



22NM50

Preliminary

Power MOSFET

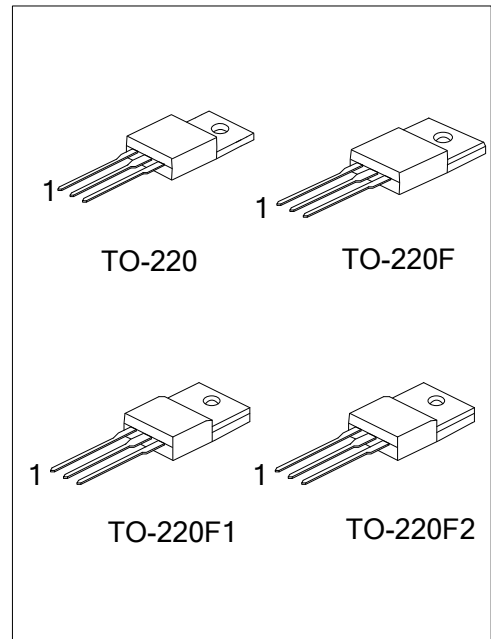
22A, 500V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION

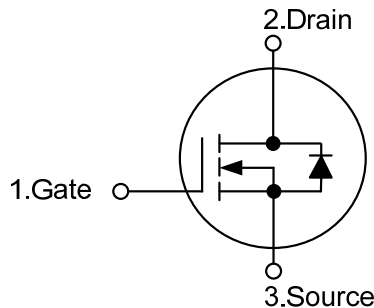
The **UTC 22NM50** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

FEATURES

- * $R_{DS(ON)} \leq 0.15 \Omega @ V_{GS}=10V, I_D=11A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness



SYMBOL



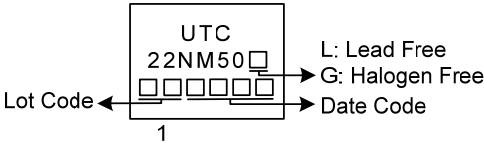
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
22NM50L-TA3-T	22NM50G-TA3-T	TO-220	G	D	S	Tube
22NM50L-TF3-T	22NM50G-TF3-T	TO-220F	G	D	S	Tube
22NM50L-TF1-T	22NM50G-TF1-T	TO-220F1	G	D	S	Tube
22NM50L-TF2-T	22NM50G-TF2-T	TO-220F2	G	D	S	Tube

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

<p>22NM50G-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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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	Continuous	I_D	22	A
	Pulsed (Note 2)	I_{DM}	44	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	968	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.9	V/ns
Power Dissipation	TO-220	P_D	118	W
	TO-220F/TO-220F1		34	W
	TO-220F2			
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. $L = 100\text{mH}$, $I_{AS} = 4.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 22\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1.06	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3.68	$^\circ\text{C}/\text{W}$
	TO-220F2			

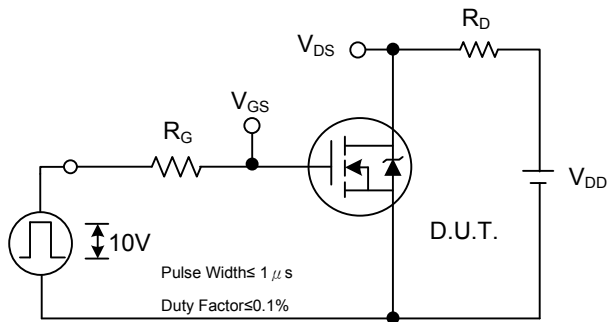
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward	V _{DS} =0V, V _{GS} =+30V			+100	nA
	Reverse		V _{DS} =0V, V _{GS} =-30V			-100
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.5		4.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =11A			0.15	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1440		pF
Output Capacitance	C _{OSS}			1385		pF
Reverse Transfer Capacitance	C _{RSS}			119		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =400V, V _{GS} =10V, I _D =22A I _G = 1mA (Note1, 2)		68		nC
Gate to Source Charge	Q _{GS}			18		nC
Gate to Drain Charge	Q _{GD}			28		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =22A, R _G =25Ω (Note1, 2)		18		ns
Rise Time	t _R			40		ns
Turn-OFF Delay Time	t _{D(OFF)}			200		ns
Fall-Time	t _F			42		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				22	A
Maximum Body-Diode Pulsed Current	I _{SM}				44	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =22A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =22A, V _{GS} =0V, dI _F /dt=100A/μs		440		ns
Body Diode Reverse Recovery Charge	Q _{rr}				8	

