

### PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)}$ typ. (@ $V_{GS} = 10V$ )	0.7 $\Omega$
Qg@type	28nC
ID	9A

### APPLICATIONS

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

### FEATURES

- \* 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

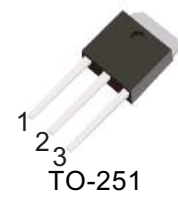
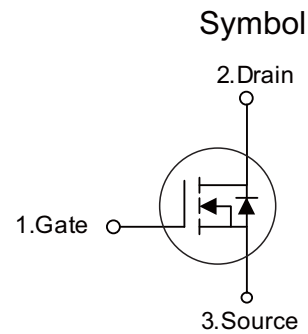
### ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	500	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	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

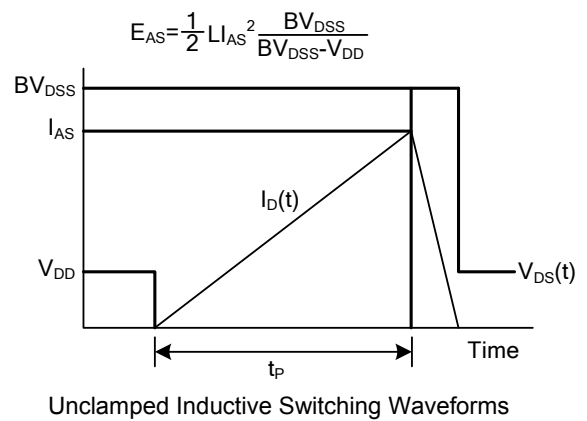
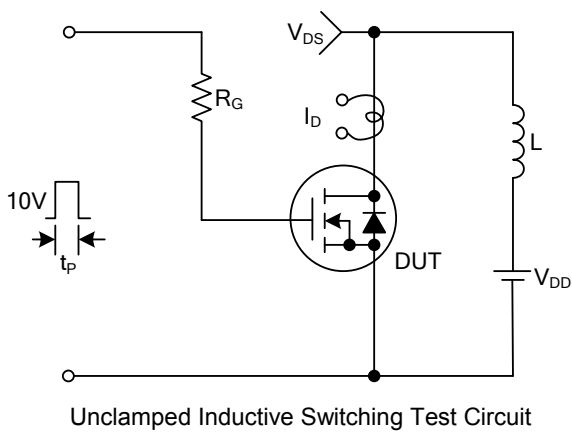
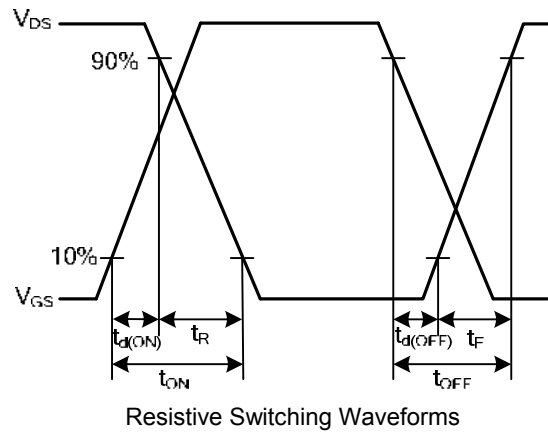
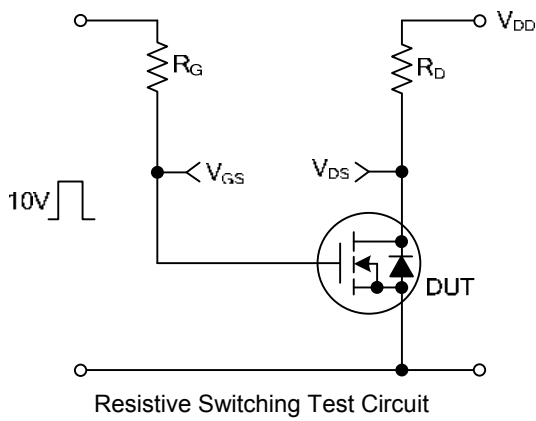
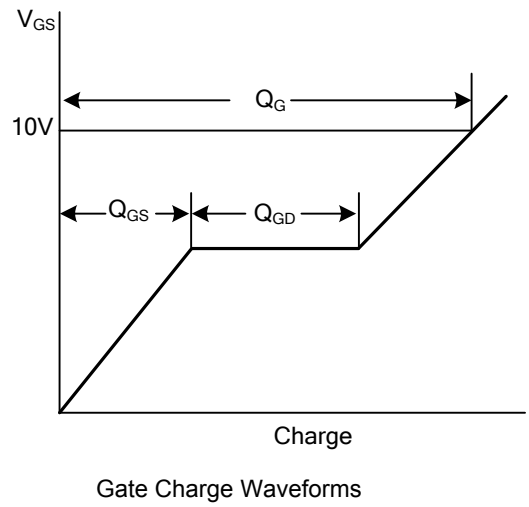
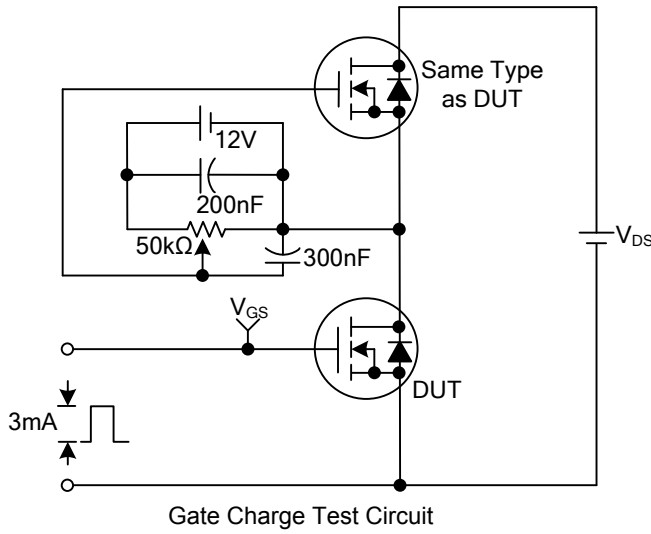


■ ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

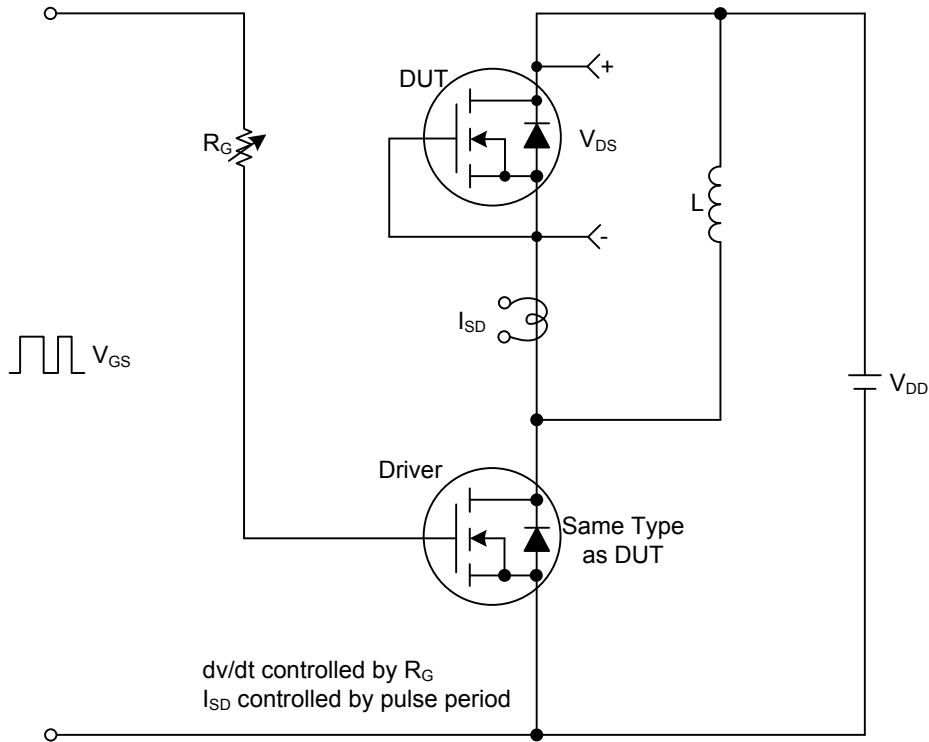
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	500	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=500\text{V}$ , $V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS}=400\text{V}$ , $T_C=125^{\circ}\text{C}$	-	-	10	
Gate- Source Leakage Current	Forward	$I_{GSS}$	-	-	+100	nA
	Reverse				-100	
On characteristics						
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	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=4.5\text{A}$	-	0.7	0.73	$\Omega$
Dynamic characteristics						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$	-	790	-	pF
Output Capacitance	$C_{OSS}$		-	130	-	pF
Reverse Transfer Capacitance	$C_{RSS}$		-	24	-	pF
Switching characteristics						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=400\text{V}$ , $I_D=9\text{A}$ (Note 1, 2)	-	28	-	nC
Gate to Source Charge	$Q_{GS}$		-	4	-	nC
Gate to Drain Charge	$Q_{GD}$		-	15	-	nC
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	-	ns
Rise Time	$t_R$		-	65	-	ns
Turn-OFF Delay Time	$t_{D(OFF)}$		-	93	-	ns
Fall-Time	$t_F$		-	64	-	ns
Source-drain diode ratings and characteristics						
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	$t_{rr}$	$I_S=9\text{A}$ , $V_{GS}=0\text{V}$ , $dI_F/dt=100\text{A}/\mu\text{s}$ (Note 1)	-	335	-	ns
Body Diode Reverse Recovery Charge	$Q_{RR}$		-	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

