

PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)Typ}(V_{GS}=10V)$	0.48Ω
Qg@type	56nC
ID	10A

APPLICATIONS

- Electronic ballast
- Switch mode 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	MOT10N50F	TO-220F	50 pieces/Tube
N/A	MOT10N50A	TO-220	50 pieces/Tube

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	Continuous ($T_C=25^{\circ}C$)	I_D	10 (Note2)	A
	Pulsed (Note 3)	I_{DM}	40 (Note 2)	A
Avalanche Current (Note 3)		I_{AR}	10	A
Avalanche Energy	Single Pulsed (Note 4)	E_{AS}	388	mJ
	Repetitive (Note 5)	E_{AR}	14.3	mJ
Peak Diode Recovery dv/dt (Note 5)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P_D	143	W
	TO-220F		48	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. Drain current limited by maximum junction temperature

3. Repetitive Rating: Pulse width limited by maximum junction temperature

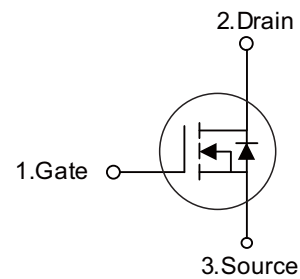
4. $L = 7mH$, $I_{AS} = 10A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}C$

5. $I_{SD} \leq 10A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}C$

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-220F		62.5	°C/W
Junction to Case	TO-220	θ_{JC}	0.87	°C/W
	TO-220F		2.58	°C/W

Symbol



TO-220



TO-220F

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

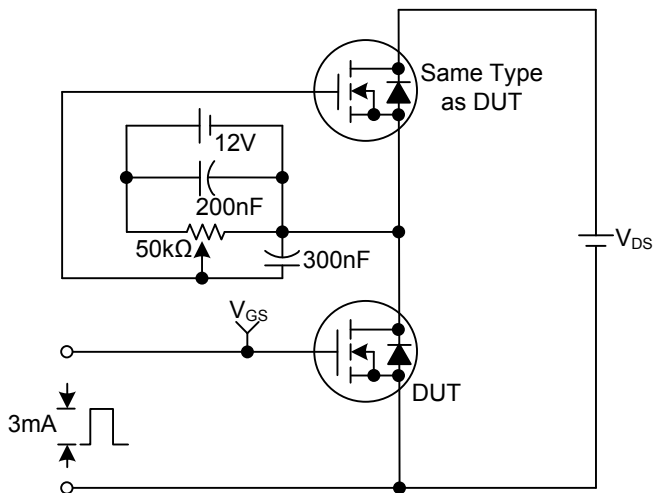
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V	-	-	+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	2.0	-	4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =5A	-	0.48	0.54	Ω
Dynamic characteristics							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	1610	-	pF
Output Capacitance		C _{OSS}		-	177	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	16	-	pF
Switching characteristics							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =400V, I _D =10A (Note 6, 7)	-	43	-	nC
Gate to Source Charge		Q _{GS}		-	7.5	-	nC
Gate to Drain Charge		Q _{GD}		-	18.5	-	nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =250V, I _D =10A, R _G =25Ω (Note 6, 7)	-	29	-	ns
Rise Time		t _R		-	80	-	ns
Turn-OFF Delay Time		t _{D(OFF)}		-	141	-	ns
Fall-Time		t _F		-	80	-	ns
Source-drain diode ratings and characteristics							
Maximum Body-Diode Continuous Current		I _S		-	-	10	A
Maximum Body-Diode Pulsed Current		I _{SM}		-	-	40	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =10A, V _{GS} =0V	-	-	1.4	V
Body Diode Reverse Recovery Time		t _{RR}	I _S =10A, V _{GS} =0V, dI _F /dt=100A/μs	-	50	-	ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note 6)	-	0.1	-	μC

