

PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)max}(V_{GS}=10V)$	1.5Ω
Qg@type	24nC
ID	5A

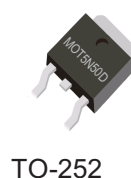
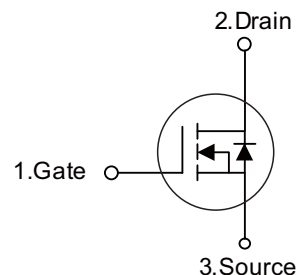
APPLICATIONS

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

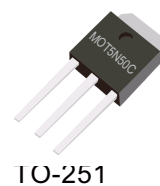
FEATURES

- * $R_{DS(ON)} < 1.5\Omega @ V_{GS}=10V$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

Symbol



TO-252



TO-251

ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT5N50D	TO-252	2500 pieces /Reel
N/A	MOT5N50C	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	I_D	5	A
	Pulsed (Note 2)	I_{DM}	20	A
Avalanche Current (Note 2)		I_{AR}	5	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	300	mJ
	Repetitive (Note 2)	E_{AR}	7.3	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation		P_D	125	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55~+150	°C

Note: 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. $L = 21.5\text{mH}$, $I_{AS} = 5\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

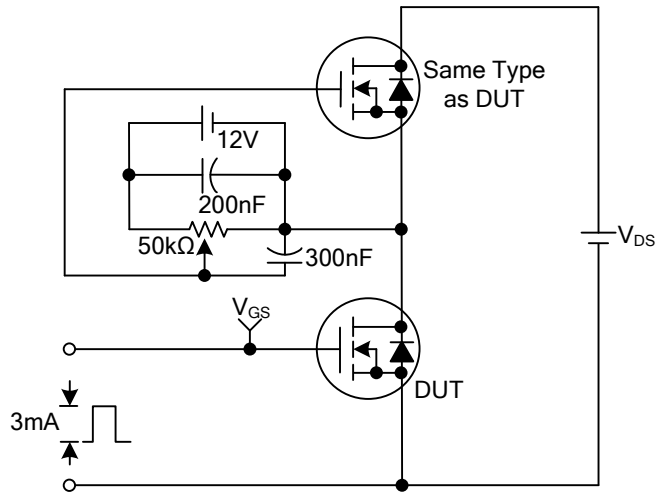
■ ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		0.5		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V			1	μA
			V _{DS} =400V, T _C =125°C			10	
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	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =2.5A		1.35	1.5	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		480	625	pF
Output Capacitance		C _{OSS}			80	105	pF
Reverse Transfer Capacitance		C _{RSS}			15	20	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =400V, I _D =5A (Note 1, 2)		18	24	nC
Gate to Source Charge		Q _{GS}			2.2		nC
Gate to Drain Charge		Q _{GD}			9.7		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =250V, I _D =5A, R _G =25Ω (Note 1, 2)		12	35	ns
Rise Time		t _R			46	100	ns
Turn-OFF Delay Time		t _{D(OFF)}			50	110	ns
Fall-Time		t _F			48	105	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				5	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				20	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =5A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =5A, V _{GS} =0V,		83		ns
Reverse Recovery Charge		Q _{RR}	dl _F /dt=100A/μs (Note 1)		0.25		uC

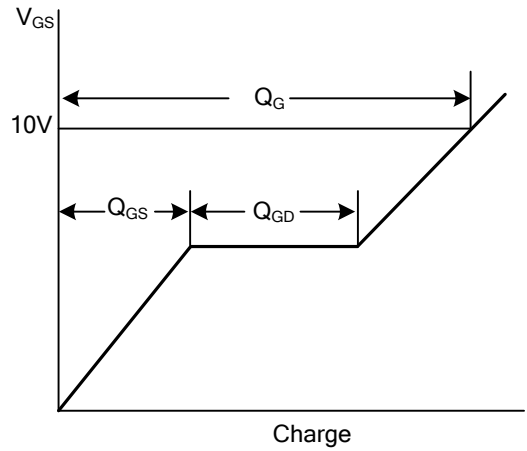
Note: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

