

■ PRODUCT CHARACTERISTICS

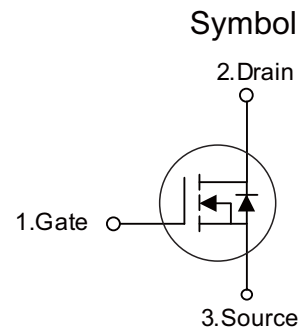
VDSS	600V
$R_{DS(on)Typ}(@V_{GS} = 10V)$	0.57Ω
Qg@type	38nC
ID	12A

■ APPLICATIONS

- * High efficiency switch mode power supplies
- * Electronic lamp ballasts based on half bridge
- * LED power supplies

■ FEATURES

- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness



■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT12N60F	TO-220F	50 pieces/Tube
N/A	MOT12N60A	TO-220	50 pieces/Tube

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	Continuous	I_D	12	A
	Pulsed (Note 2)	I_{DM}	48	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	480	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.78	V/ns
Power Dissipation	TO-220	P_D	225	W
	TO-220F		51	W
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-55 ~ +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 = 5.8mH, $I_{AS} = 12A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}C$

4. $I_{SD} \leq 12A$, di/dt $\leq 200A/s$, $V_{DD} \leq BV_{DSS}$ Starting $T_J = 25^{\circ}C$

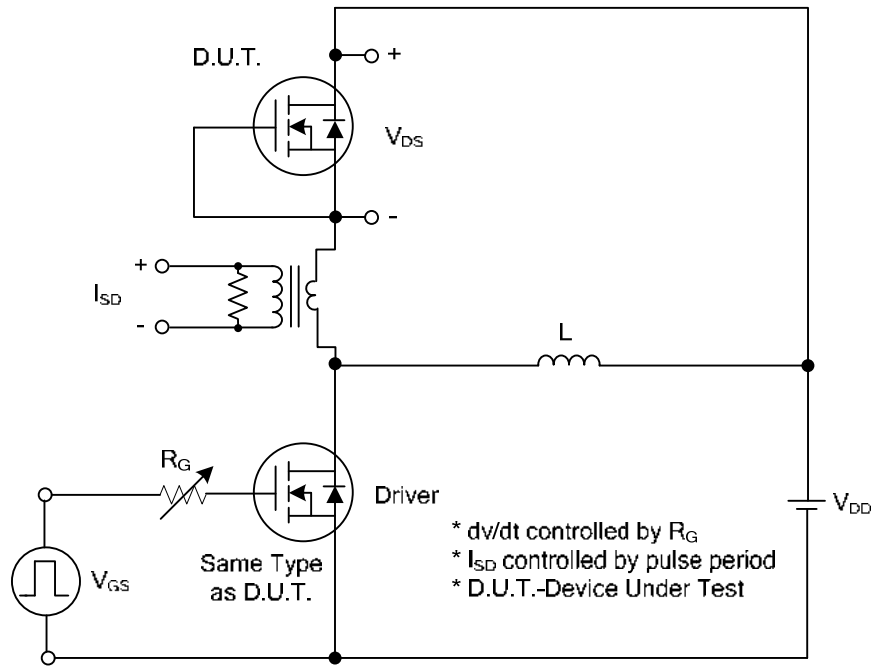
■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	600	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V	-	-	1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C	-	0.7	-	V/°C
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 =6.0A	-	0.57	0.70	Ω
Dynamic characteristics						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	1880	-	pF
Output Capacitance	C _{OSS}		-	180	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	10	-	pF
Switching characteristics						
Total Gate Charge	Q _G	V _{DS} =300V, I _D =12A, V _{GS} =10V I _G =1mA(Note1,2)	-	38	-	nC
Gate-Source Charge	Q _{GS}		-	13	-	nC
Gate-Drain Charge	Q _{GD}		-	8	-	nC
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note1,2)	-	90	-	ns
Turn-On Rise Time	t _R		-	109	-	ns
Turn-Off Delay Time	t _{D(OFF)}		-	190	-	ns
Turn-Off Fall Time	t _F		-	100	-	ns
Source-drain diode ratings and characteristics						
Maximum Continuous Drain-Source Diode Forward Current	I _S		-	-	12	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}		-	-	48	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =12A	-	-	1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =0.2A,	-	544	-	ns
Reverse Recovery Charge	Q _{rr}	di/dt=100A/μs	-	5.9	-	μC

