

PRODUCT CHARACTERISTICS

VDSS	700V
$R_{DS(on)max}(V_{GS}=10\text{ V})$	0.9 Ω
Qg@type	32.5nC
ID	12A

APPLICATIONS

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

FEATURES

- * $R_{DS(ON)} = 0.9\ \Omega @ V_{GS} = 10\text{ V}$
- * Ultra low gate charge
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT12N70F	TO-220F	50 pieces/Tube
N/A	MOT12N70A	TO-220	50 pieces/Tube

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	700	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	12	A
	Pulsed (Note 2)	I_{DM}	24	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	103	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.7	V/ns
Power Dissipation	TO-220	P_D	150	W
	TO-220F		36	W
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

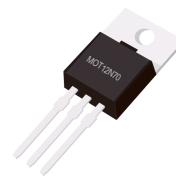
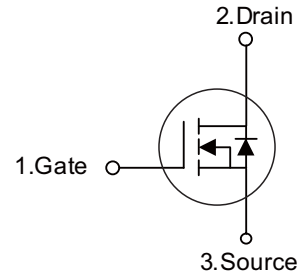
3. $L = 10\text{mH}$, $I_{AS} = 4.53\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

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

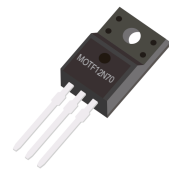
THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	TO-220	θ_{JC}	0.83	$^\circ\text{C/W}$
	TO-220F		3.47	$^\circ\text{C/W}$

Symbol



TO-220



TO-220F

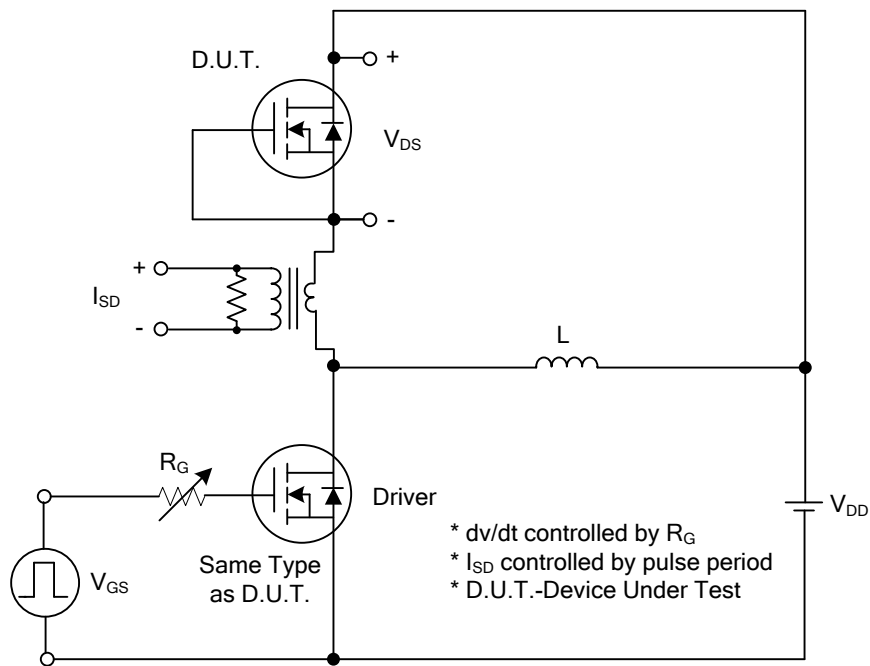
■ ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	700			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =700V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	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 =6.0A		0.79	0.9	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		1820		pF
Output Capacitance	C _{OSS}			147		pF
Reverse Transfer Capacitance	C _{RSS}			4.6		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =100V, I _D =12A, V _{GS} =10V I _G =1mA (Note1,2)		32.5		nC
Gate-Source Charge	Q _{GS}			12.5		nC
Gate-Drain Charge	Q _{GD}			7		nC
Turn-On Delay Time	t _{D(ON)}	V _{DD} =100V, I _D =12A, R _G =25Ω (Note1,2)		26		ns
Turn-On Rise Time	t _R			19		ns
Turn-Off Delay Time	t _{D(OFF)}			83		ns
Turn-Off Fall Time	t _F			31		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				12	A
Maximum Body-Diode Pulsed Current	I _{SM}				24	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 =12A, di/dt=100A/μs		400		ns
Reverse Recovery Charge	Q _{rr}			5.8		μC

