



3.0A, 500V N-CHANNEL SUPER-JUNCTION MOSFET

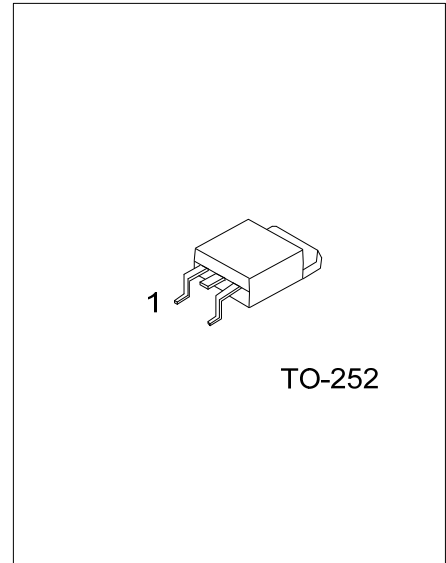
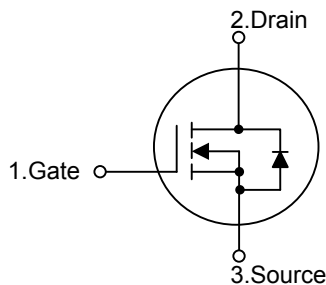
DESCRIPTION

The **UTC 3NM50** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at DC-DC, AC-DC converters for power applications.

FEATURES

- * $R_{DS(ON)} < 1.8\Omega$ @ $V_{GS}=10V$, $I_D=1.5A$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL



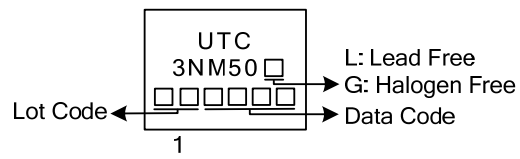
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
3NM50L-TN3-R	3NM50G-TN3-R	TO-252	G	D	S	Tape Reel

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

3NM50L-TN3-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) TN3: TO-252
	(3)Green Package	(3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current ($T_C=25^\circ\text{C}$)	Continuous	I_D	3.0	A
	Pulsed (Note 2)	I_{DM}	12	A
Avalanche Current (Note 2)		I_{AR}	2.4	A
Avalanche Energy (Note 3)	Single Pulsed	E_{AS}	29	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	5.3	V/ns
Power Dissipation		P_D	50	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.

3. $L=10\text{mH}$, $I_{AS}=2.4\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$.

4. $I_{SD}\leq 3.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.5	$^\circ\text{C}/\text{W}$