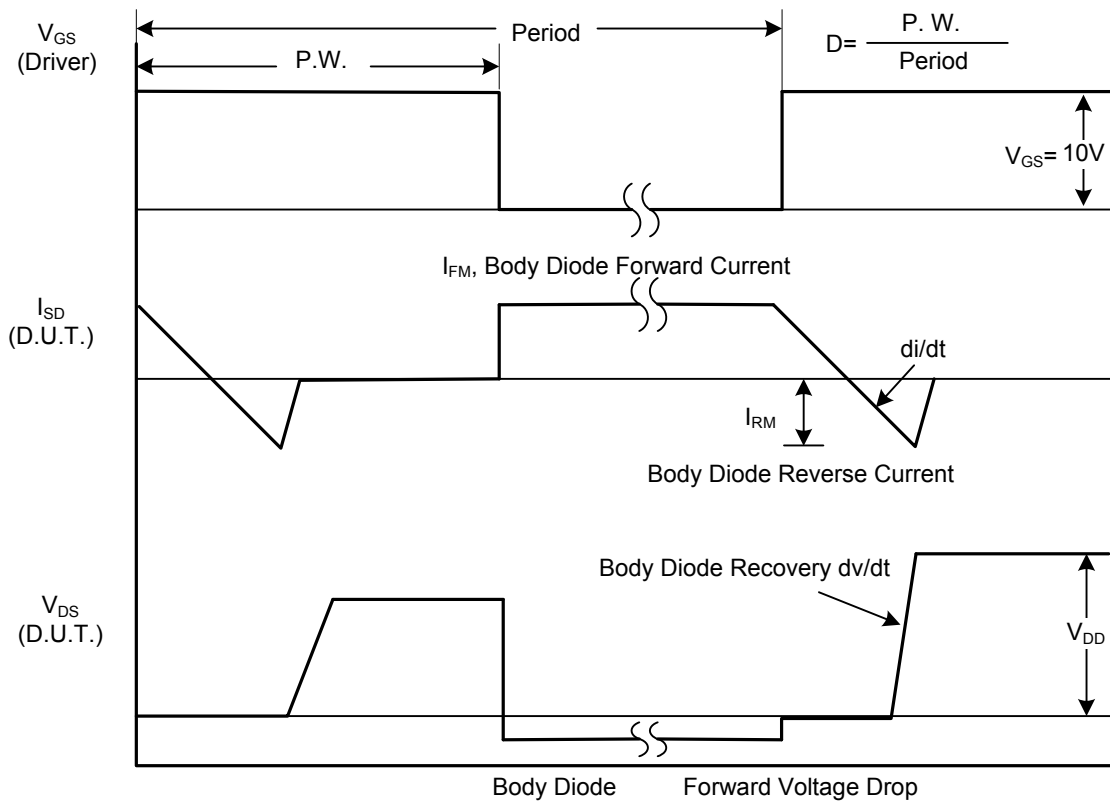
Notes: 1. Pulse Test : Pulse width ≤300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

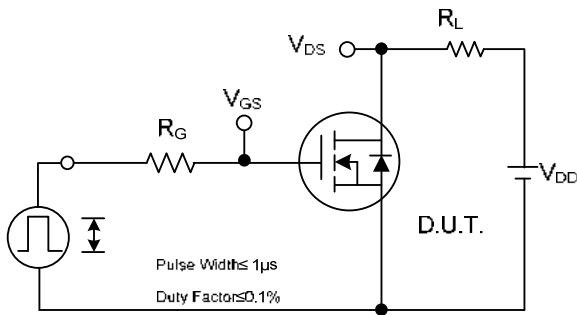


Peak Diode Recovery dv/dt Test Circuit

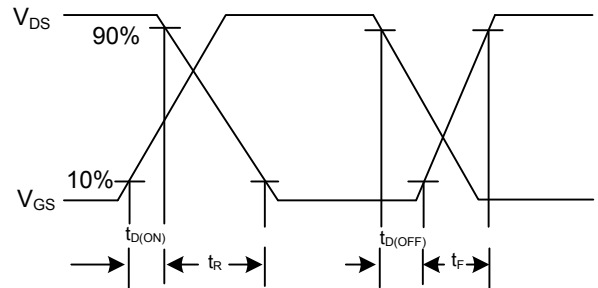


Peak Diode Recovery dv/dt Waveforms

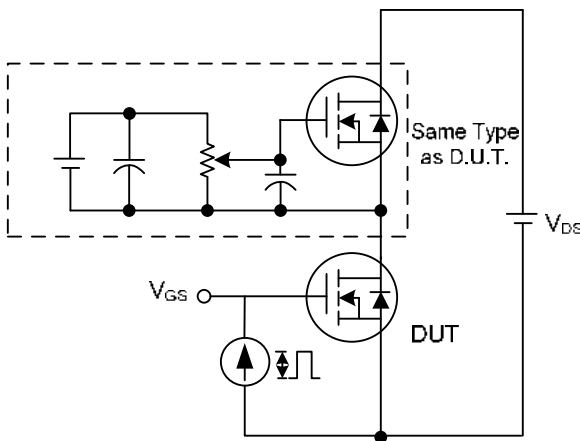
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