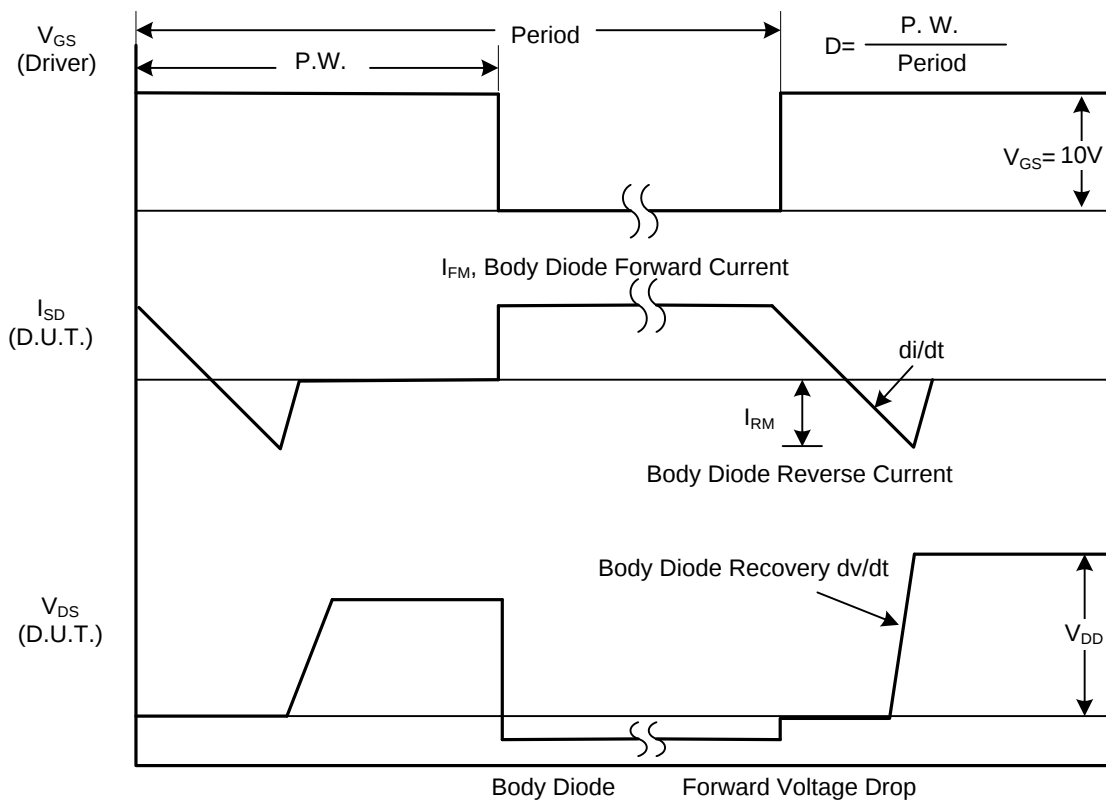
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