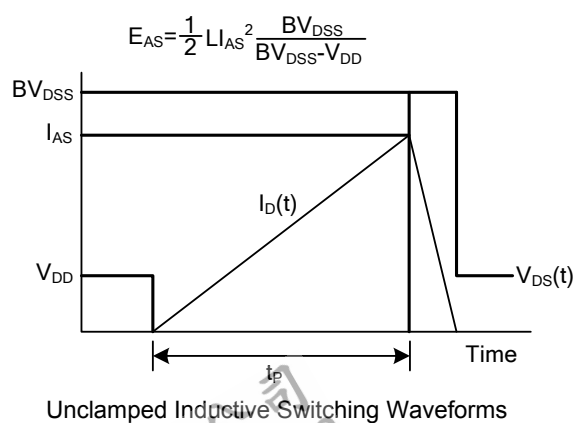
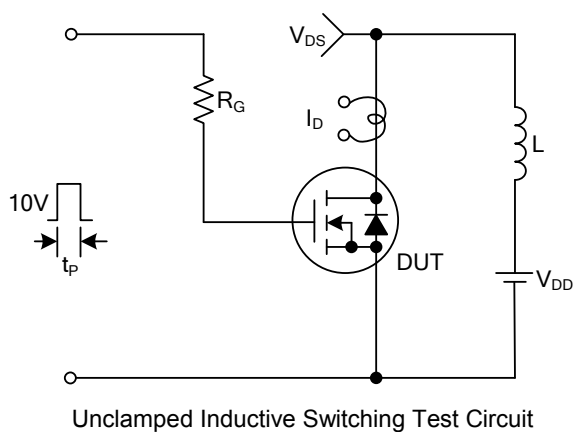
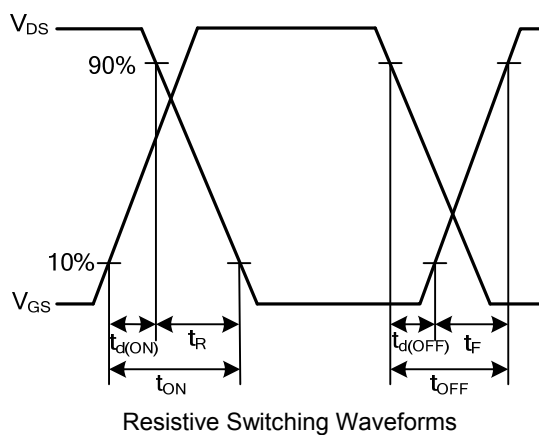
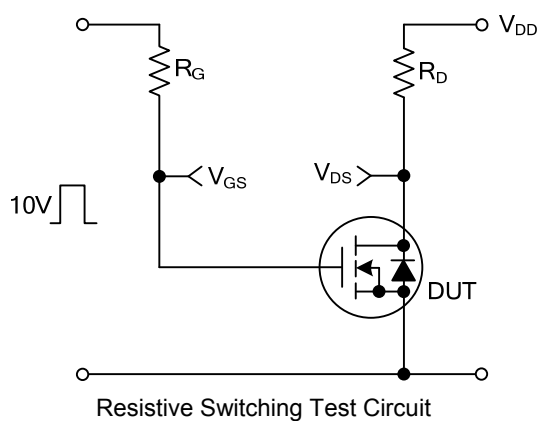
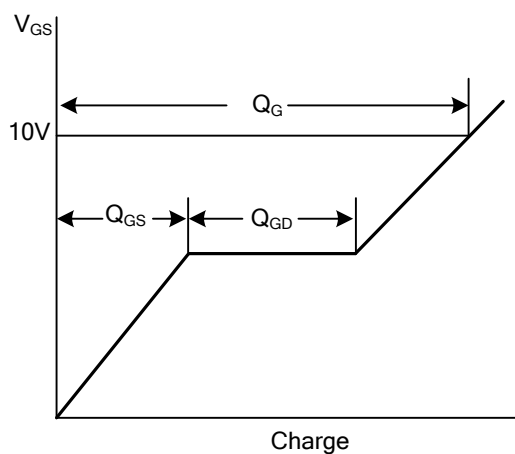
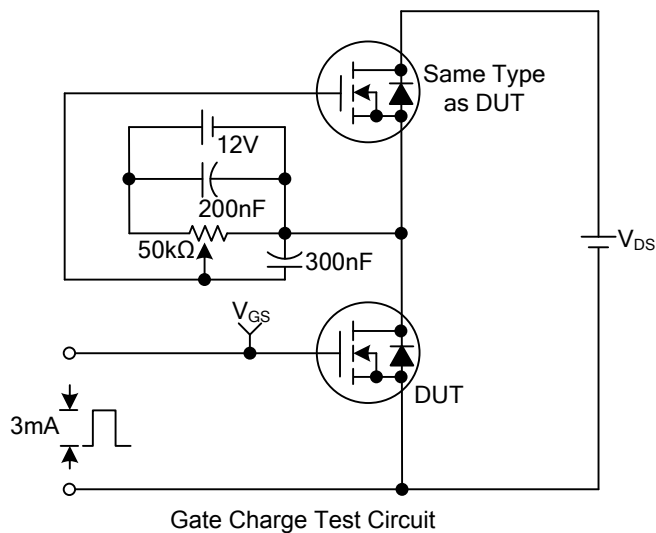
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μA
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	2.5		4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =1.5A			1.8	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		155		pF
Output Capacitance		C _{OSS}			137		pF
Reverse Transfer Capacitance		C _{RSS}			25		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A, I _G = 250μA (Note 1, 2)		35		nC
Gate to Source Charge		Q _{GS}			3		nC
Gate to Drain Charge		Q _{GD}			7.5		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		37		ns
Rise Time		t _R			37		ns
Turn-OFF Delay Time		t _{D(OFF)}			82		ns
Fall-Time		t _F			44		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				3	A
Maximum Body-Diode Pulsed Current		I _{SM}				12	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =3.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =3.0A, V _{GS} =0V,		210		ns
Reverse Recovery Charge		Q _{rr}	di _r /dt = 100A/μs		1.2		μC