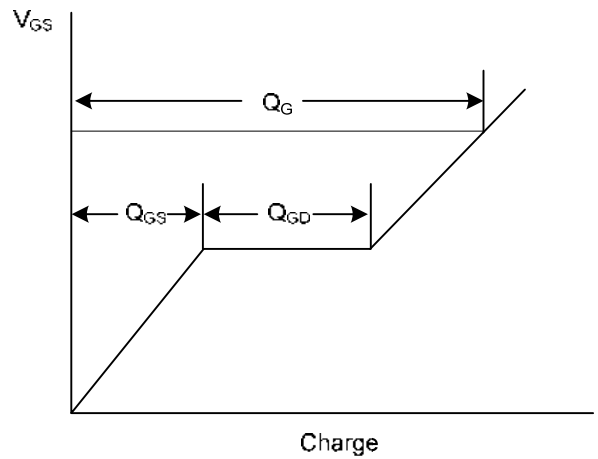
Switching Test Circuit



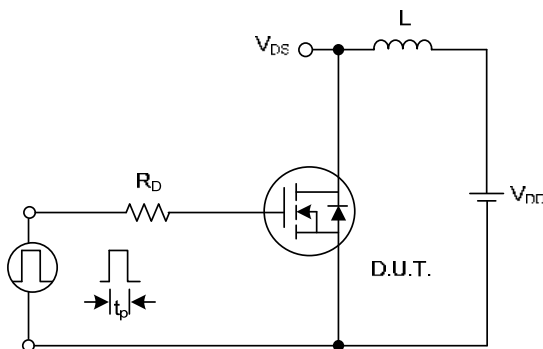
Switching Waveforms



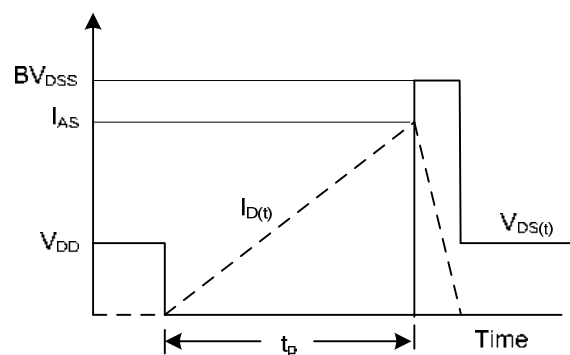
Gate Charge Test Circuit



Gate Charge Waveform