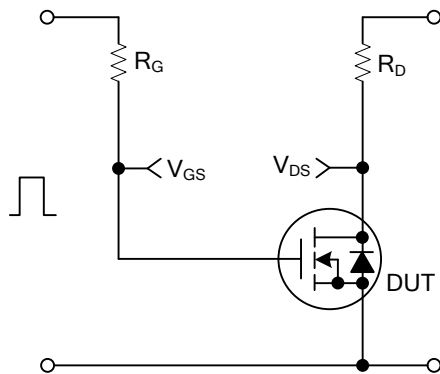


Peak Diode Recovery dv/dt Test Circuit

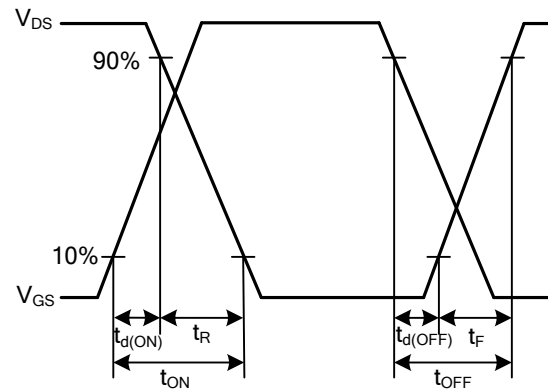


Peak Diode Recovery dv/dt Waveforms

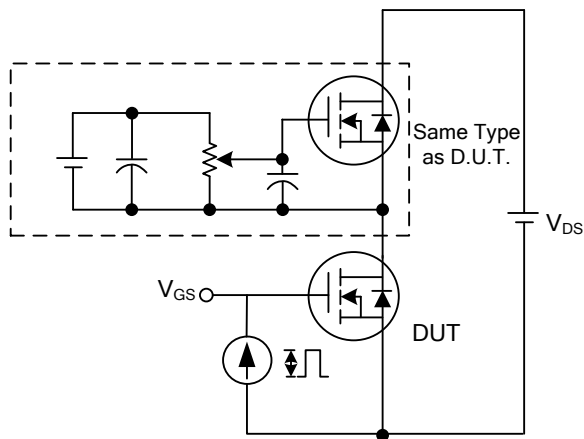
TEST CIRCUITS AND WAVEFORMS(Cont.)



