

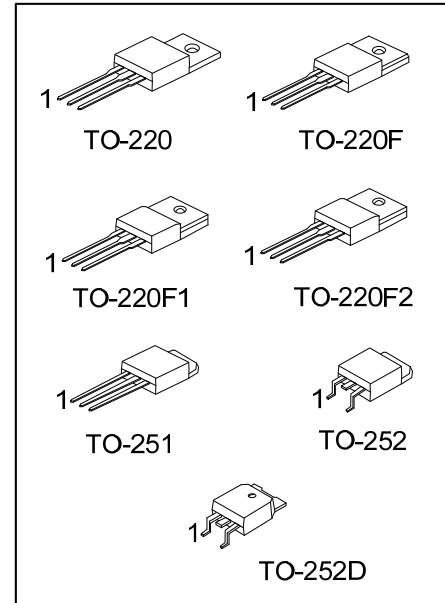
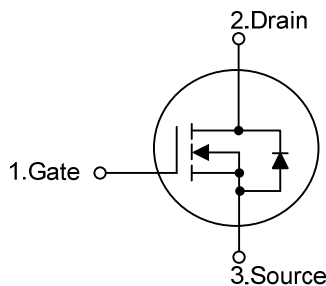
**2N90****Power MOSFET****2.0A, 900V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **2N90** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology 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 **2N90** is universally applied in high efficiency switch mode power supply.

FEATURES

- * $R_{DS(ON)} \leq 7.2 \Omega$ @ $V_{GS}=10V$, $I_D=1.1A$
- * High switching speed
- * Improved dv/dt capability
- * 100% avalanche tested

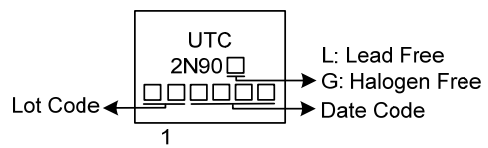
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N90L-TA3-T	2N90G-TA3-T	TO-220	G	D	S	Tube
2N90L-TF1-T	2N90G-TF1-T	TO-220F1	G	D	S	Tube
2N90L-TF2-T	2N90G-TF2-T	TO-220F2	G	D	S	Tube
2N90L-TF3-T	2N90G-TF3-T	TO-220F	G	D	S	Tube
2N90L-TM3-T	2N90G-TM3-T	TO-251	G	D	S	Tube
2N90L-TN3-R	2N90G-TN3-R	TO-252	G	D	S	Tape Reel
2N90L-TND-R	2N90G-TND-R	TO-252D	G	D	S	Tape Reel

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

2N90G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2 TF3: TO-220F, TM3: TO-251, TN3: TO-252, TND: TO-252D (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage (Note 2)		V _{DSS}	900	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous	I _D	2.2	A
	Pulsed (Note 2)	I _{DM}	8.8	A
Avalanche Current (Note 2)		I _{AR}	2.2	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	170	mJ
	Repetitive (Note 2)	E _{AR}	8.5	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation	TO-220	P _D	85	W
	TO-220F/TO-220F1		25	
	TO-220F2			
	TO-251/ TO-252 TO-252D		43	
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. $L = 65\text{mH}$, $I_{AS} = 2.2\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 2.2\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER	PACKAGE	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-220F1/TO-220F2			
	TO-251/ TO-252		110	
	TO-252D			
Junction to Case	TO-220	θ_{JC}	1.47	$^{\circ}\text{C/W}$
	TO-220F/TO-220F1			
	TO-220F2		5	
	TO-251/ TO-252			
	TO-252D		2.85	