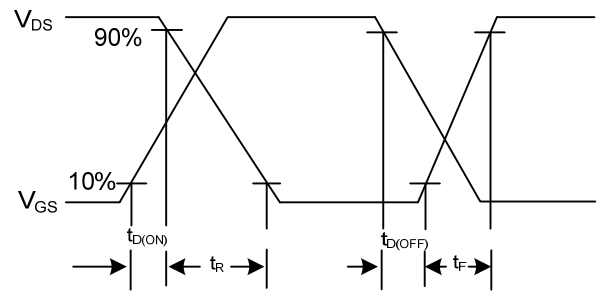
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

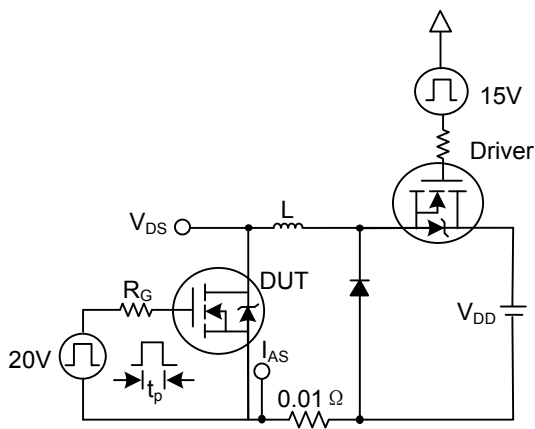
■ TEST CIRCUITS AND WAVEFORMS



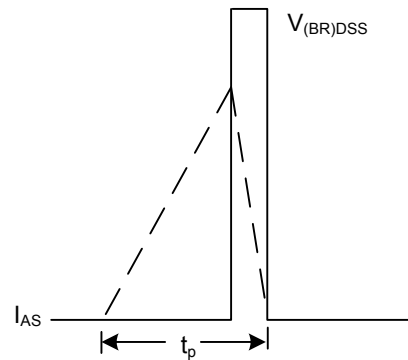
Switching Test Circuit



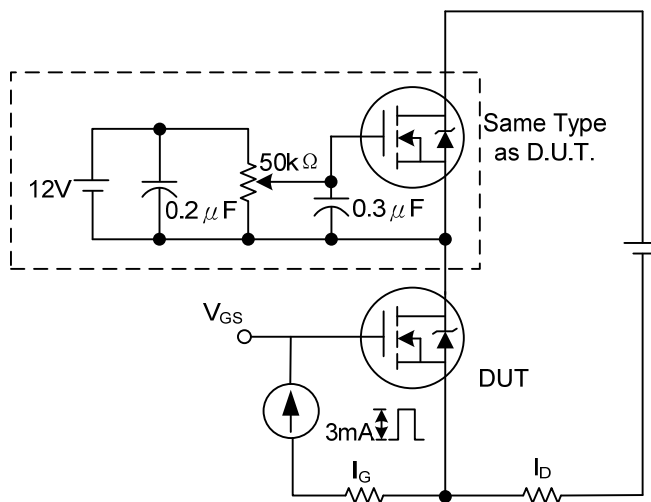
Switching Waveforms



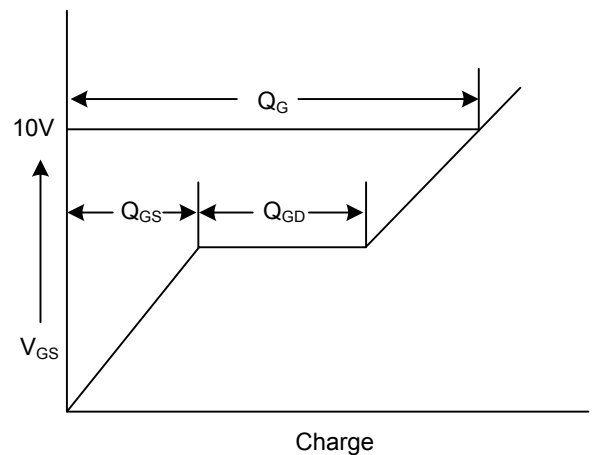
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

