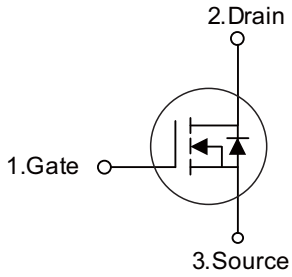
■ PRODUCT CHARACTERISTICS

VDSS	800V
R_{DS}(on)typ(@V_{GS} =10 V)	1.3Ω
Qg@type	45nC
ID	12A

Symbol



■ APPLICATIONS

- Electronic ballast
- Switch mode power supply

■ FEATURES

* Fast Switching Capability
* Avalanche Energy Specified
* Improved dv/dt Capability, High Ruggedness

TO-220

TO-220F

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT12N80HSF	TO-220F	50 pieces/Tube
N/A	MOT12N80SA	TO-220	50 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current (T_C = 25°C)		I_D	12	A
Pulsed Drain Current (Note 2)		I_{DM}	48	A
Avalanche Current (Note 2)		I_{AR}	12	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	920	mJ
	Repetitive (Note 2)	E_{AR}	24	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation	TO-220AB	P_D	240	W
	TO-220F		36	
Linear Derating Factor above T_C = 25°C	TO-220AB		1.92	°C/W
	TO-220F		0.288	
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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.

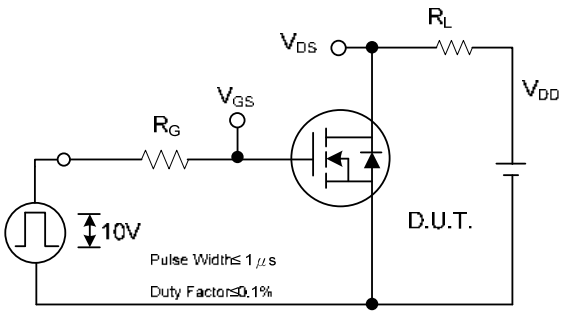
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L=17.3mH, I_{AS}=10A, V_{DD}=50V, R_G=25Ω, Satarting T_J=25°C
4. I_{SD} ≤ 10 A, di/dt ≤ 200A/μs, V_{DD} ≤BV_{DSS}, Satarting T_J=25°C.

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

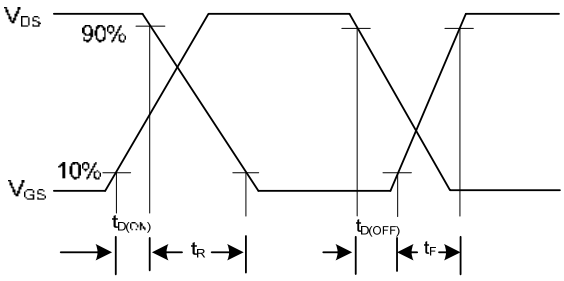
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0 V, I_D	800	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =800V, V_{GS} =0 V	-	-	10	μA
		V_{DS} =640V, T_C =125°C	-	-	100	
Gate-Body Leakage Current	I_{GSS}	V_{DS} =0 V, V_{GS} = ±30 V	-	-	±100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D =250 μA, Referenced to 25°C	-	0.98	-	mV/°C
On characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250 μA	3.0	-	5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 6.0 A	-	1.3	1.5	Ω
Dynamic characteristics						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS} =0V, f=1MHz	-	2150	-	pF
Output Capacitance	C_{OSS}		-	180	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	15	-	pF
Switching characteristics						
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=400V, I_D=12.0A, R_G=25Ω(Note 1,2)	-	50	-	ns
Turn-ON Rise Time	t_R		-	130	-	
Turn-OFF Delay Time	$t_{D(OFF)}$		-	90	-	
Turn-OFF Fall-Time	t_F		-	80	-	
Total Gate Charge	Q_G	V_{DS} =640V, V_{GS} =10V, I_D =12.0A (Note 1,2)	-	45	-	nC
Gate Source Charge	Q_{GS}		-	13.5	-	
Gate Drain Charge	Q_{GD}		-	17	-	
Source-drain-diode ratings and characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	I_S=12.0 A,V_{GS}=0V	-	-	1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S		-	-	10.0	A
Maximum Pulsed Drain-Source Diode Diode Forward Current	I_{SM}		-	-	40.0	
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI_F /dt = 100 A/μs, I_S = 12.0 A (Note 1)	-	730	-	ns
Reverse Recovery Charge	Q_{RR}		-	10.9	-	nC

Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. Independent of operating temperature.