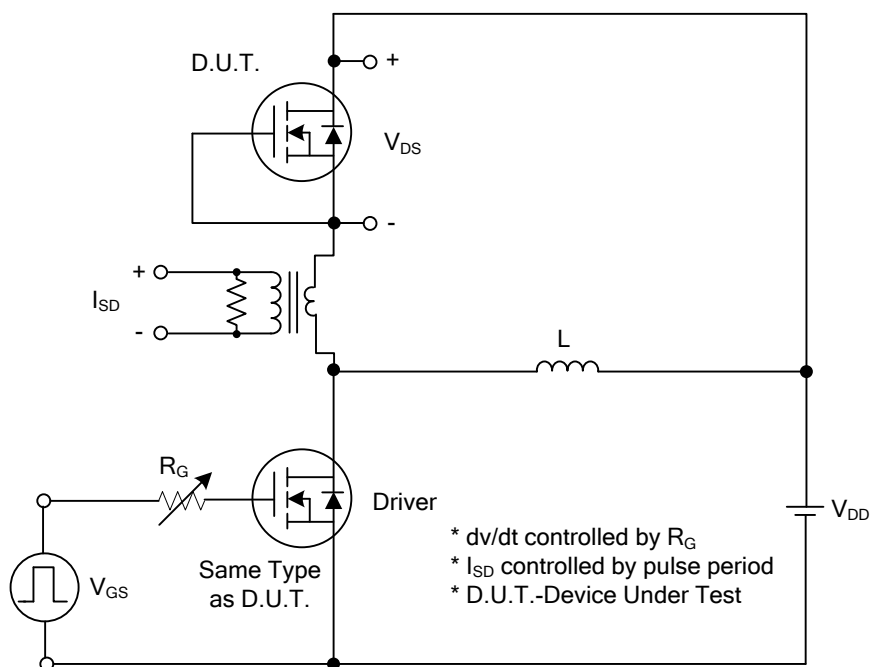
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	900			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		1.0		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
			V _{DS} =720V, T _C =125°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 =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =1.1A		5.6	7.2	Ω
Forward Transconductance		g _{FS}	V _{DS} =50V, I _D =1.1A (Note 1)		2.0		S
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		480	520	pF
Output Capacitance		C _{OSS}			45		pF
Reverse Transfer Capacitance		C _{RSS}			7		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =50V, I _D =1.3A I _G =100μA (Note 1,2)		16	26	nC
Gate to Source Charge		Q _{GS}			5.5		nC
Gate to Drain Charge		Q _{GD}			4.5		nC
Turn-ON Delay Time		t _{D(ON)}	V _{GS} =10V, V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note 1,2)		50		ns
Rise Time		t _R			65		ns
Turn-OFF Delay Time		t _{D(OFF)}			90		ns
Fall-Time		t _F			45		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				2.2	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				8.8	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =2.2A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =2.2A, V _{GS} =0V, dI _F /dt=100A/μ		400		ns
Reverse Recovery Charge		Q _{rr}	s (Note 1)		1.6		μC

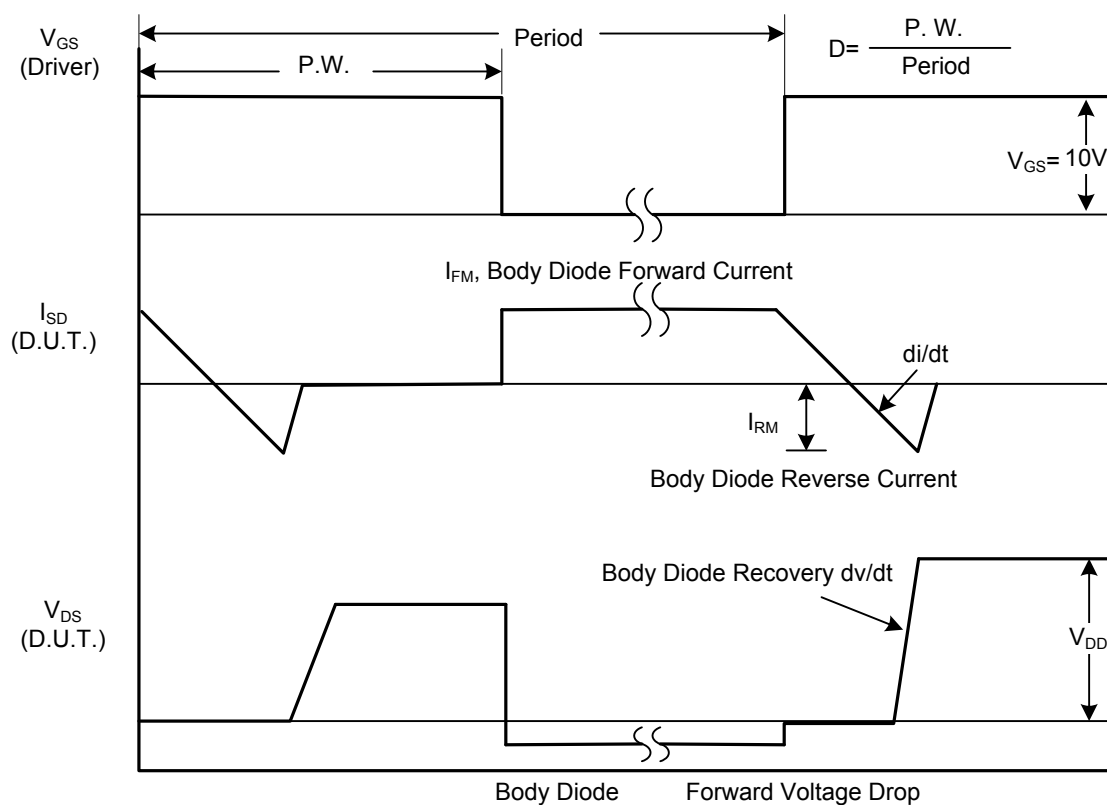
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