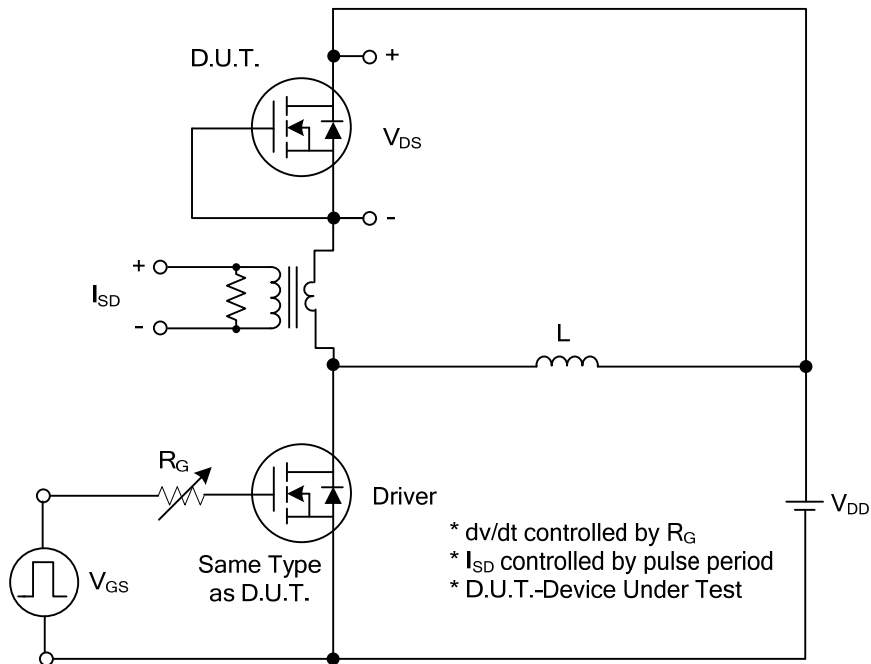


Gate Charge Test Circuit

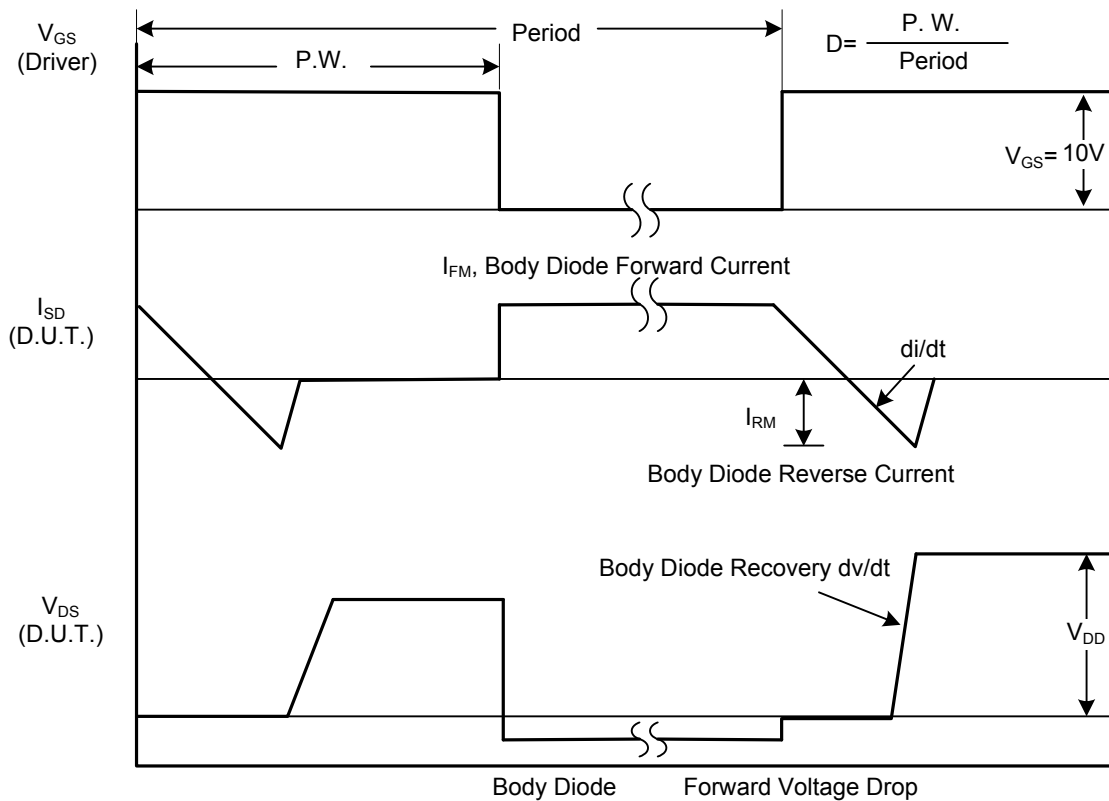


Gate Charge Waveform

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



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