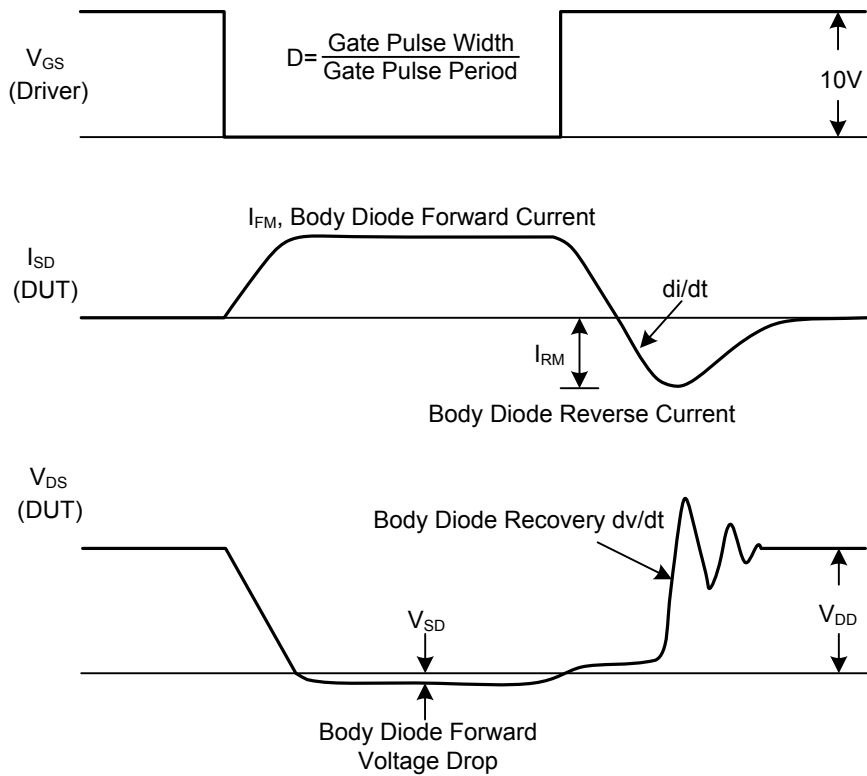
■ TEST CIRCUITS AND WAVEFORMS



