

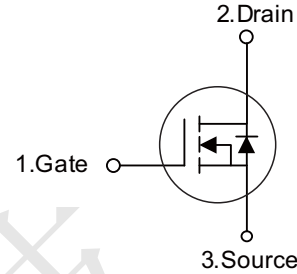


### MOT9N50C/MOT9N50D N-CHANNEL MOSFET

#### ■ PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)max}(@V_{GS} = 10\text{ V})$	0.72Ω
Qg@type	35nC
ID	9A

#### Symbol



#### ■ APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast
- LED power supply

#### ■ FEATURES

- \*  $R_{DS(ON)} < 0.72\Omega @ V_{GS} = 10V$
- \* Fast Switching Capability
- \* Avalanche Energy Specified
- \* Improved dv/dt Capability, High Ruggedness



#### ■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT9N50D	TO-252	2500 pieces /Reel
N/A	MOT9N50C	TO-251	70 pieces/Tube

#### ■ 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 ( $T_C=25^\circ\text{C}$ )	$I_D$	9 (Note 5)
	Pulsed (Note 2)	$I_{DM}$	36 (Note 5)
Avalanche Current (Note 2)	$I_{AR}$	9	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	360
	Repetitive (Note 4)	$E_{AR}$	13.5
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.5	V/ns
Power Dissipation	$P_D$	44	W
Derate above $25^\circ\text{C}$		0.35	W/ $^\circ\text{C}$
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.  $L = 8\text{mH}$ ,  $I_{AS} = 9\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
4.  $I_{SD} \leq 9\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$
5. Drain current limited by maximum junction temperature



