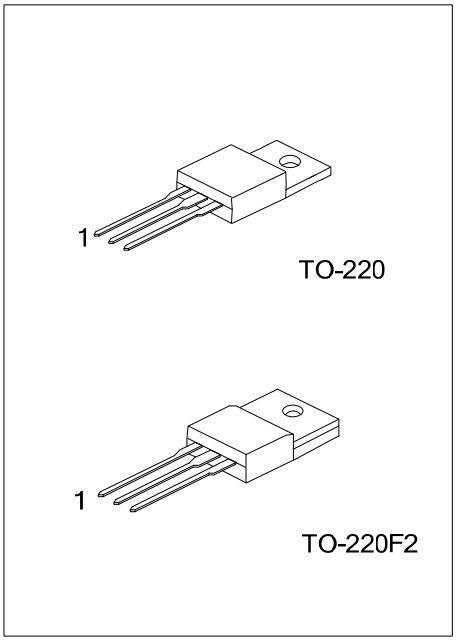
8A, 900V N-CHANNEL POWER MOSFET



■ DESCRIPTION

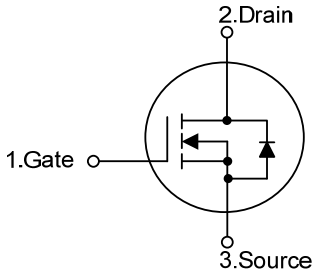
The UTC **8N90** is an N-channel mode power MOSFET, using UTC's advanced technology to provide costumers planar stripe and DMOS technology. This technology allows a minimum on-state resistance, superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

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

■ FEATURES

* $R_{DS(ON)}$<1.55Ω @ V_{GS}=10V
* Fast Switching Speed
* 100% Avalanche Tested
* Improved dv/dt Capability

■ SYMBOL



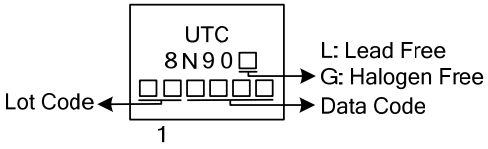
■ ORDERING INFORMATION

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
8N90L-TF2-T	8N90G-TF2-T	TO-220F2	G	D	S	Tube

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

8N90L-TA3-T (1)Packing Type (2)Package Type (3)Halogen Free	(1) T: Tube (2) TA3: TO-220, TF2: TO-220F2 (3) L: Lead Free, G: Halogen Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	900	V
Gate to Source Voltage		V_{GSS}	±30	V
Continuous Drain Current (T_C=25°C)		I_D	8	A
Pulsed Drain Current (Note 2)		I_{DM}	25	A
Avalanche Current (Note 2)		I_{AR}	6.3	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	850	mJ
Repetitive Avalanche Energy (Note 2)		E_{AR}	17.1	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation (T_C=25°C)	TO-220	P_D	147	W
	TO-220F2		62	
Linear Derating Factor above T_C=25°C	TO-220		1.17	W/°C
	TO-220F2		0.5	
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55~+150	°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=27mH, I_{AS}=8A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤8A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$θ_{JA}$	62.5	°C/W
Junction to Case	TO-220	$θ_{JC}$	0.85	°C/W
	TO-220F2		2.0	