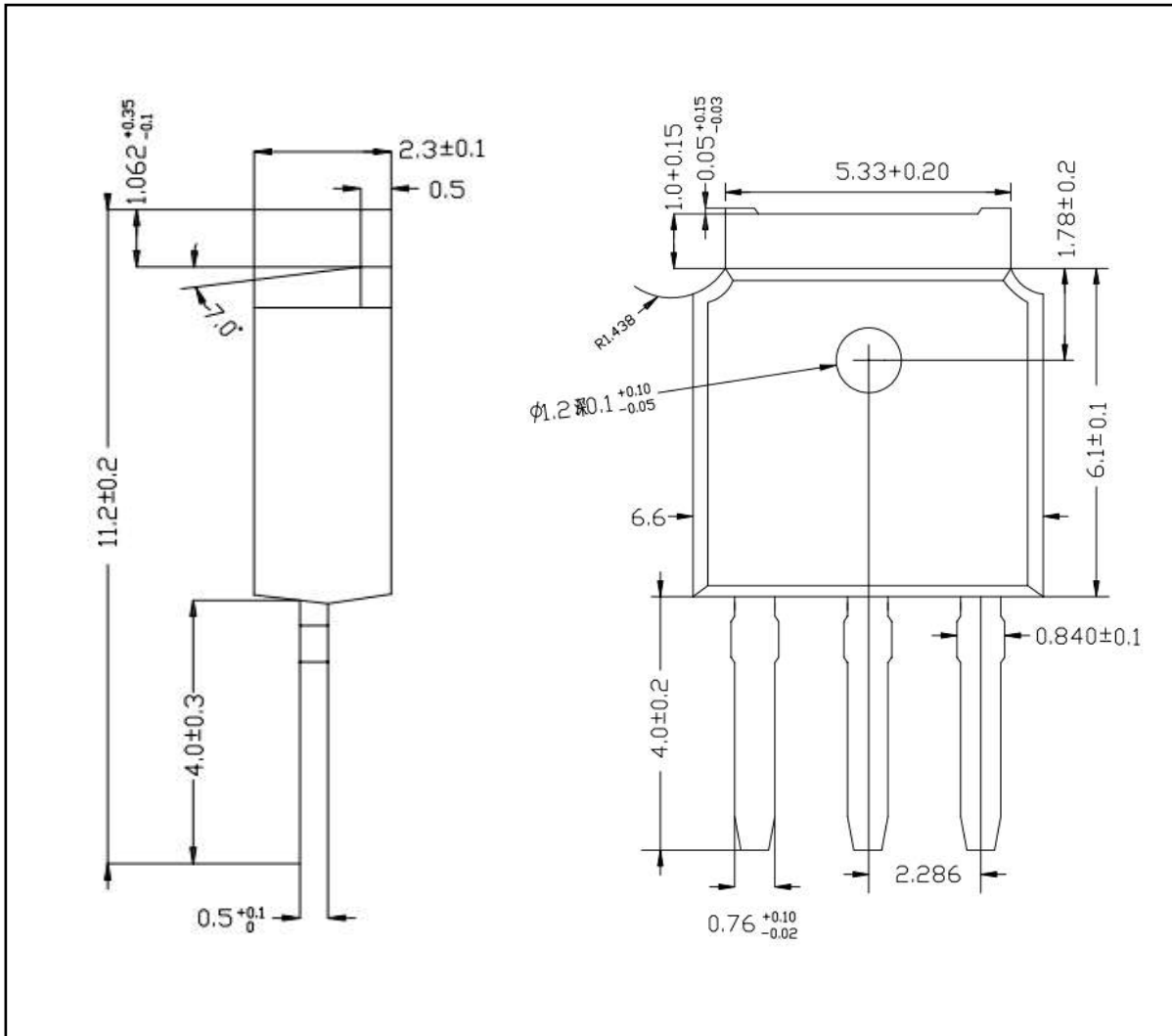
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