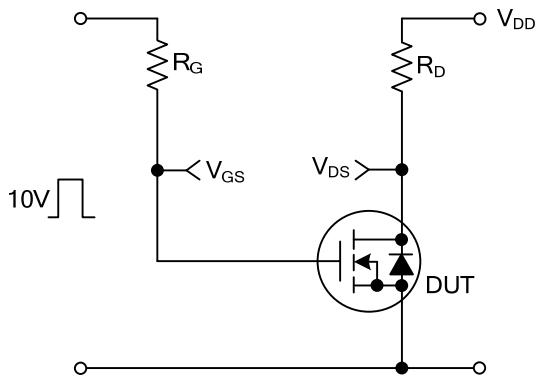
■ TEST CIRCUITS AND WAVEFORMS



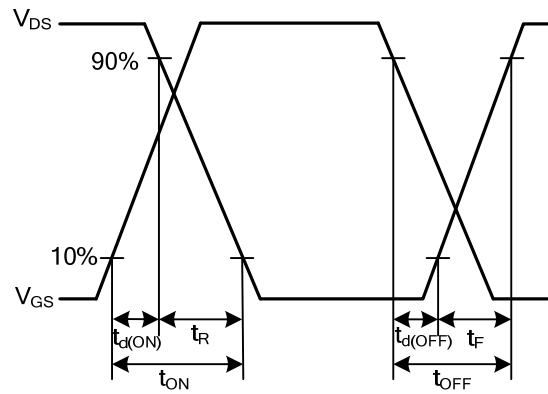
Gate Charge Test Circuit



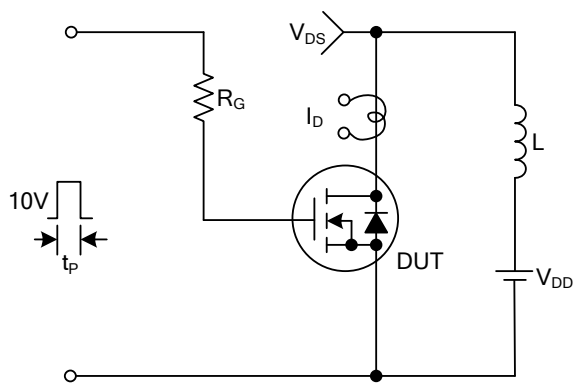
Gate Charge Waveforms