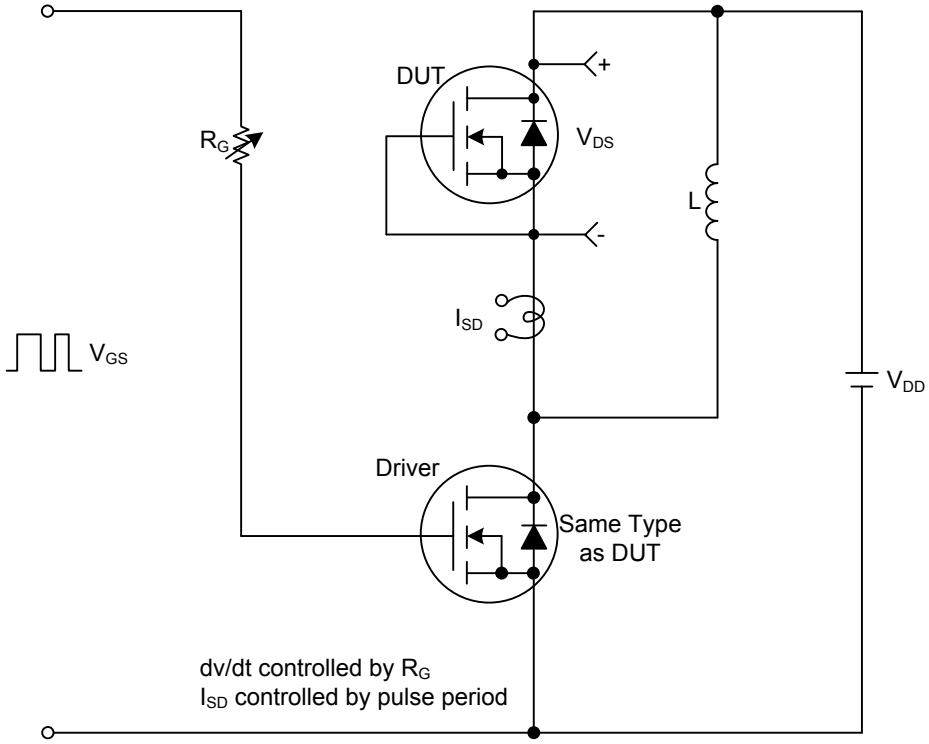
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

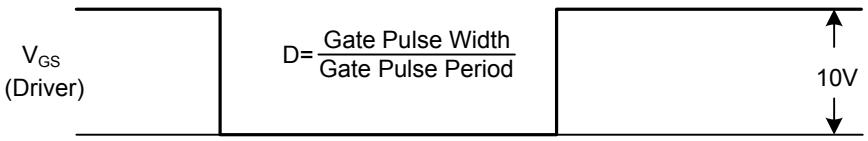
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	900			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25°C		0.95		V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=900V, 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		1.16	1.55	Ω
Forward Transconductance (Note 2)	g_{FS}	V_{DS}=50V, I_D=4A		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 2, Note 3)						
Total Gate Charge	Q_G	V_{DS}=50V, V_{GS}=10V, I_D=1.3A		54		nC
Gate-Source Charge	Q_{GS}			12		nC
Gate-Drain Charge	Q_{GD}			16		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=30V, I_D=0.5A, R_G=25Ω		95		ns
Turn-ON Rise Time	t_R			220		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			275		ns
Turn-OFF Fall Time	t_F			175		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				8	A
Maximum Body-Diode Pulsed Current	I_{SM}				32	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S =8A, V_{GS}=0V			1.4	V

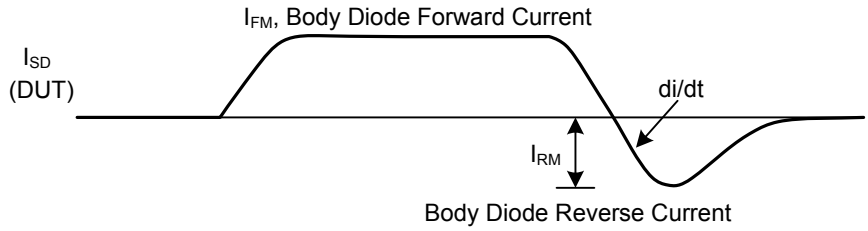
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

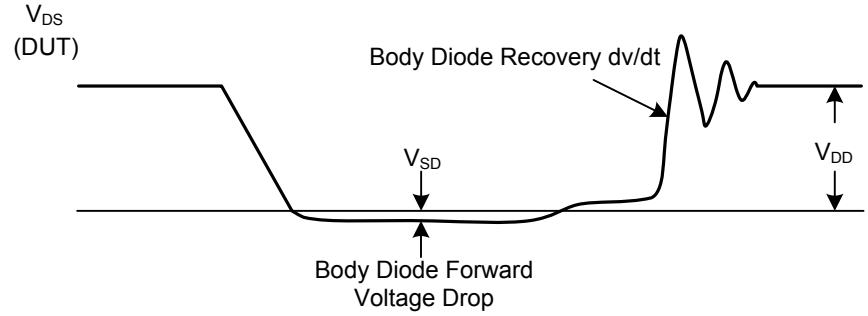
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