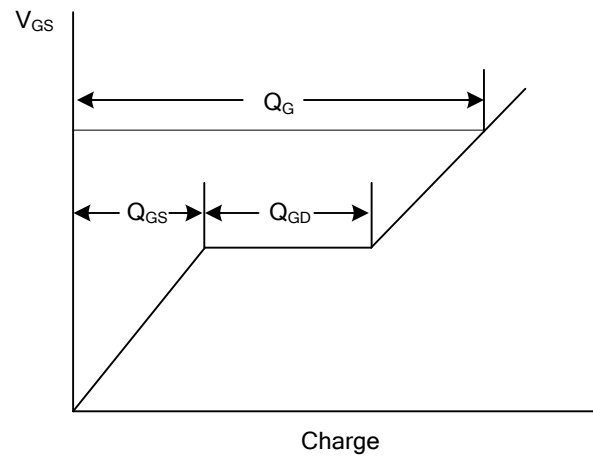
Switching Test Circuit



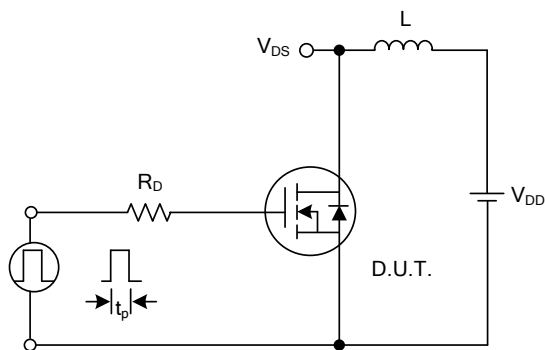
Switching Waveforms



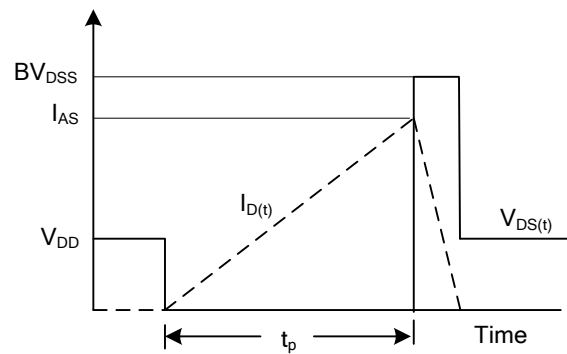
Gate Charge Test Circuit



Gate Charge Waveform

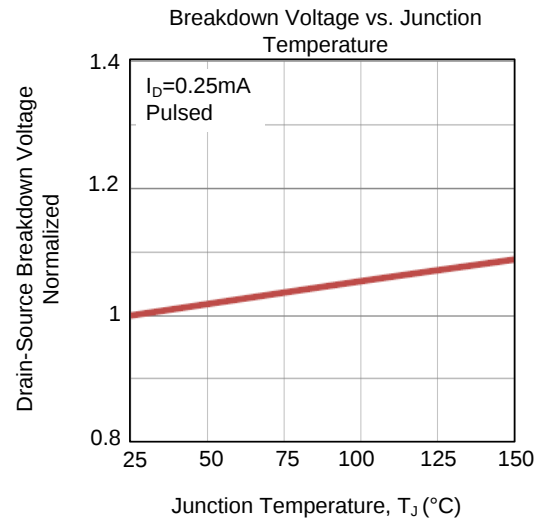
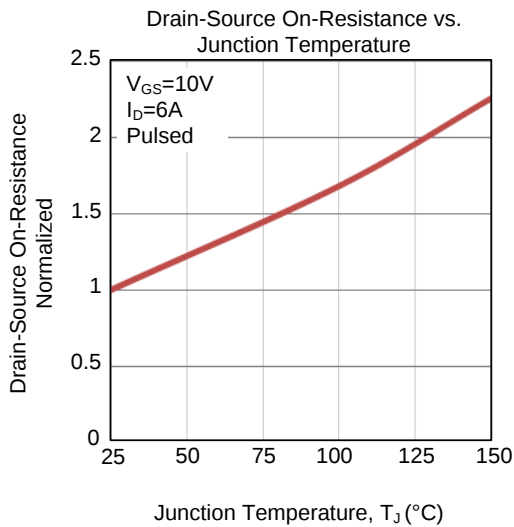
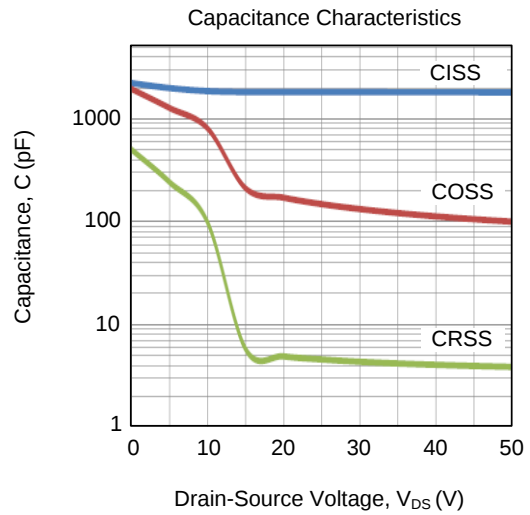
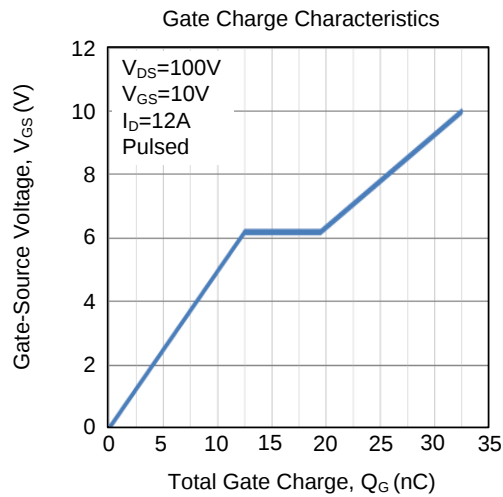
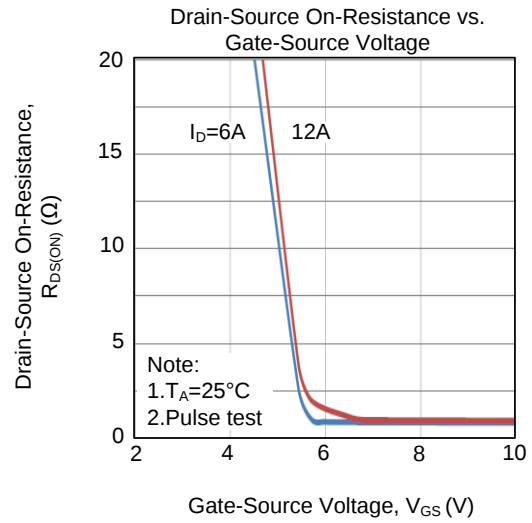
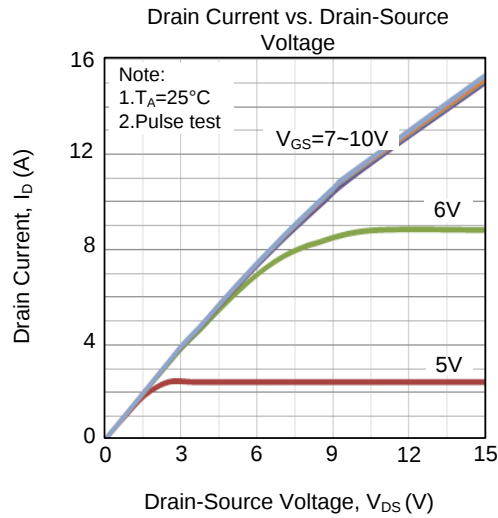