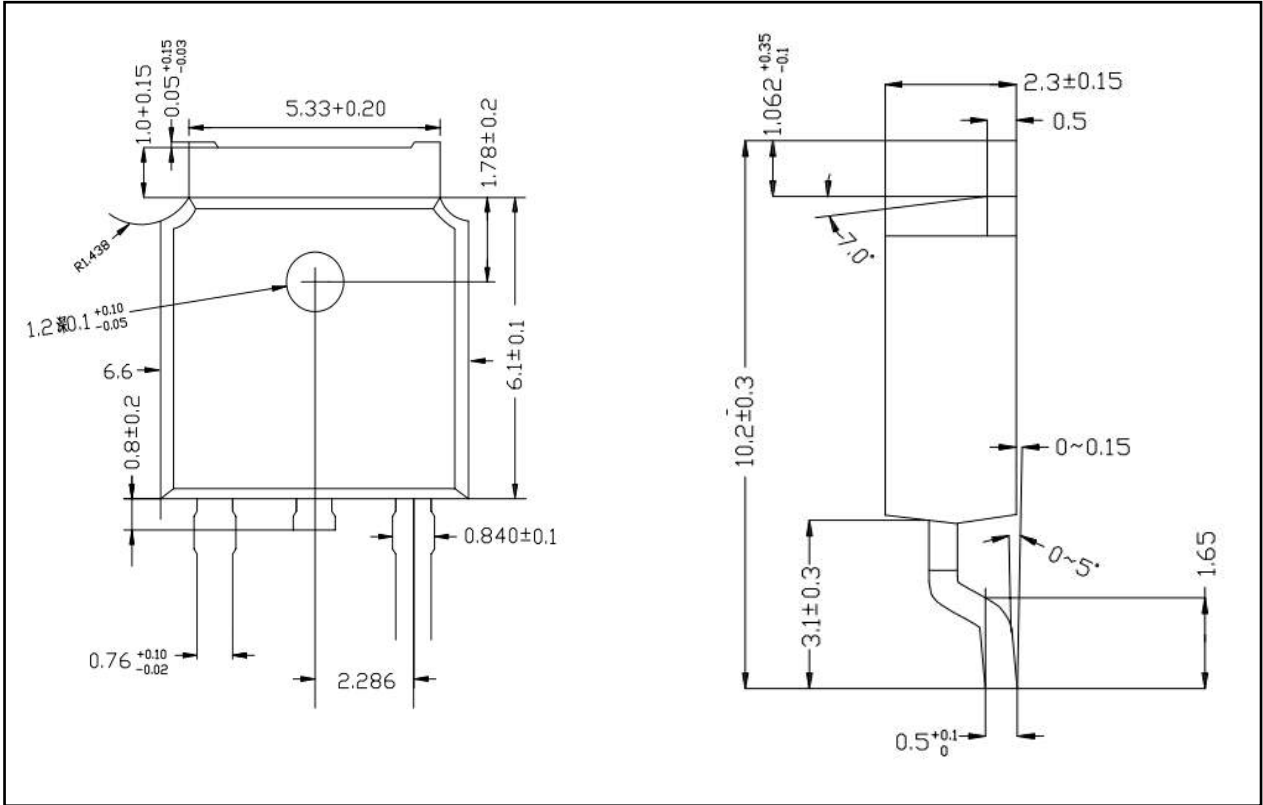
Peak Diode Recovery dv/dt Test Circuit & Waveforms



■ TO-251 PACKAGE OUTLINE DIMENSIONS



■ TO-252 PACKAGE OUTLINE DIMENSIONS



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