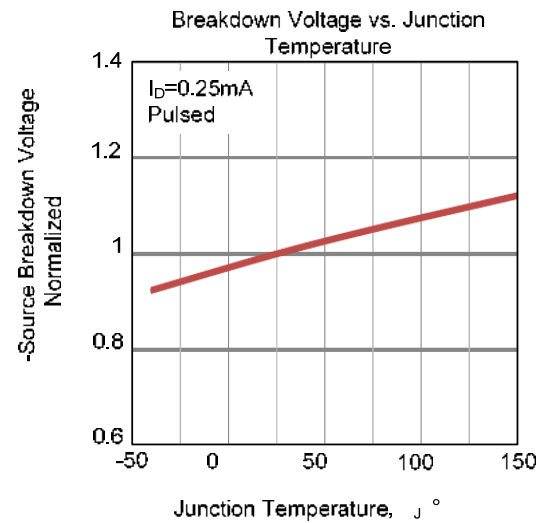
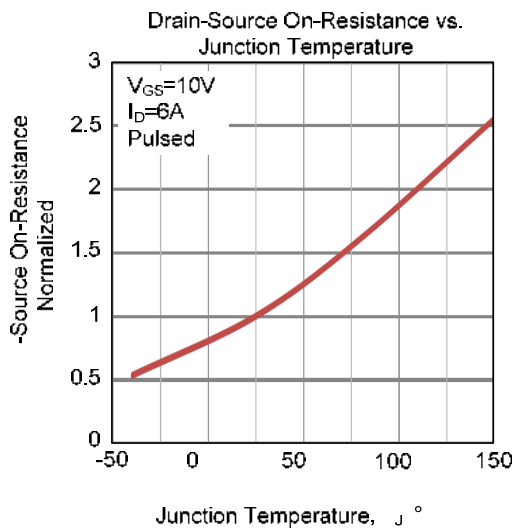
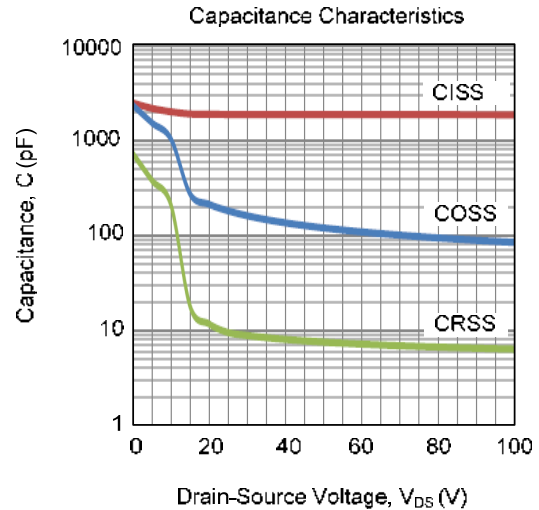
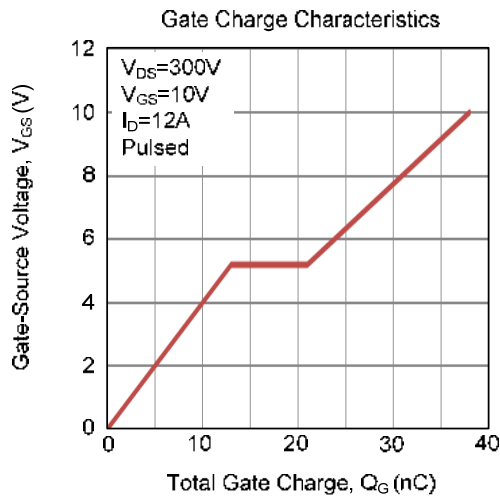
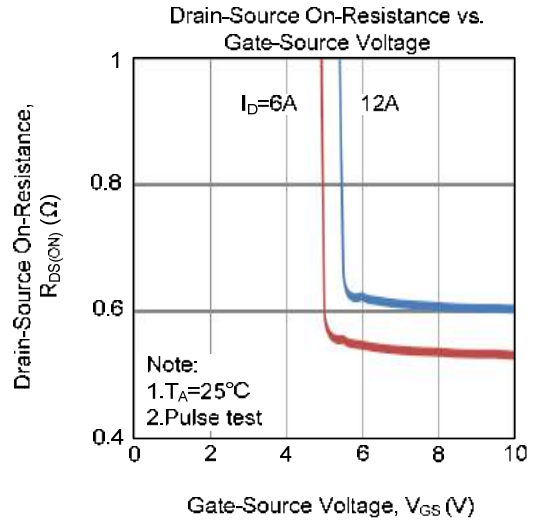
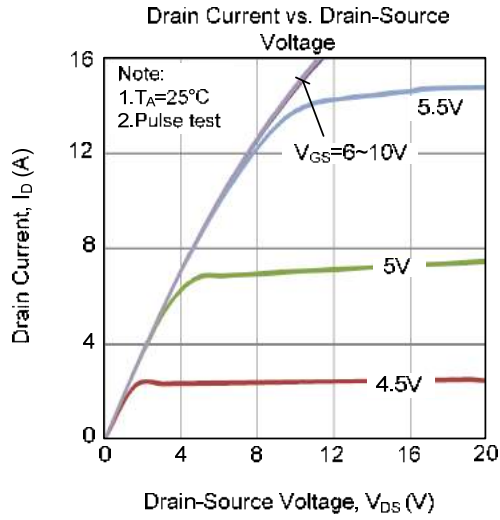