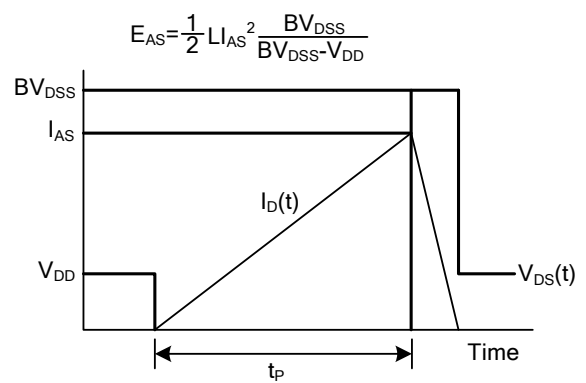
Resistive Switching Test Circuit



Resistive Switching Waveforms

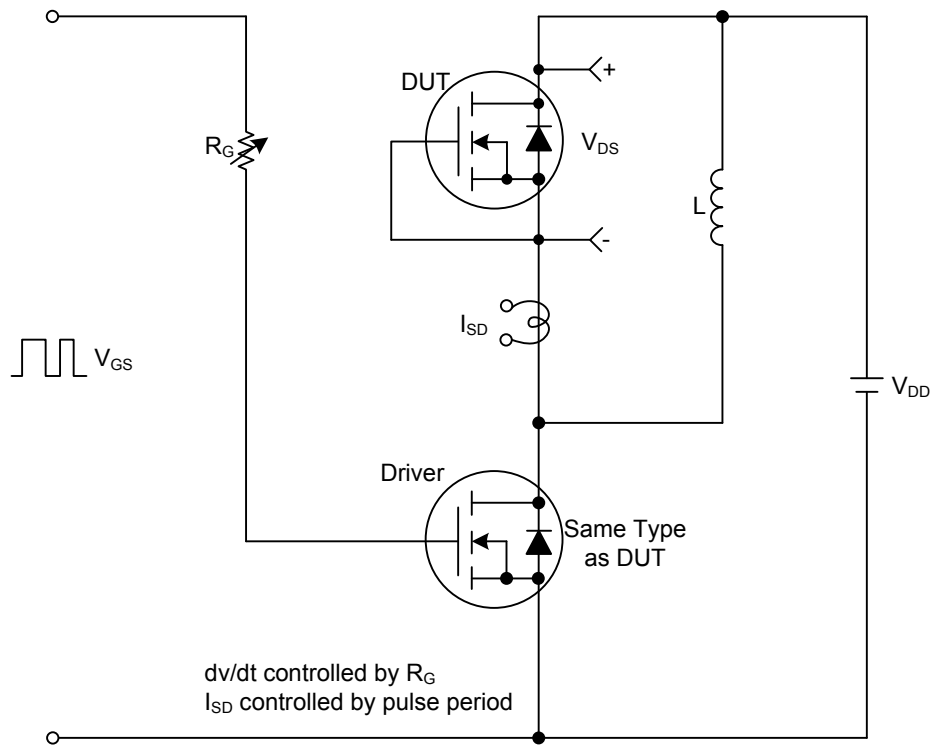


Unclamped Inductive Switching Test Circuit

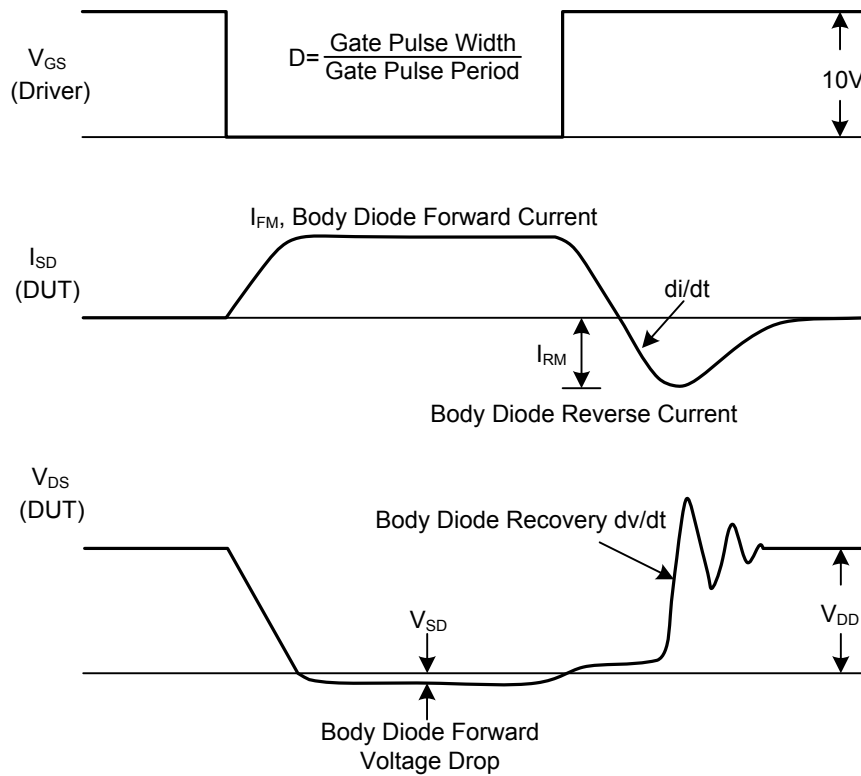