Notes: 6. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

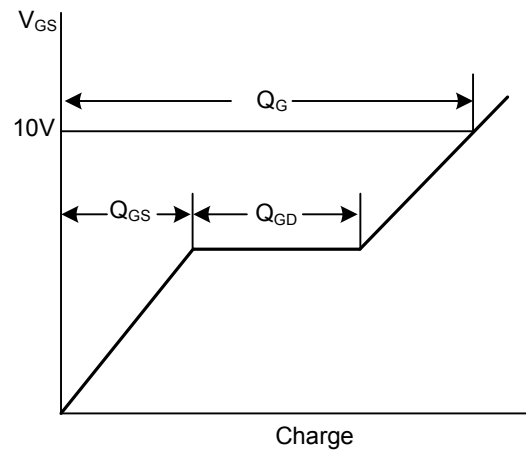
7. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

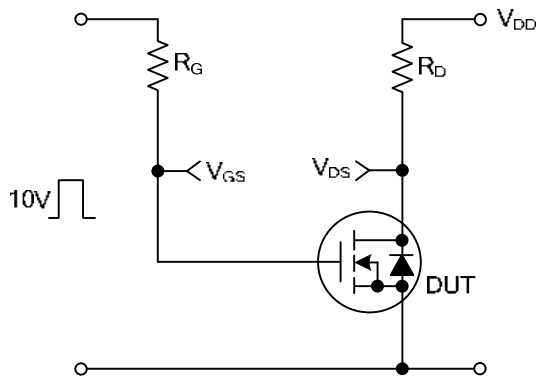
Gate Charge Test Circuit



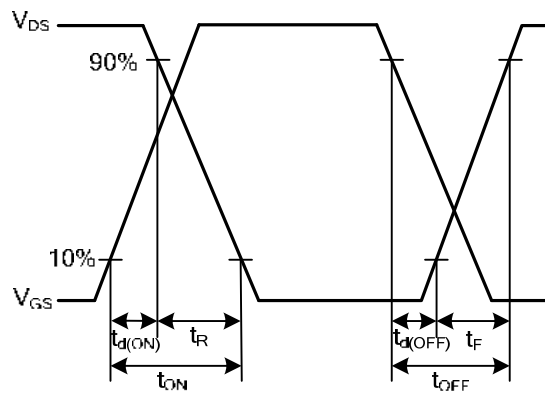
Gate Charge Waveforms



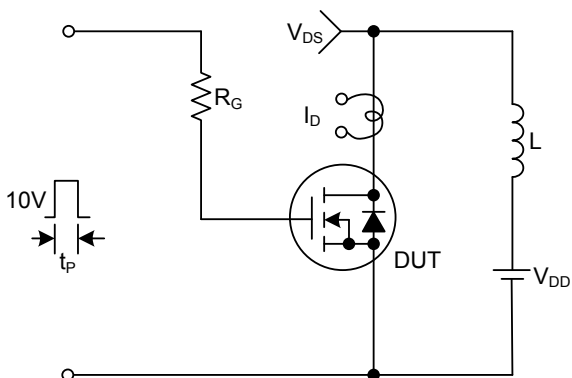
