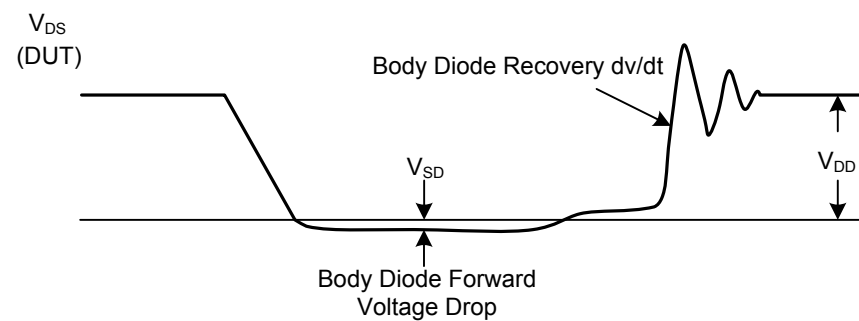
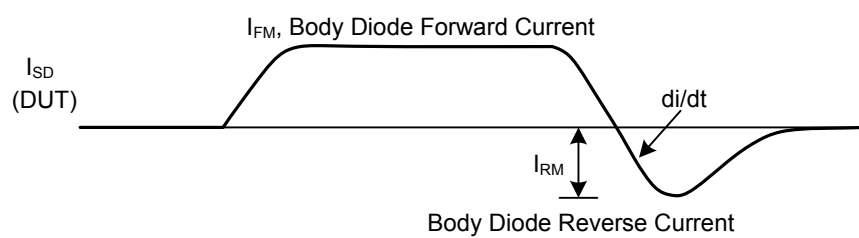
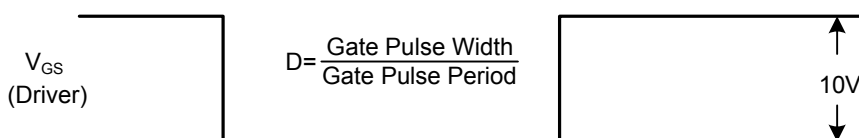
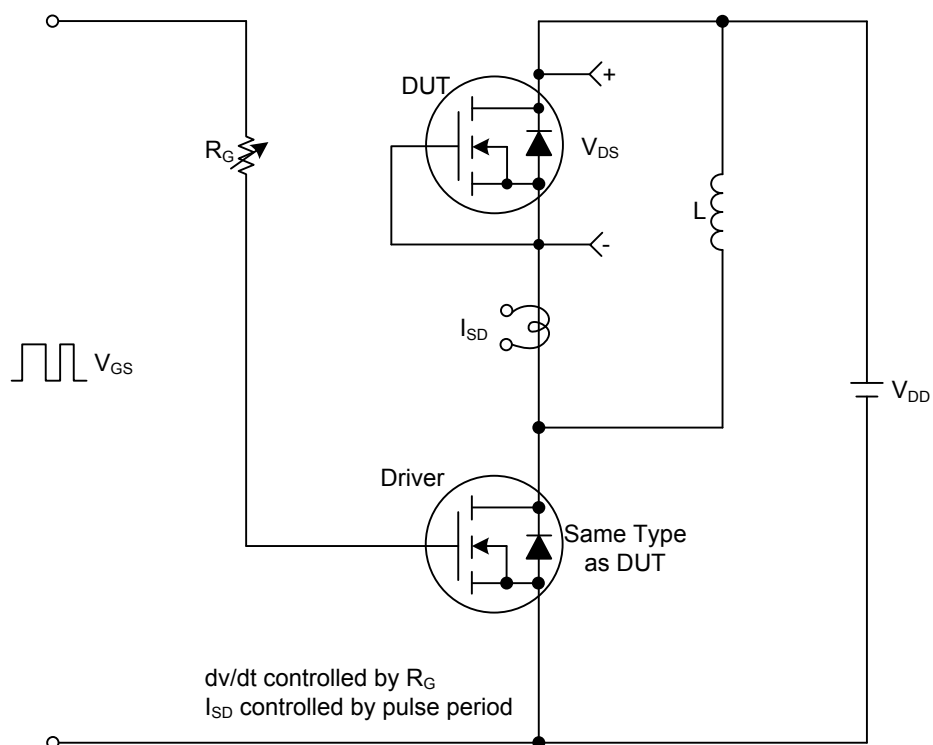
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	900			V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.95		V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
		V _{DS} =720V, T _C =125°C			100	μA
Gate-Source Leakage Current	I _{GSS}	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 =4A		940	1550	mΩ
Forward Transconductance (Note 1)	g _{FS}	V _{DS} =50V, I _D =4A ⁴		5.5		S
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V,V _{GS} =0V,f=1.0MHz		1600	2080	pF
Output Capacitance	C _{OSS}			130	170	pF
Reverse Transfer Capacitance	C _{RSS}			12	15	pF
SWITCHING PARAMETERS (Note 1, Note 2)						
Total Gate Charge	Q _G	V _{DS} =720V, V _{GS} =10V, I _D =8A		35	45	nC
Gate-Source Charge	Q _{GS}			10		nC
Gate-Drain Charge	Q _{GD}			14		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =450V, I _D =8A, R _G =25Ω		40	90	ns
Turn-ON Rise Time	t _R			110	230	ns
Turn-OFF Delay Time	t _{D(OFF)}			70	150	ns
Turn-OFF Fall Time	t _F			70	150	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				8	A
Maximum Body-Diode Pulsed Current	I _{SM}				25	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =8A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{RR}	V _{GS} =0V, I _S =8A, dI _F /dt=100A/μs		530		ns
Body Diode Reverse Recovery Charge	Q _{RR}	(Note 1)		5.8		μC