Unclamped Inductive Switching Waveforms

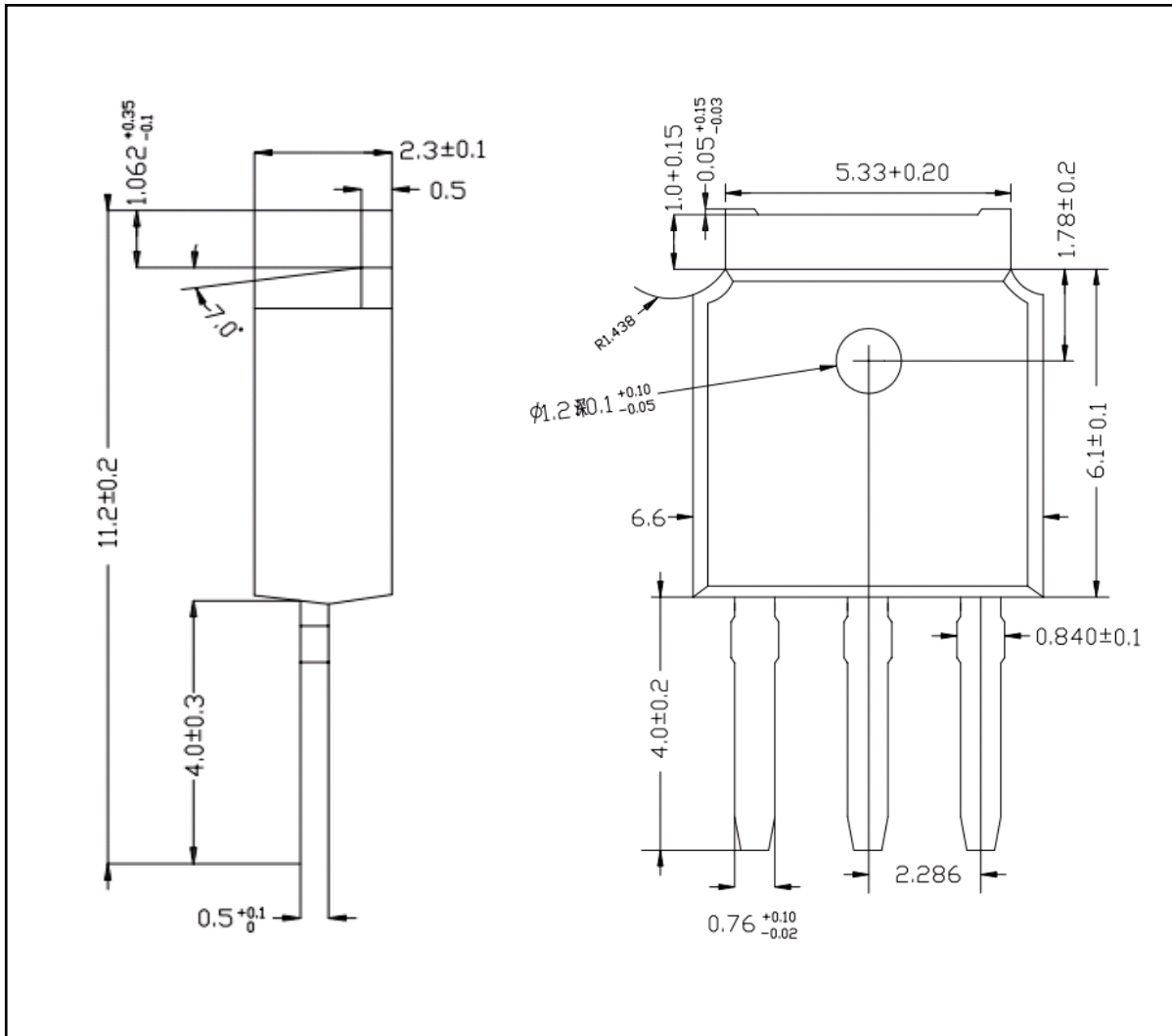
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit & Waveforms



■ TO-251-3L PACKAGE OUTLINE DIMENSIONS



■ TO-252-2L PACKAGE OUTLINE DIMENSIONS