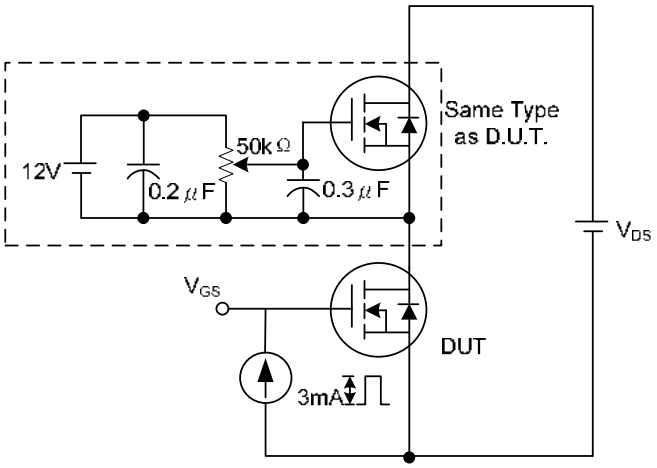
■ TEST CIRCUITS AND WAVEFORMS



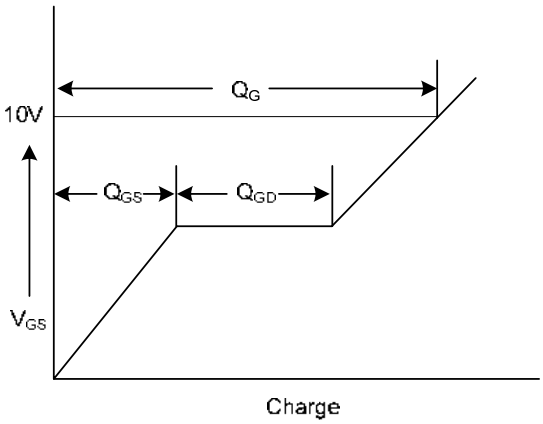
Switching Test Circuit



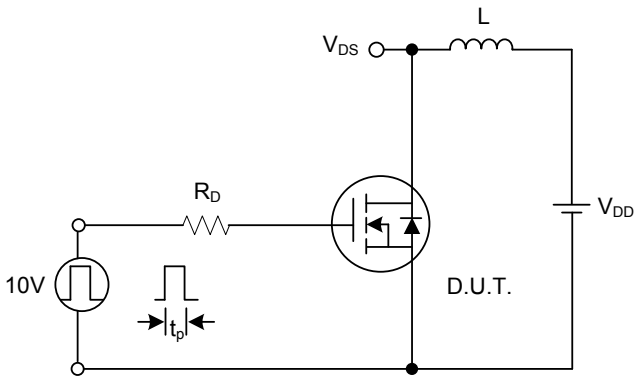