Resistive Switching Test Circuit



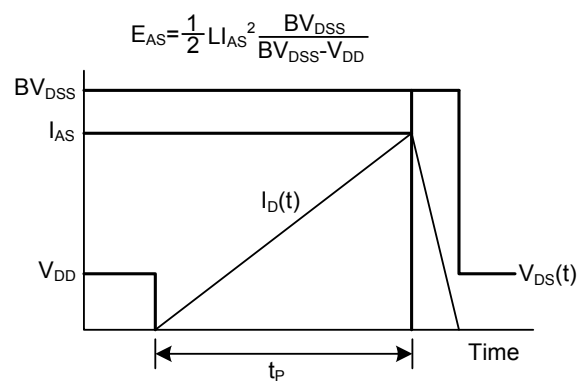
Resistive Switching Waveforms



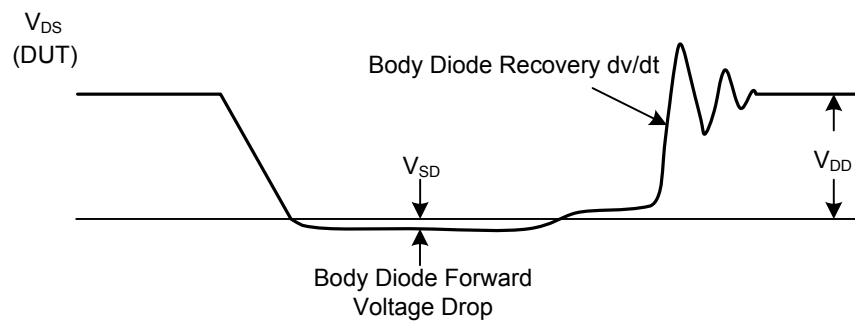
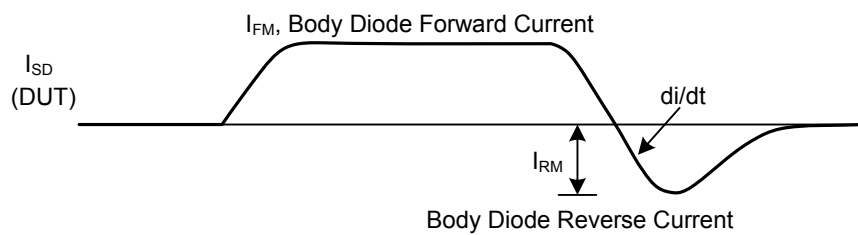
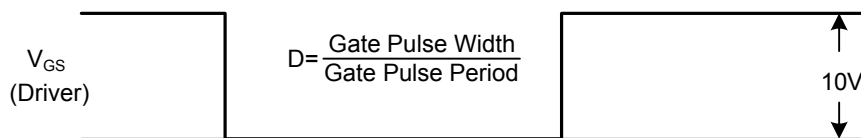
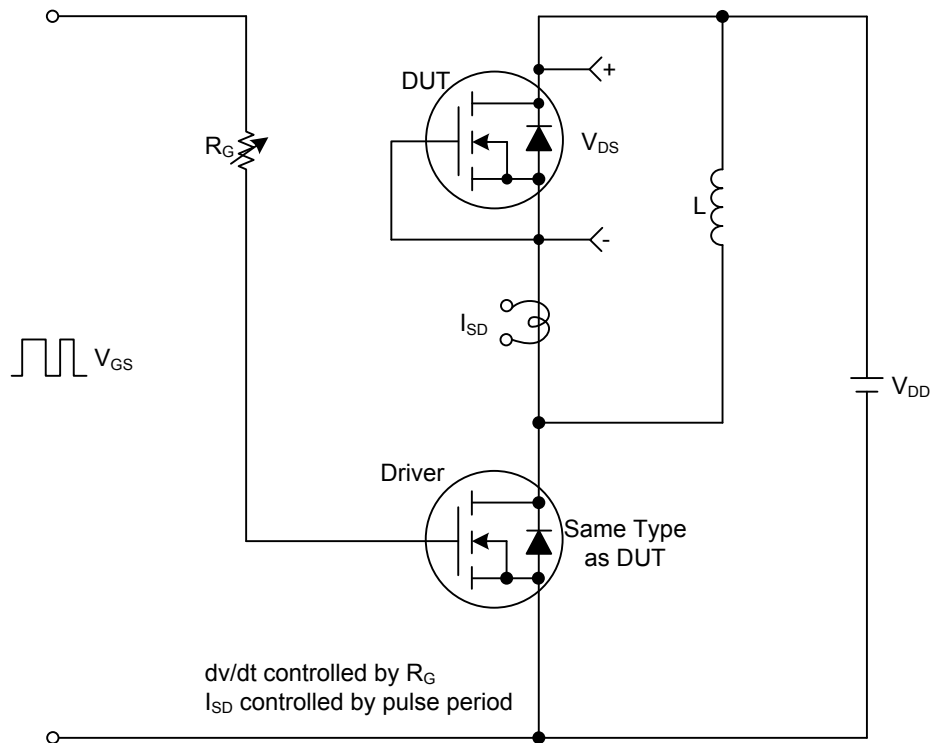
Unclamped Inductive Switching Test Circuit