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

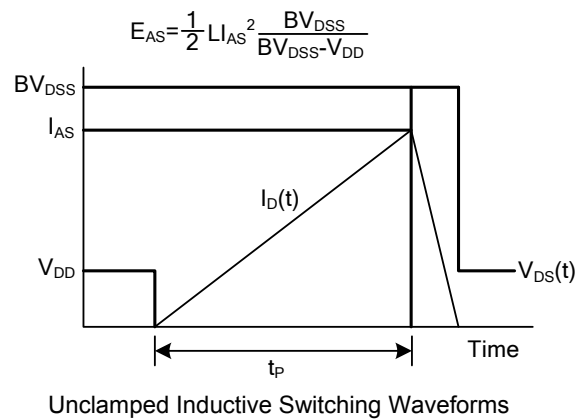
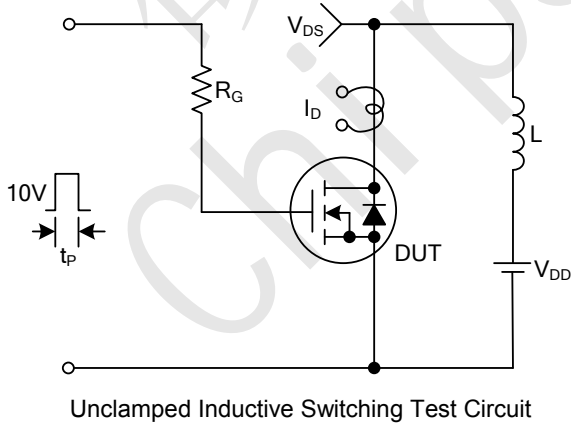
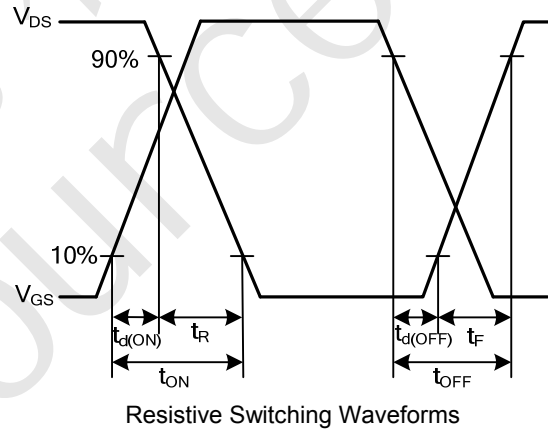
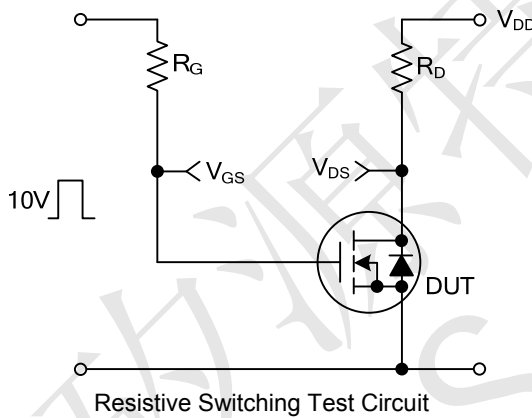
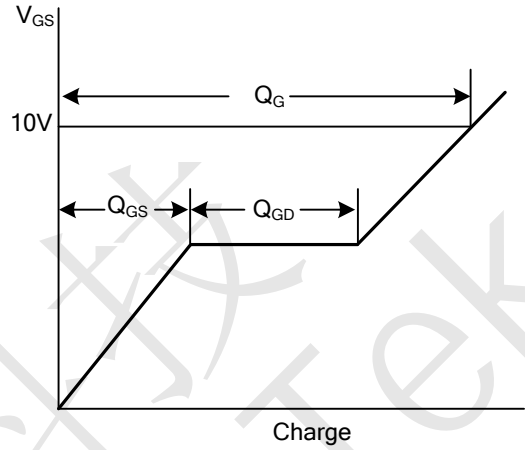
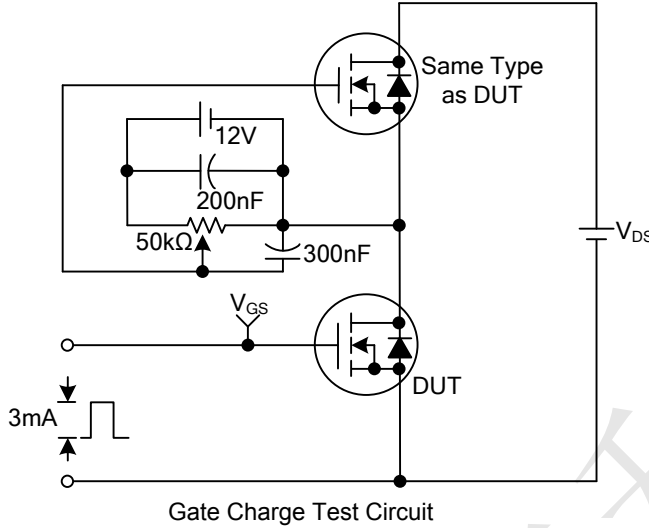
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	500			V
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=500\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
			$V_{DS}=400\text{V}$ , $T_C=125^\circ\text{C}$			10	
Gate- Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=+30\text{V}$ , $V_{DS}=0\text{V}$			+100	nA
	Reverse		$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=4.5\text{A}$		0.69	0.72	$\Omega$
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		790	1030	pF
Output Capacitance		$C_{OSS}$			130	170	
Reverse Transfer Capacitance		$C_{RSS}$			24	30	
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge		$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=400\text{V}$ , $I_D=9\text{A}$ (Note 1, 2)		28	35	nC
Gate to Source Charge		$Q_{GS}$			4		
Gate to Drain Charge		$Q_{GD}$			15		
Turn-ON Delay Time		$t_{D(ON)}$	$V_{DD}=250\text{V}$ , $I_D=9\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		18	45	ns
Rise Time		$t_R$			65	140	
Turn-OFF Delay Time		$t_{D(OFF)}$			93	195	
Fall-Time		$t_F$			64	125	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current		$I_S$				9	A
Maximum Body-Diode Pulsed Current		$I_{SM}$				36	A
Drain-Source Diode Forward Voltage		$V_{SD}$	$I_S=9\text{A}$ , $V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time		$t_{rr}$	$I_S=9\text{A}$ , $V_{GS}=0\text{V}$ , $dI_F/dt=100\text{A}/\mu\text{s}$		335		ns
Body Diode Reverse Recovery Charge		$Q_{RR}$	(Note 1)		2.95		$\mu\text{C}$

- Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$   
2. Essentially independent of operating temperature