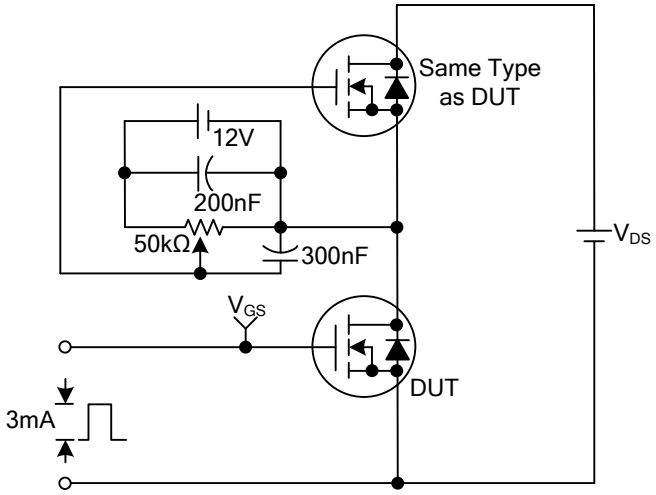




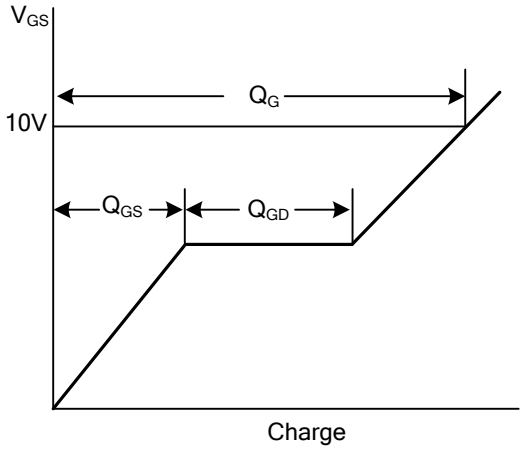




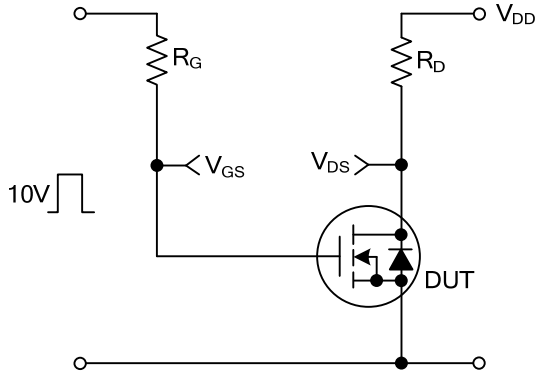
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