Switching Waveforms



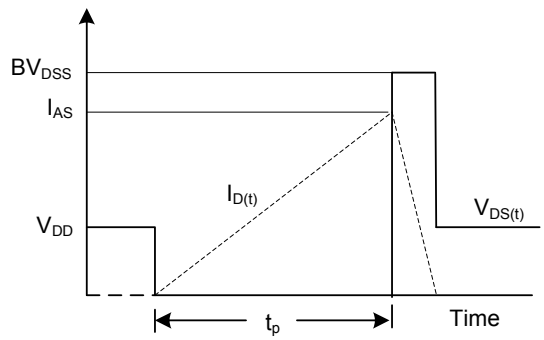
Gate Charge Test Circuit



Gate Charge Waveform

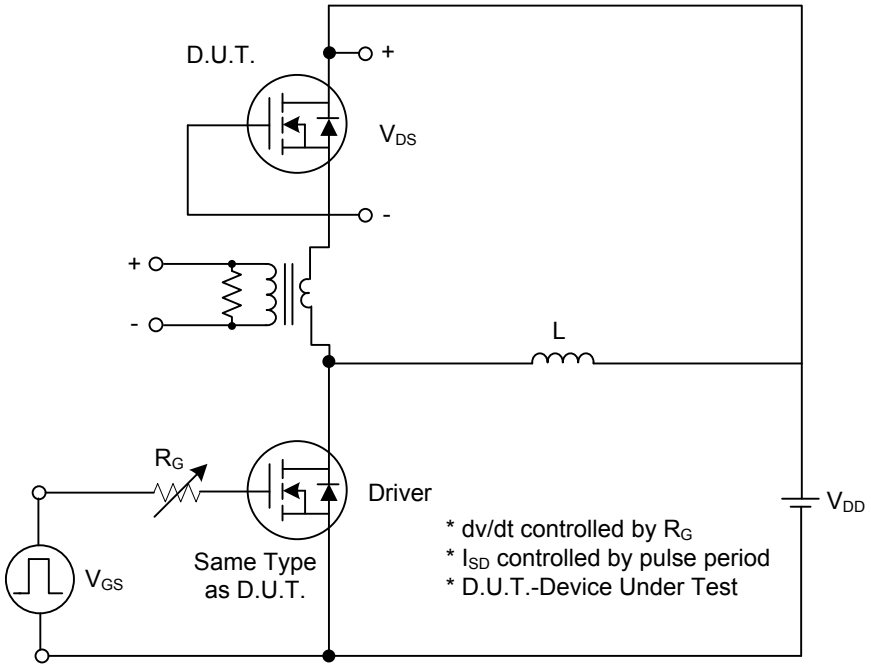


Unclamped Inductive Switching Test Circuit