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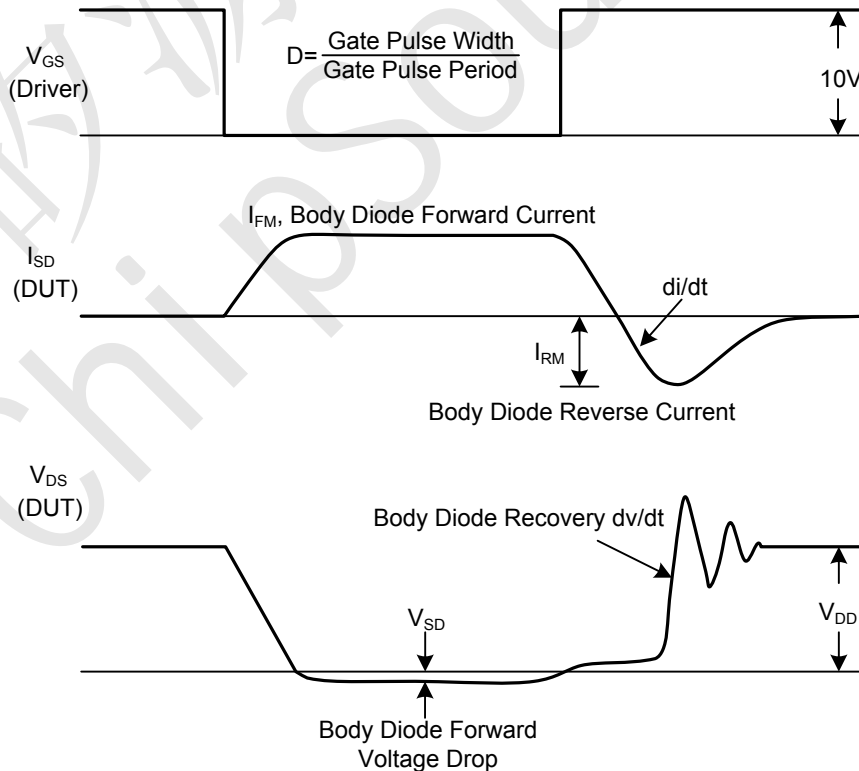
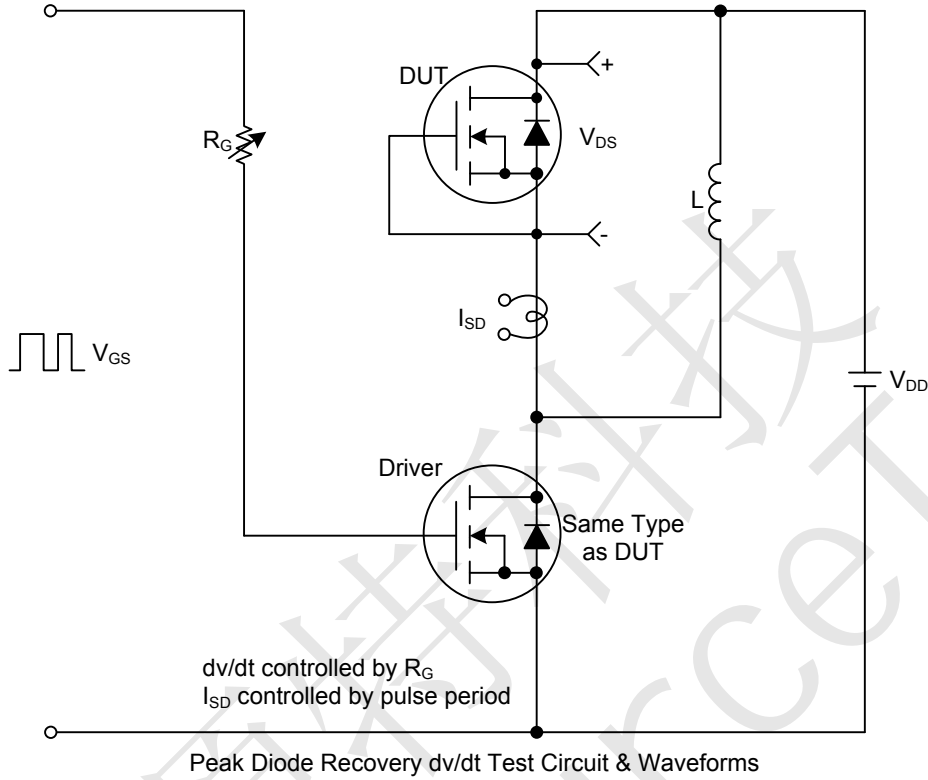
#### ■ TEST CIRCUITS AND WAVEFORMS