TEST CIRCUITS AND WAVEFORMS

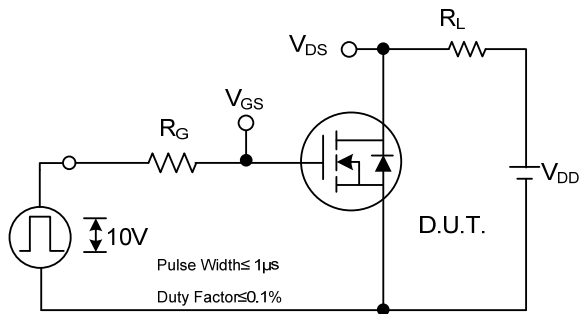


Peak Diode Recovery dv/dt Test Circuit

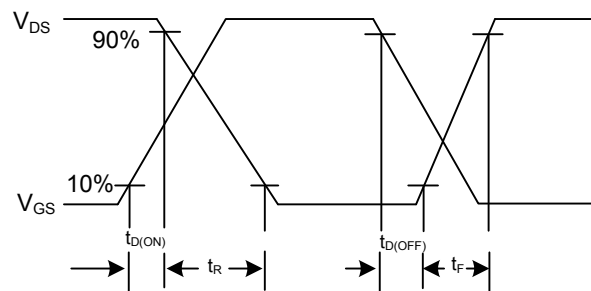


Peak Diode Recovery dv/dt Waveforms

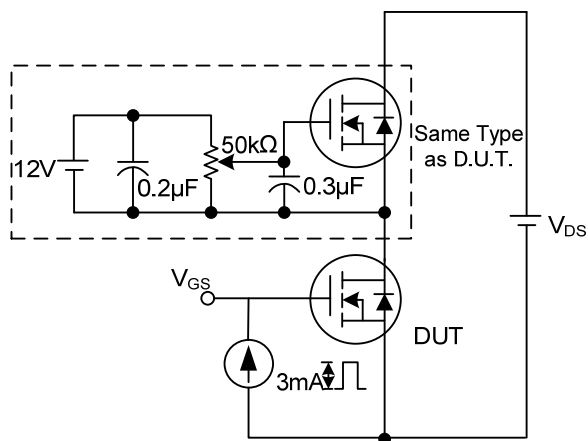
■ TEST CIRCUITS AND WAVEFORMS



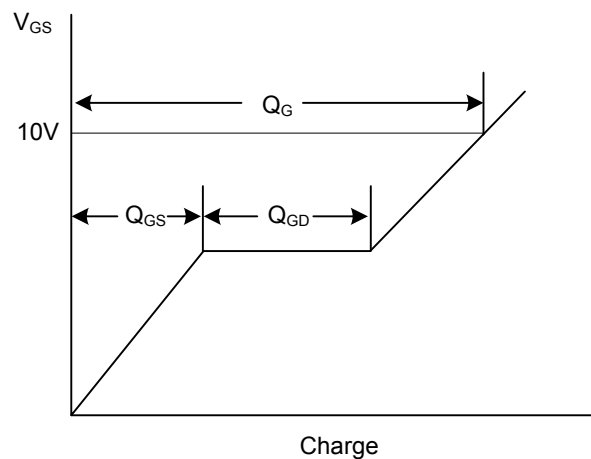
Switching Test Circuit



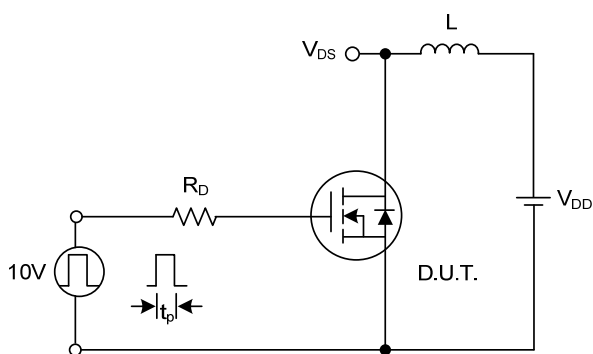