Unclamped Inductive Switching Test Circuit

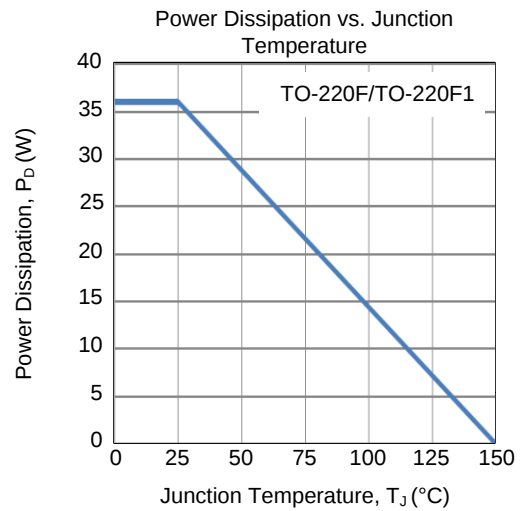
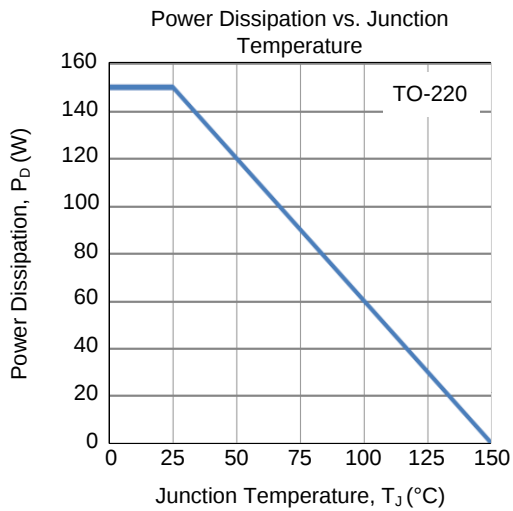
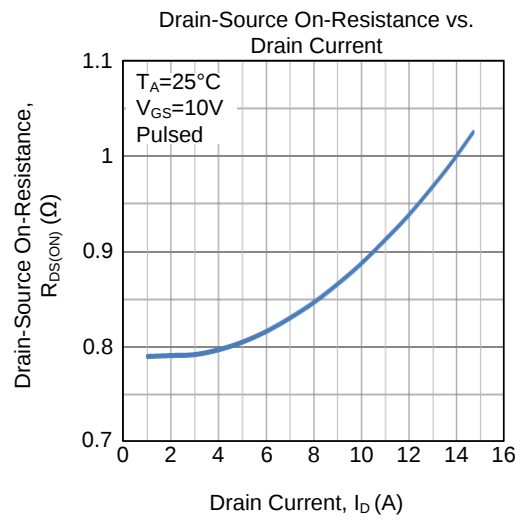
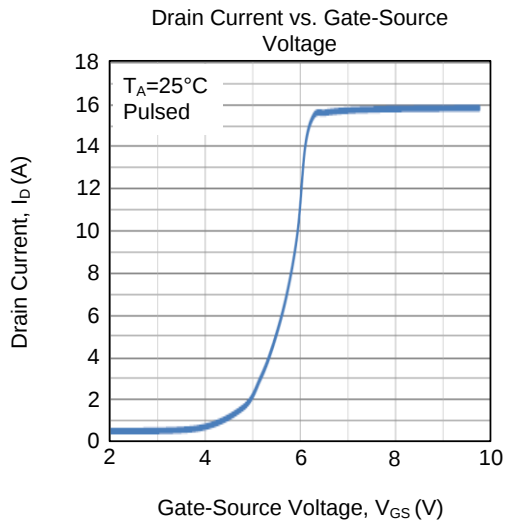
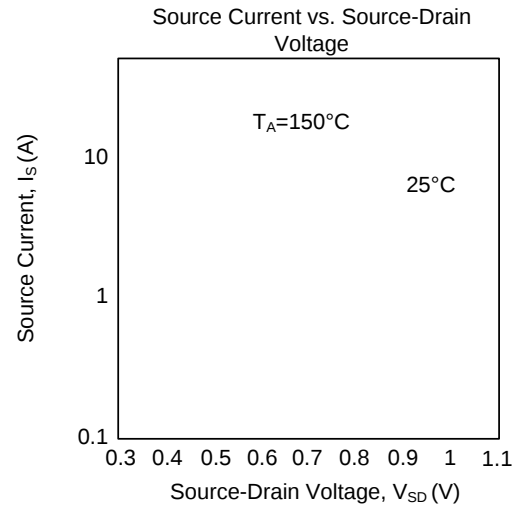
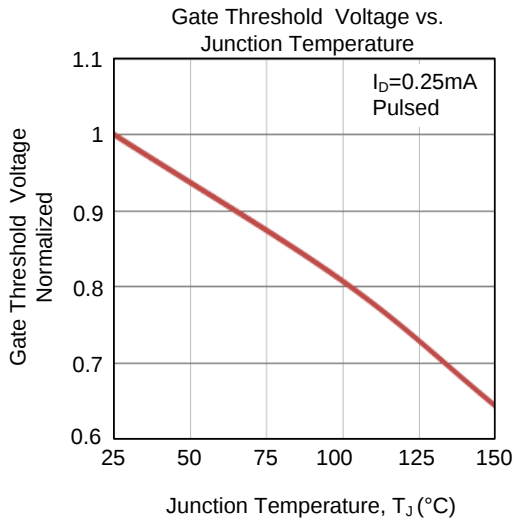