Unclamped Inductive Switching Test Circuit

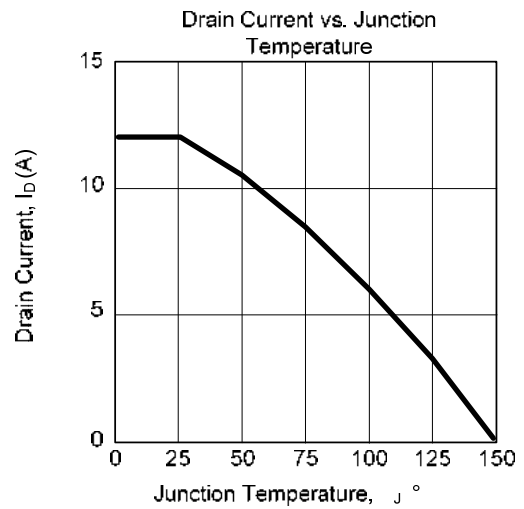
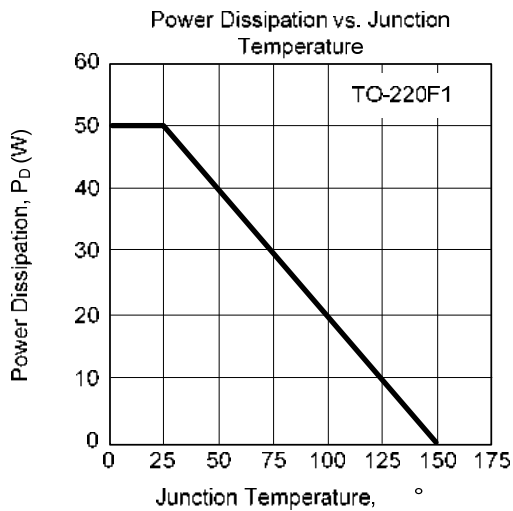
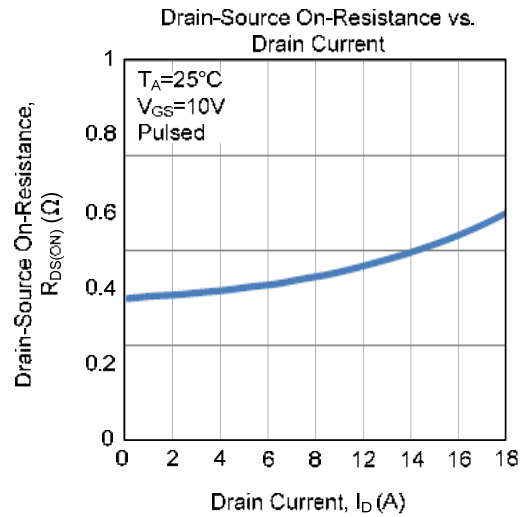
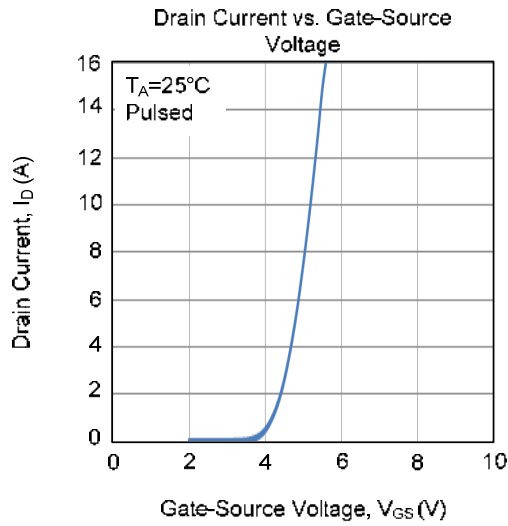
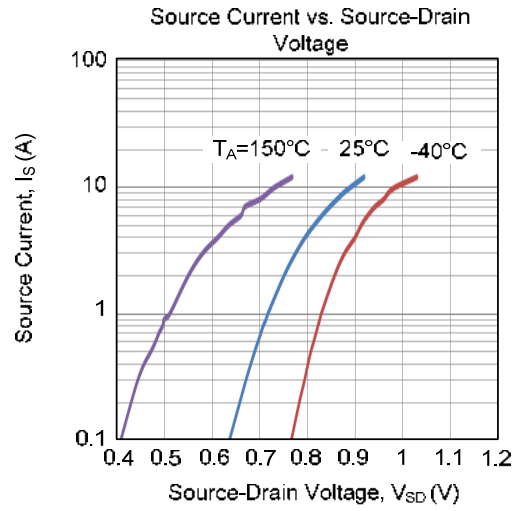
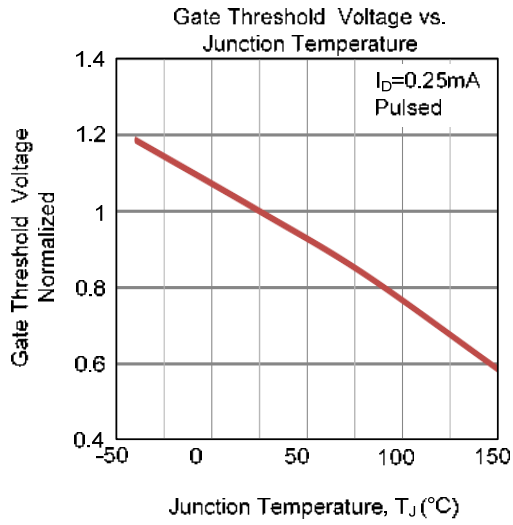