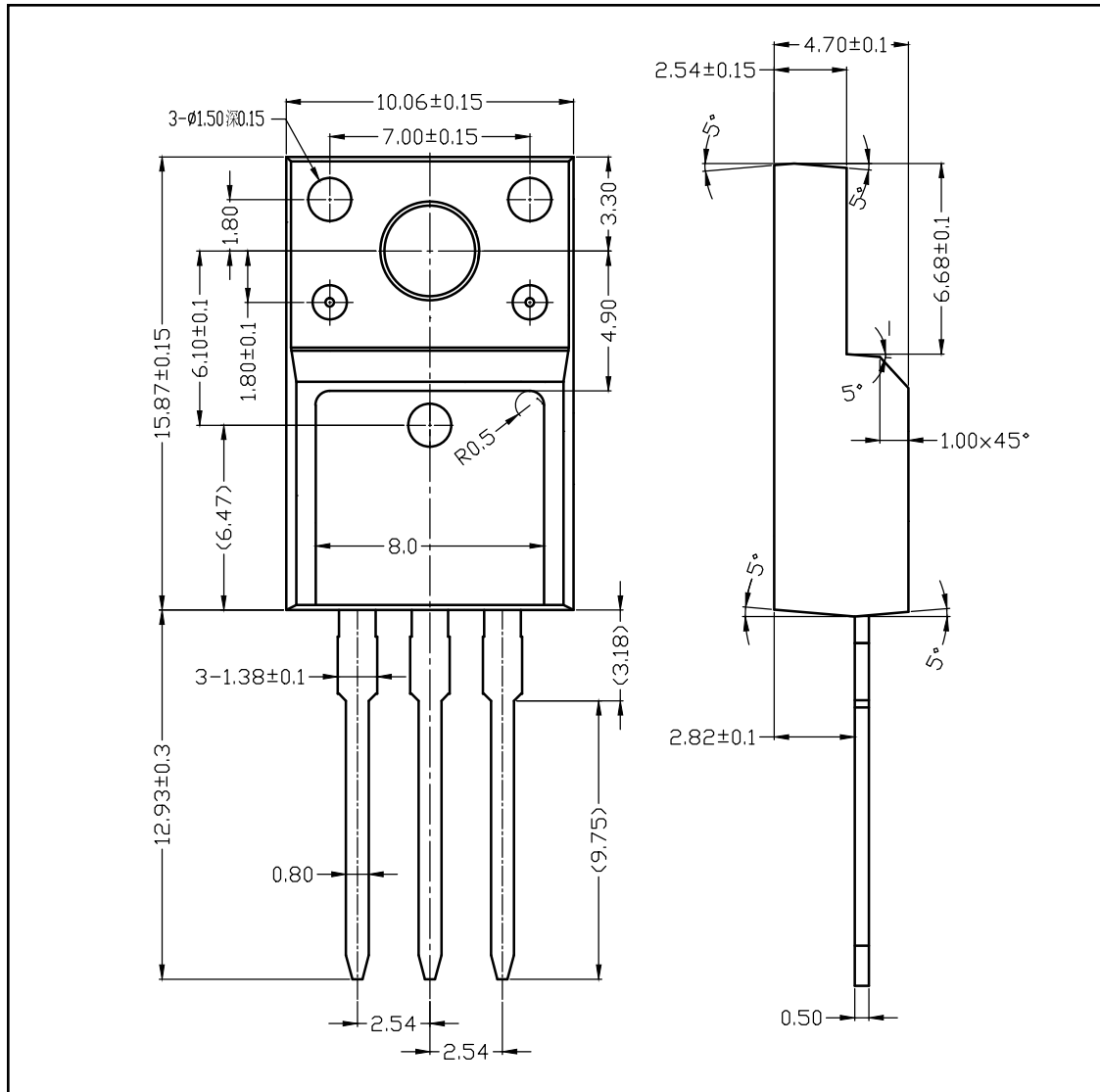
Unclamped Inductive Switching Waveforms



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



■ TO-220F PACKAGE OUTLINE DIMENSIONS



■ TO-220 PACKAGE OUTLINE DIMENSIONS