Switching Waveforms



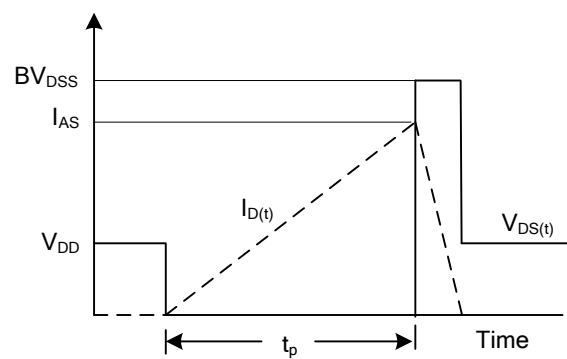
Gate Charge Test Circuit



Gate Charge Waveform

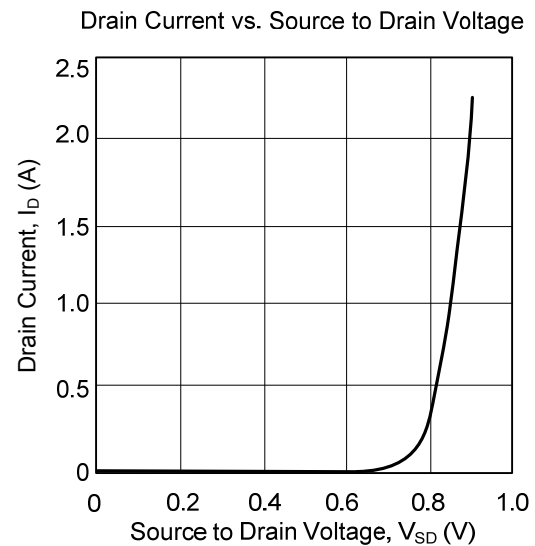
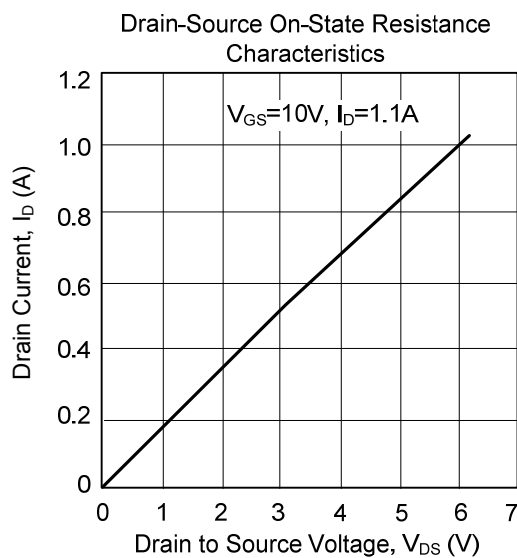
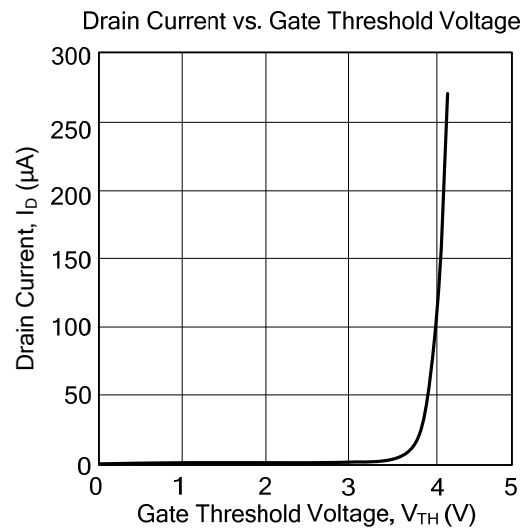
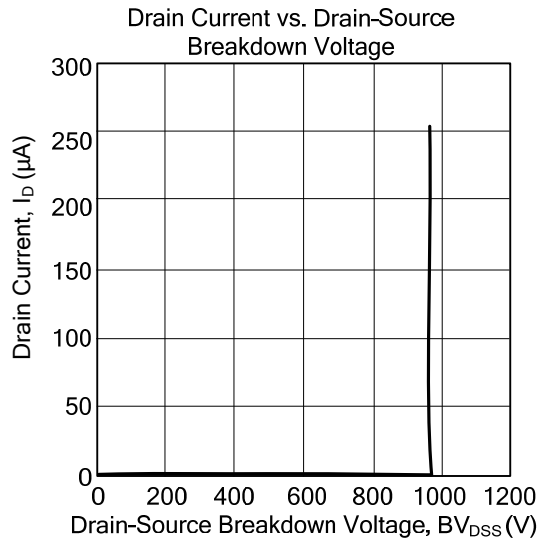


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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