Unclamped Inductive Switching Waveforms

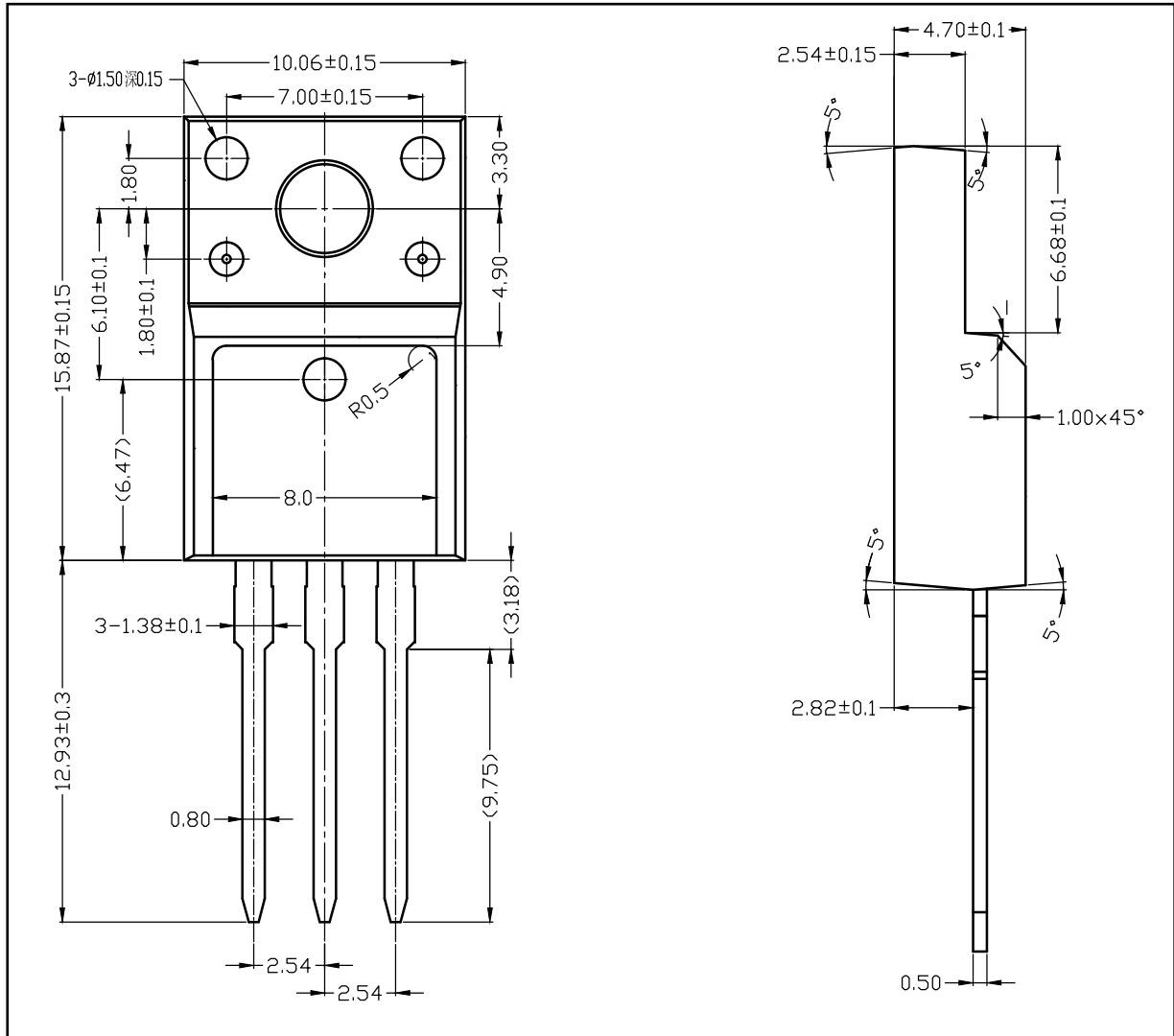
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