Unclamped Inductive Switching Waveforms

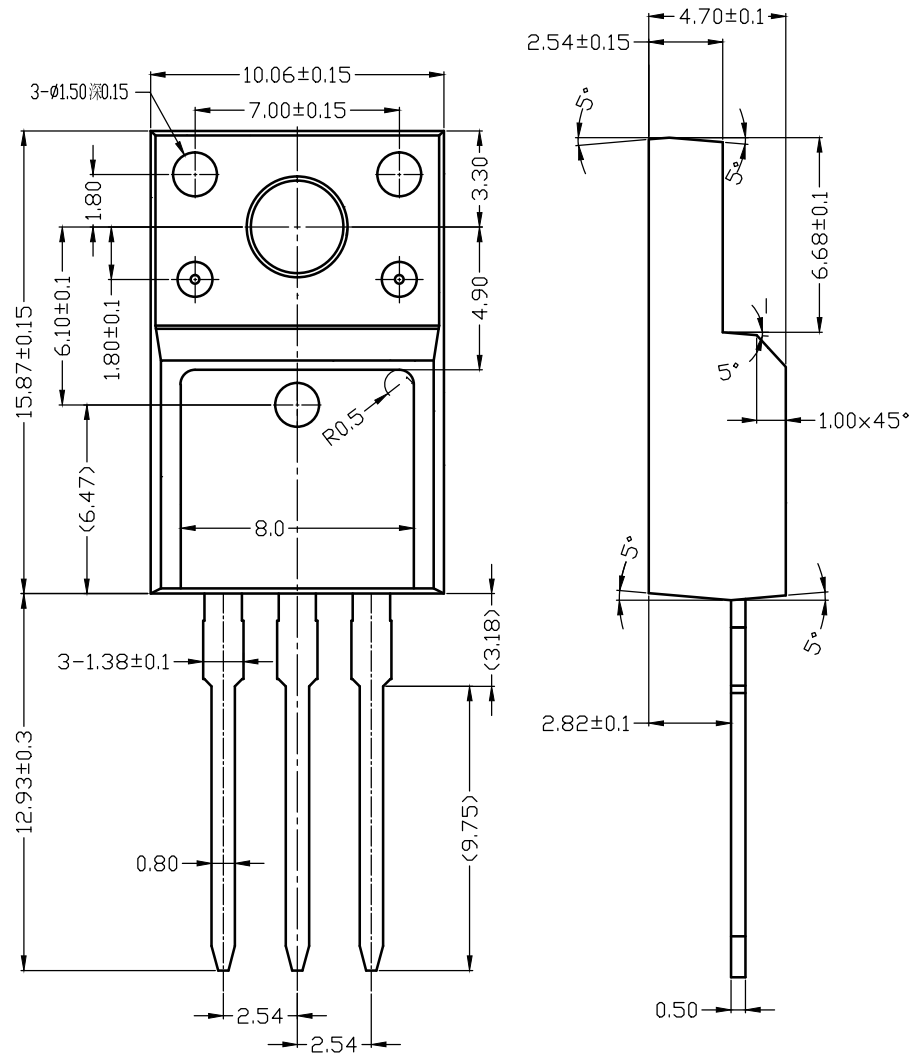
■ TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS(Cont.)



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