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

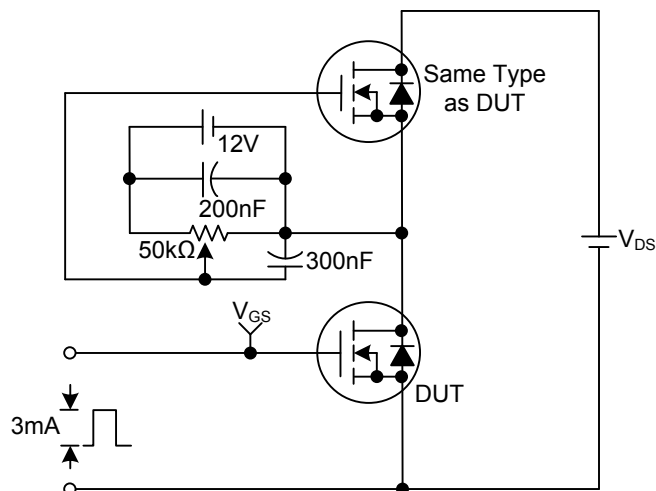
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

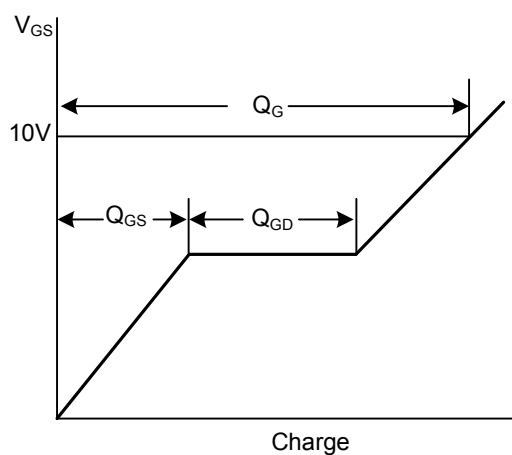
Peak Diode Recovery dv/dt Test Circuit & Waveforms

■ TEST CIRCUITS AND WAVEFORMS

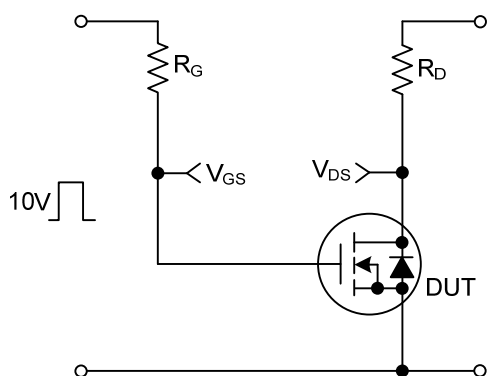
Gate Charge Test Circuit



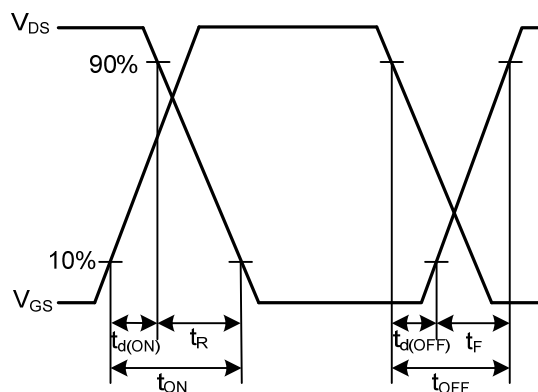
Gate Charge Waveforms



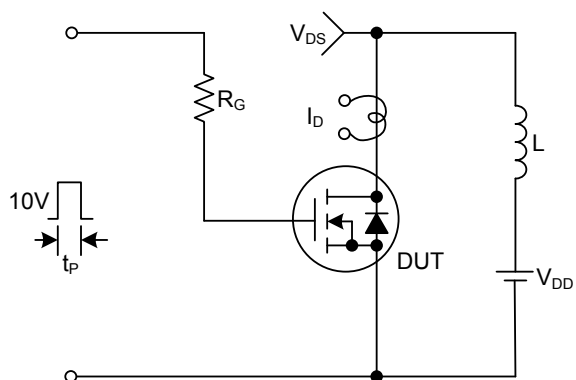
Resistive Switching Test Circuit



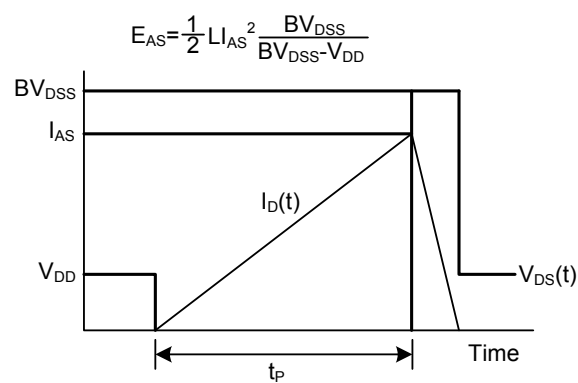
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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