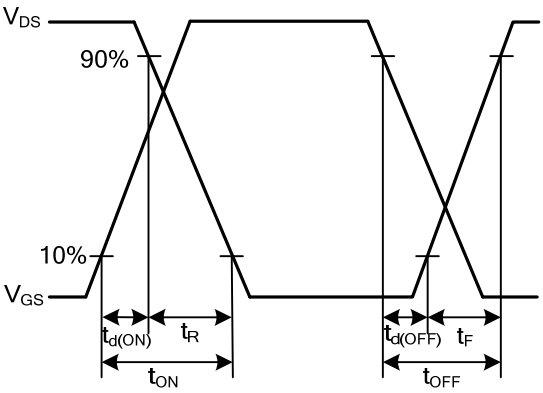
Gate Charge Test Circuit



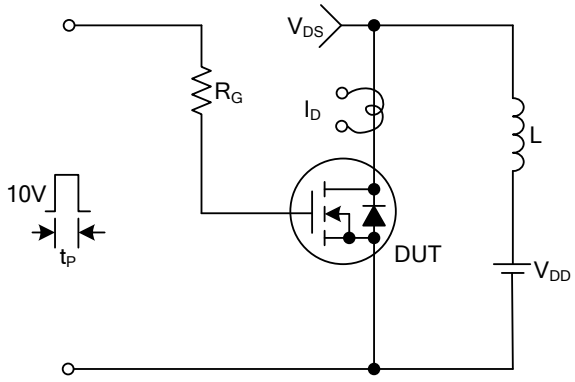
Gate Charge Waveforms



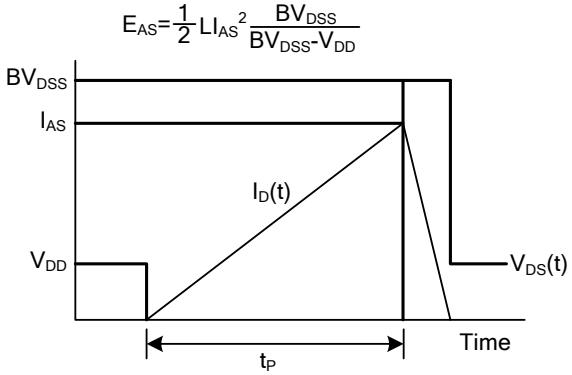
Resistive Switching Test Circuit



Resistive Switching Waveforms



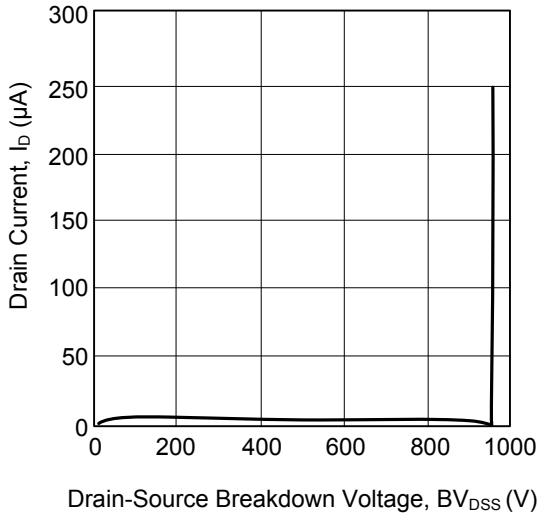
Unclamped Inductive Switching Test Circuit



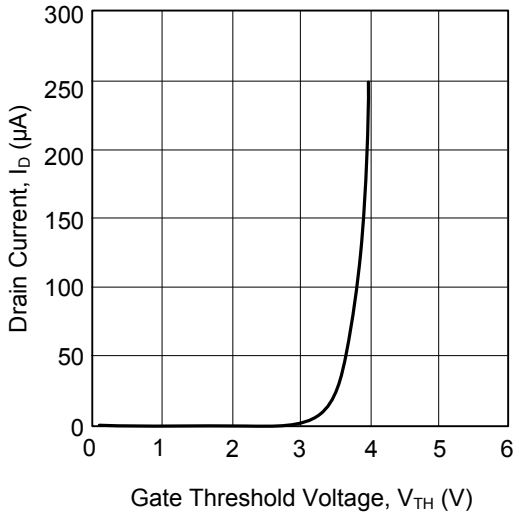
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

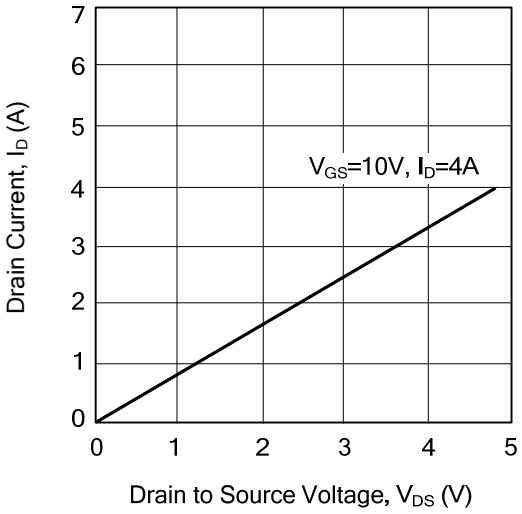
Drain Current vs. Drain-Source Breakdown Voltage



Drain Current vs. Gate Threshold Voltage



Drain-Source On-State Resistance Characteristics



Body-Diode Continuous Current vs. Source to Drain Voltage