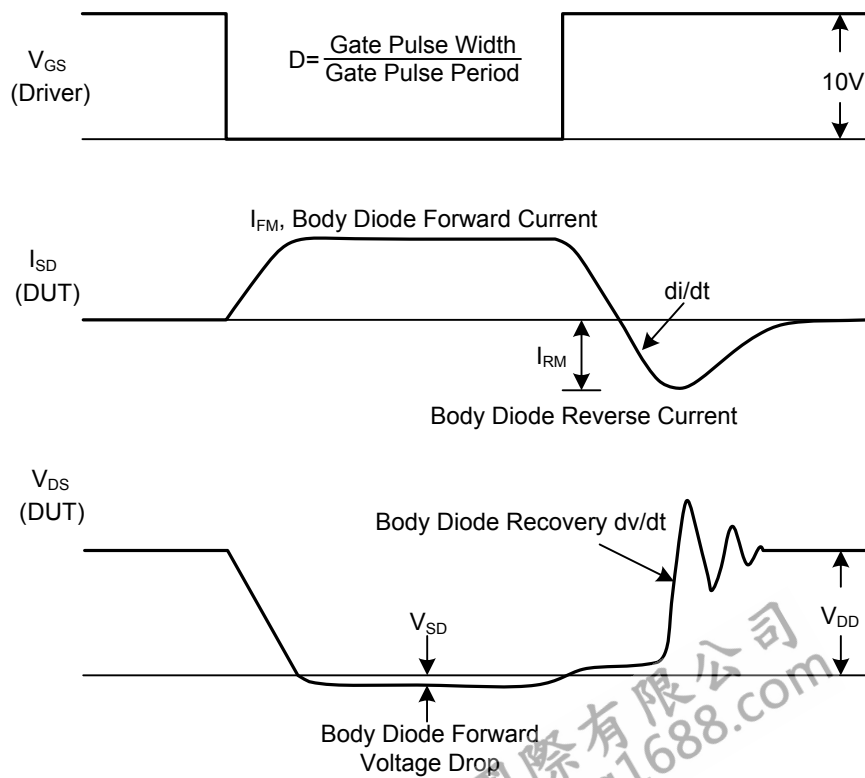
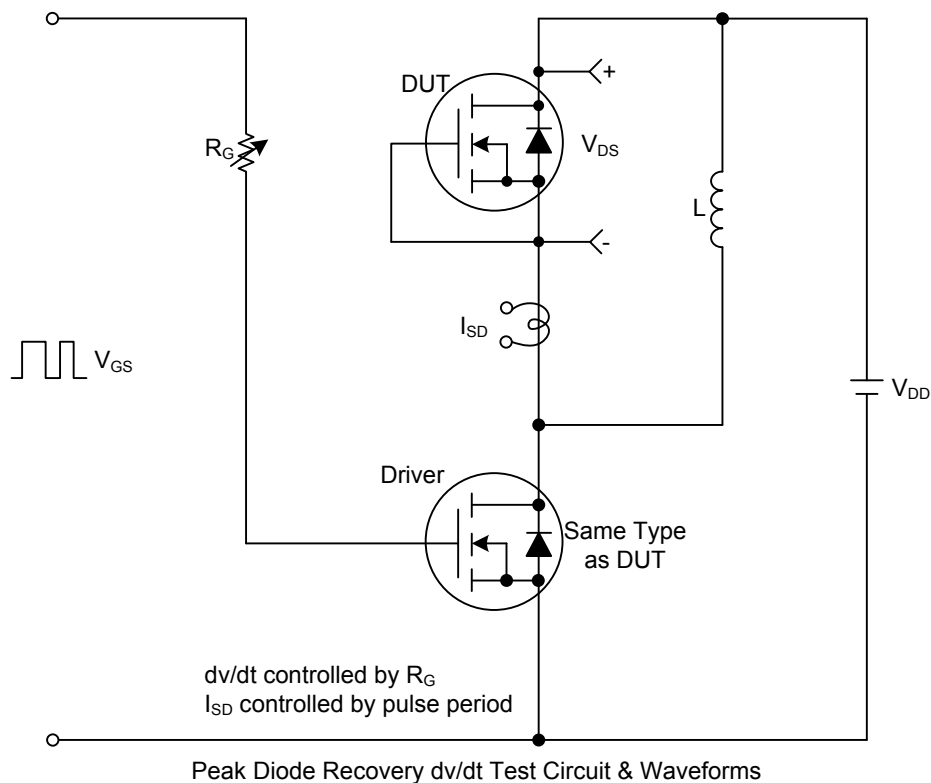
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



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