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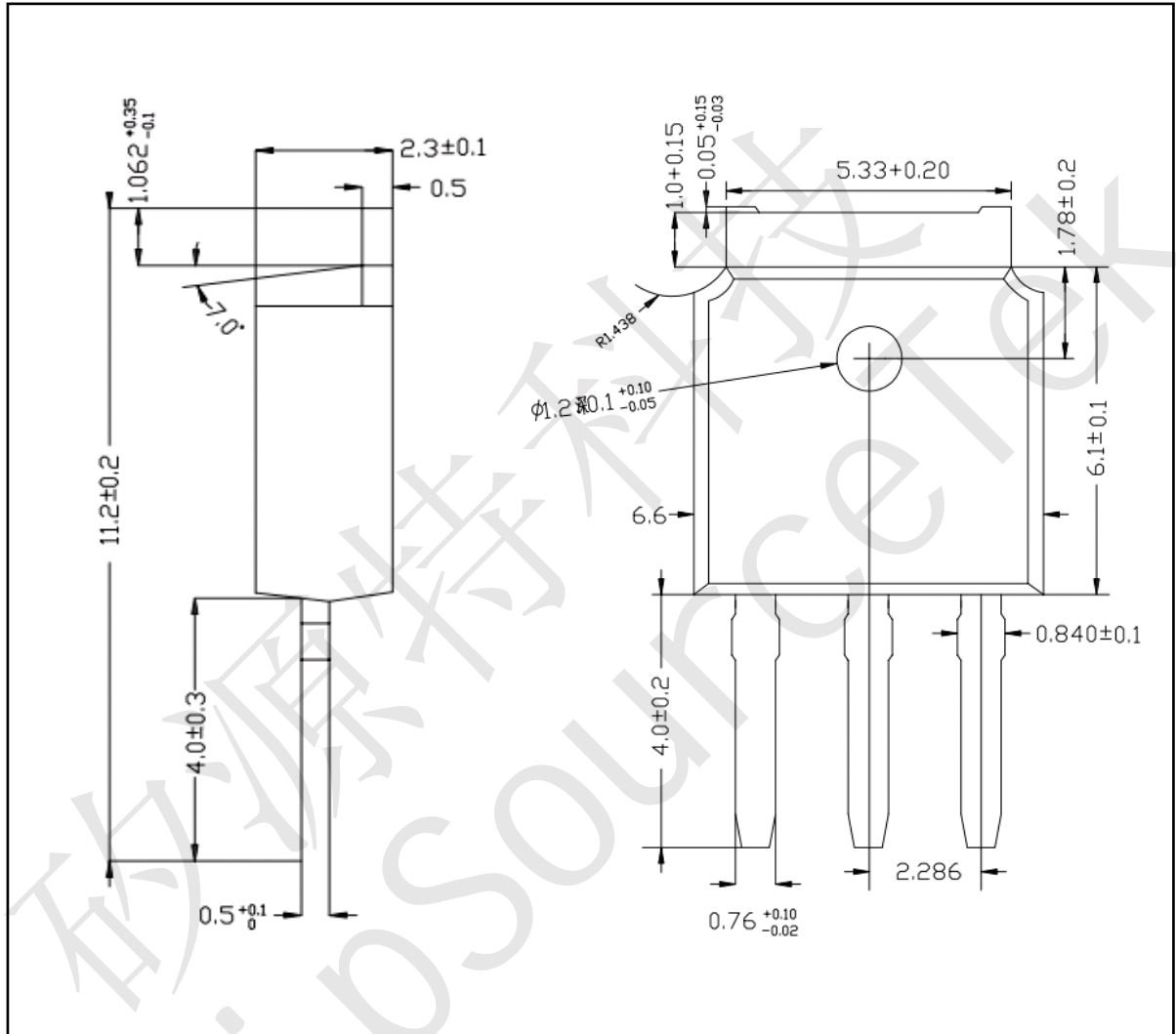
#### ■ TEST CIRCUITS AND WAVEFORMS(Cont.)





MOT9N50C/MOT9N50D N-CHANNEL MOSFET

■ TO-251 PACKAGE OUTLINE DIMENSIONS





MOT9N50C/MOT9N50D N-CHANNEL MOSFET

■ TO-252 PACKAGE OUTLINE DIMENSIONS