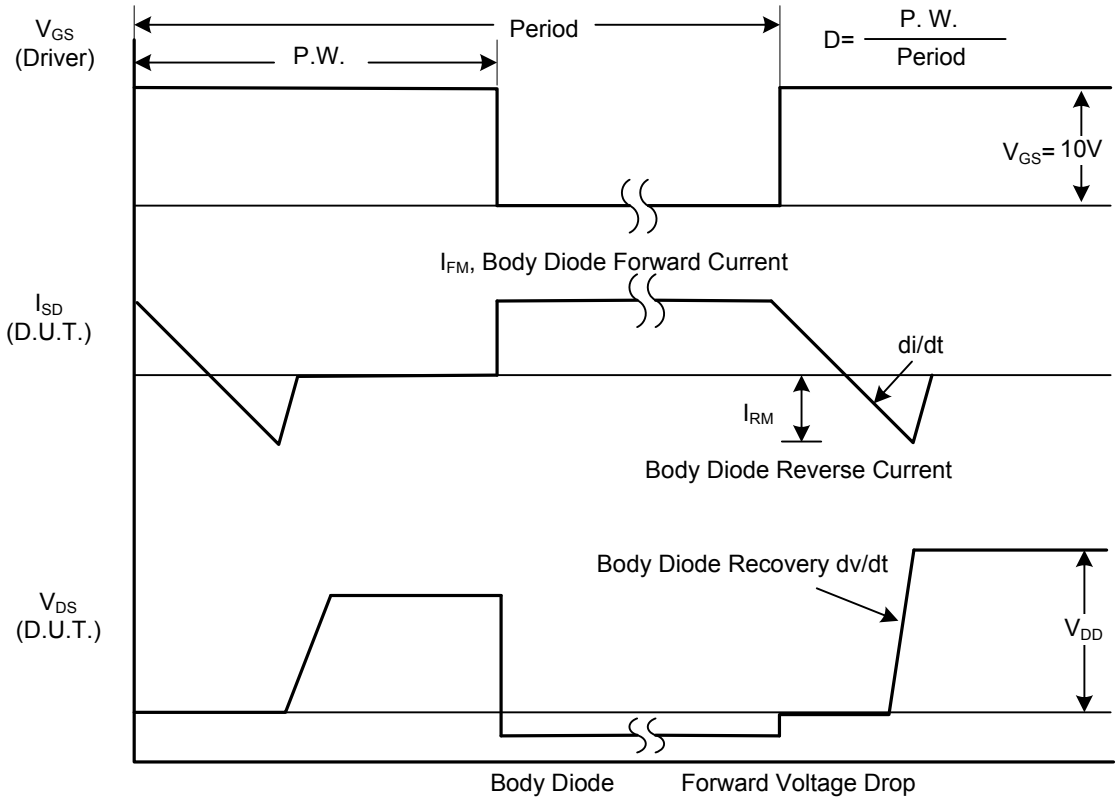


Unclamped Inductive Switching Waveforms

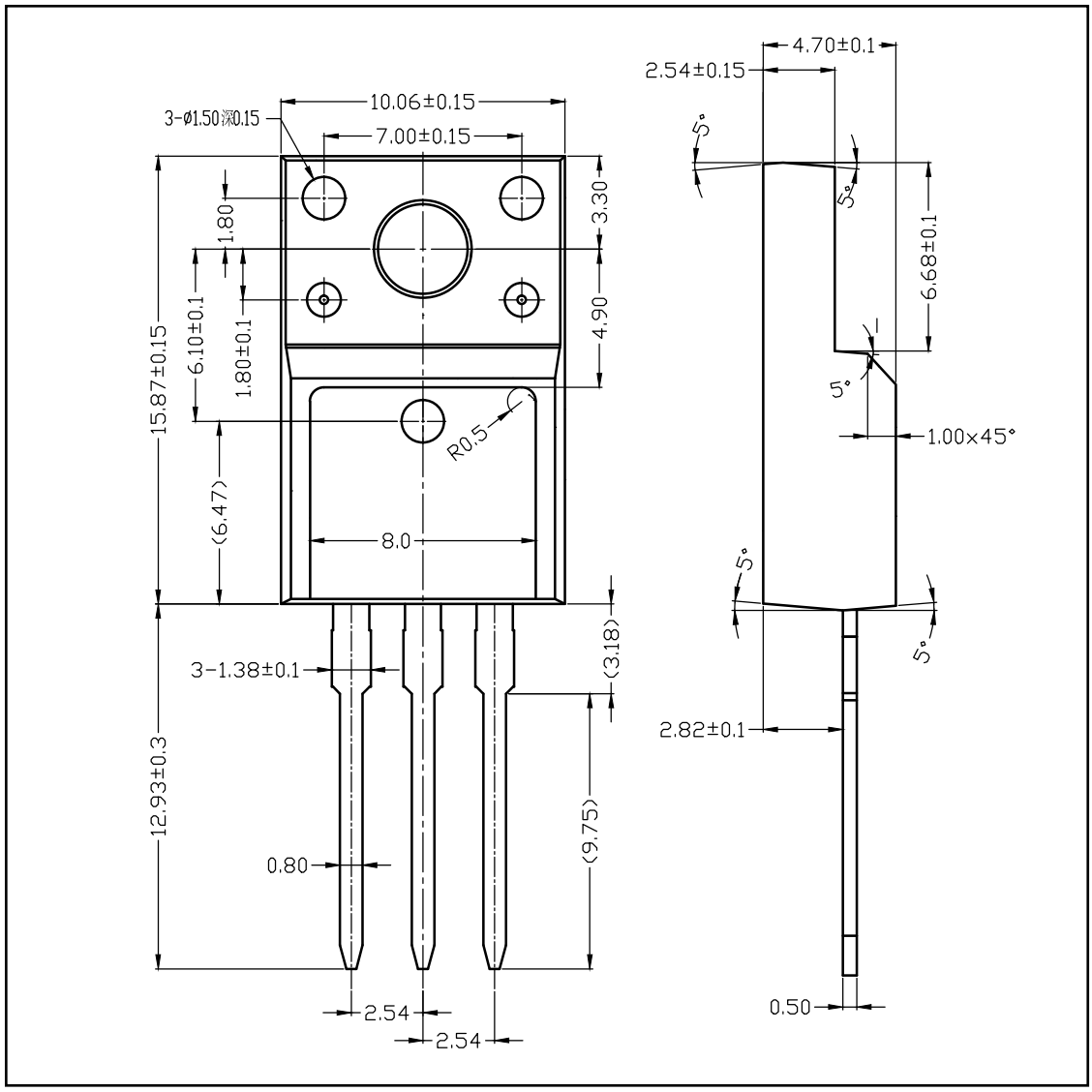
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS