

■ PRODUCT CHARACTERISTICS

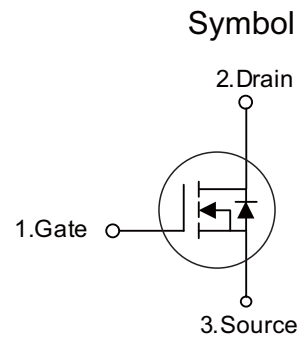
VDSS	700V
$R_{DS(on)Typ}(V_{GS}=10V)$	1Ω
Qg@type	42nC
ID	10A

■ APPLICATIONS

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

■ FEATURES

- * 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	MOT10N70F	TO-220F	50 pieces/Tube
N/A	MOT10N70A	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	10	A
	Pulsed (Note 2)	I_{DM}	40	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	120	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.6	V/ns
Power Dissipation	TO-220	P_D	150	W
	TO-220F		35	W
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. $L = 10\text{mH}$, $I_{AS} = 5.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$

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

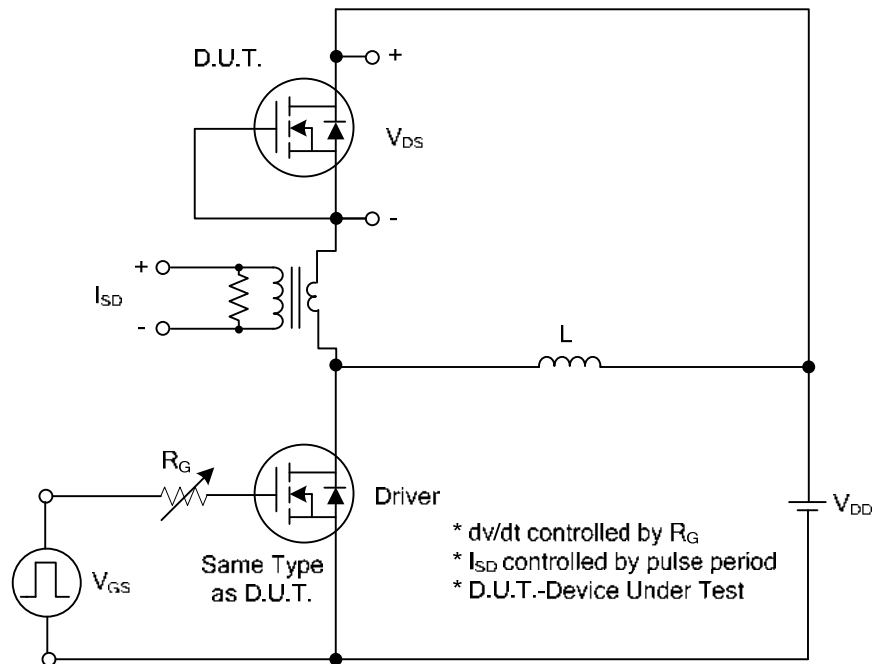
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

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	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 =5.0A	-	1	1.1	Ω
Dynamic characteristics							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0 MHz	-	1400	-	pF
Output Capacitance		C _{OSS}		-	142	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	10.4	-	pF
Switching characteristics							
Total Gate Charge (Note 1)		Q _G	V _{DS} =100V, V _{GS} =10V, I _D =10A I _G =1mA (Note 1, 2)	-	42	-	nC
Gateource Charge		Q _{GS}		-	7.8	-	nC
Gate-Drain Charge		Q _{GD}		-	6.6	-	nC
Switching characteristics							
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =10A, R _G =25Ω (Note 1, 2)	-	12	-	ns
Rise Time		t _R		-	19	-	ns
Turn-off Delay Time		t _{D(OFF)}		-	92	-	ns
Fall-Time		t _F		-	41	-	ns
Source-drain diode ratings and characteristics							
Maximum Continuous Drain-Source Diode Forward Current		I _S		-	-	10	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}		-	-	20	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	V _{GS} =0V, I _S =10A	-	-	1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	V _{GS} =0V, I _S =10A,	-	368	-	ns
Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs (Note1)	-	4.6	-	μC

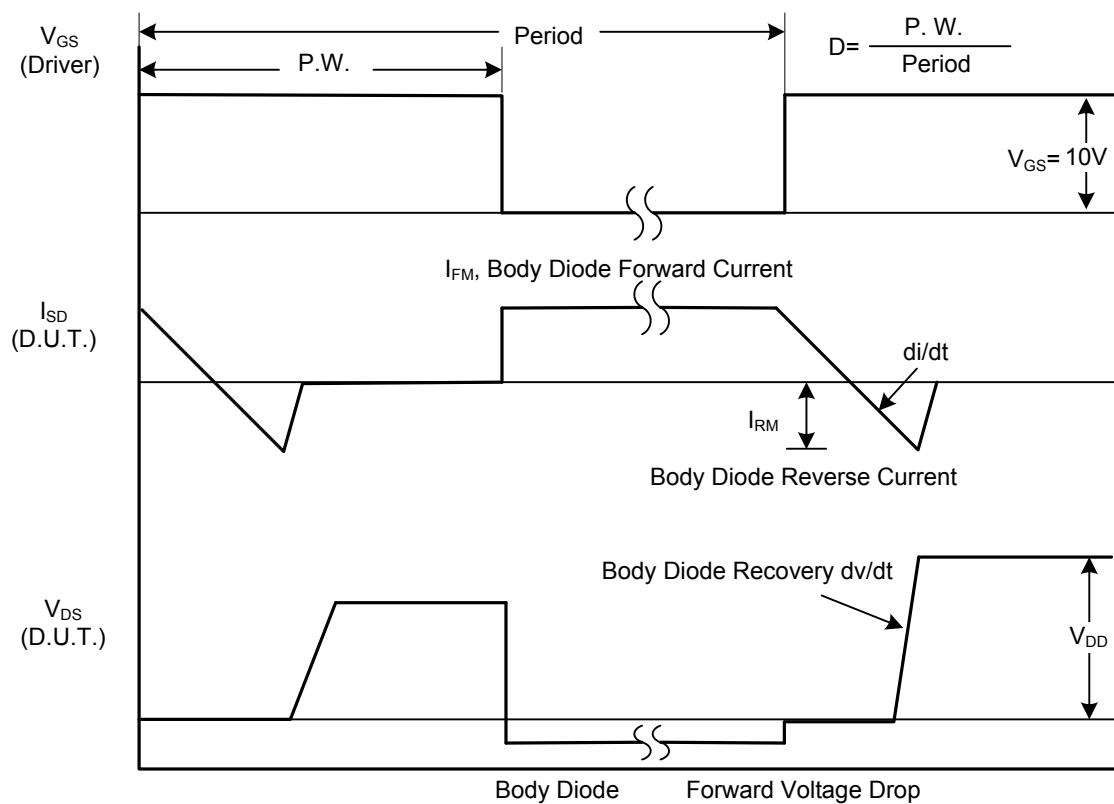
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

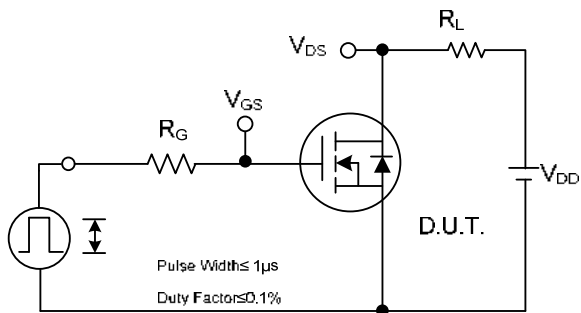


Peak Diode Recovery dv/dt Test Circuit

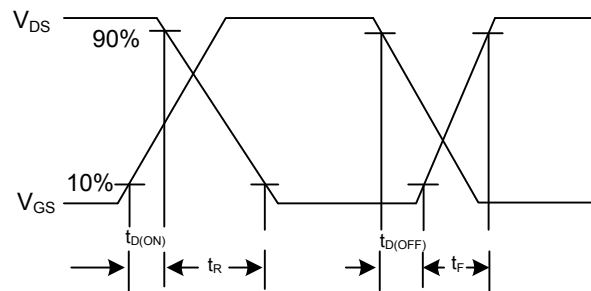


Peak Diode Recovery dv/dt Waveforms

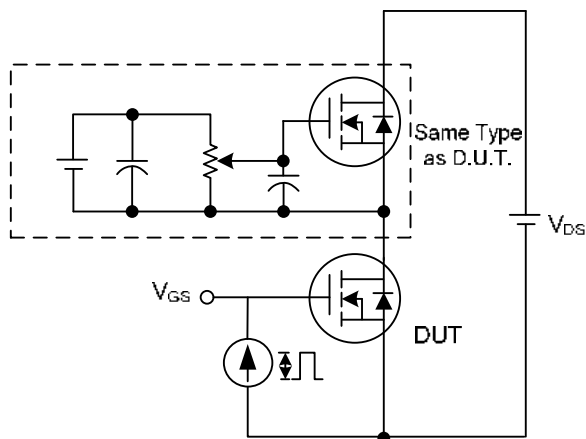
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



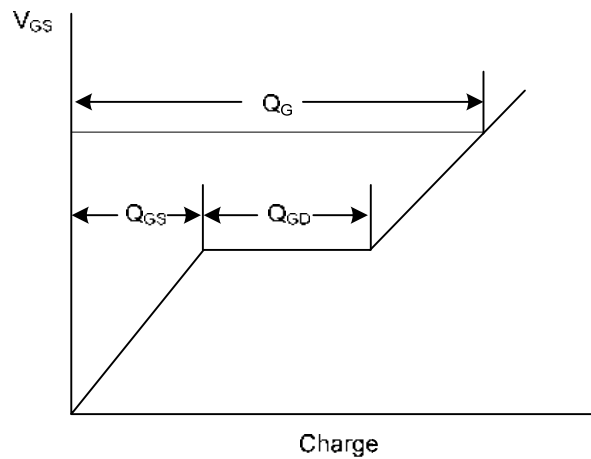
Switching Test Circuit



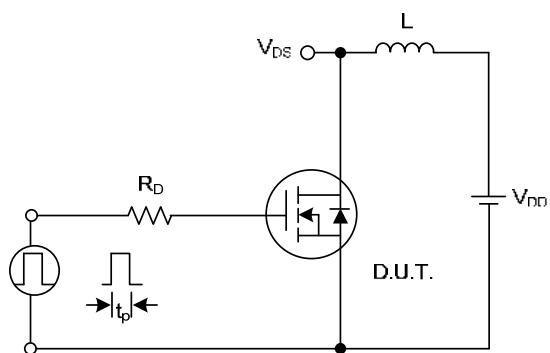
Switching Waveforms



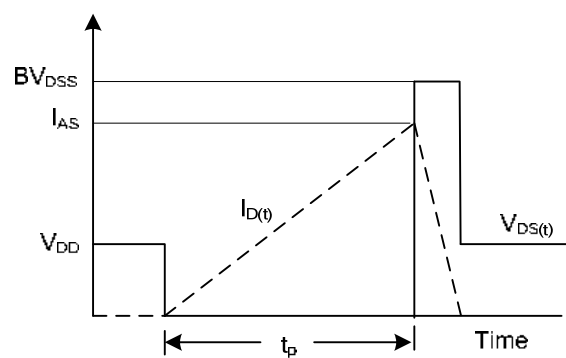
Gate Charge Test Circuit



Gate Charge Waveform

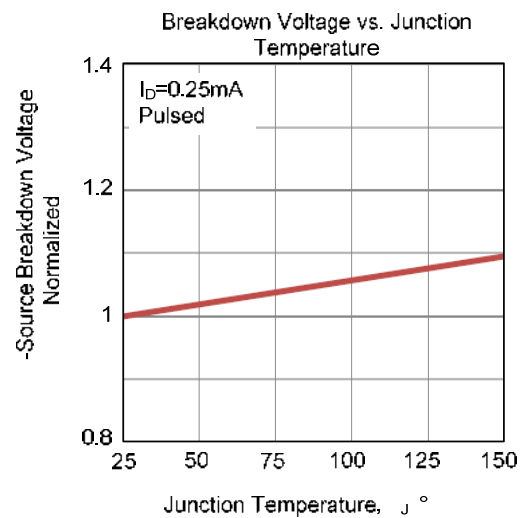
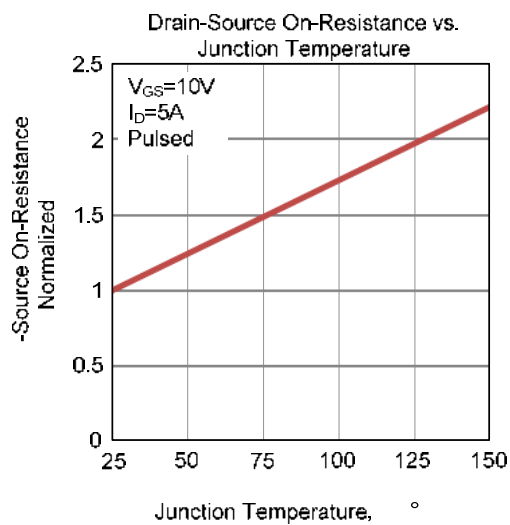
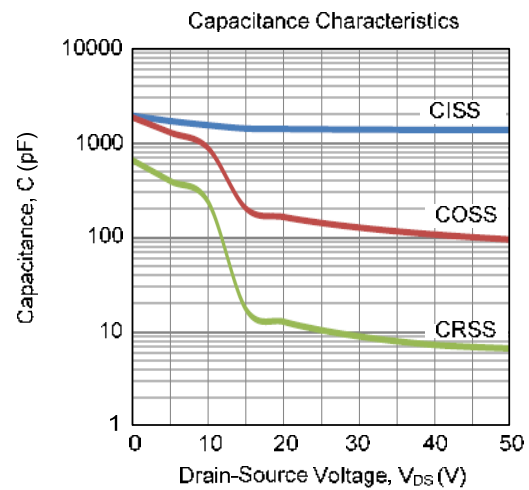
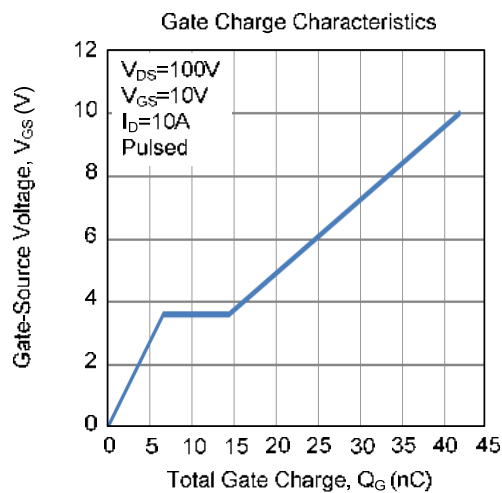
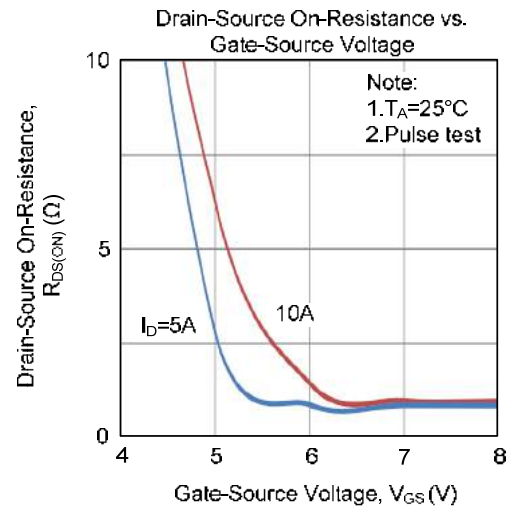
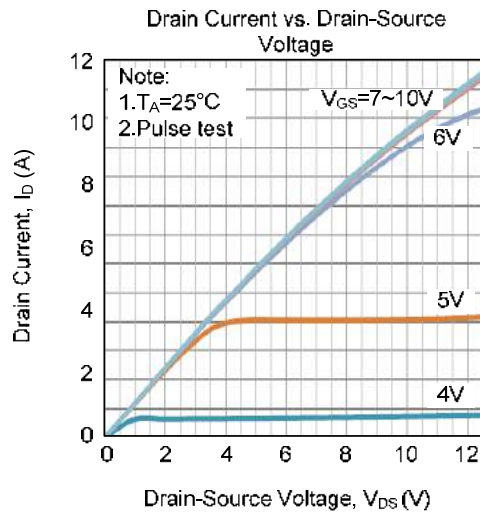


Unclamped Inductive Switching Test Circuit

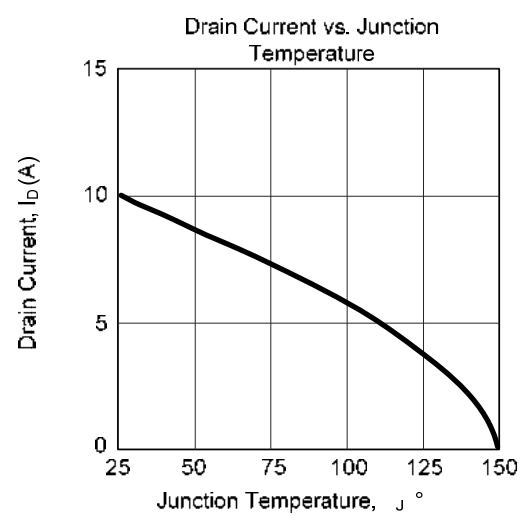
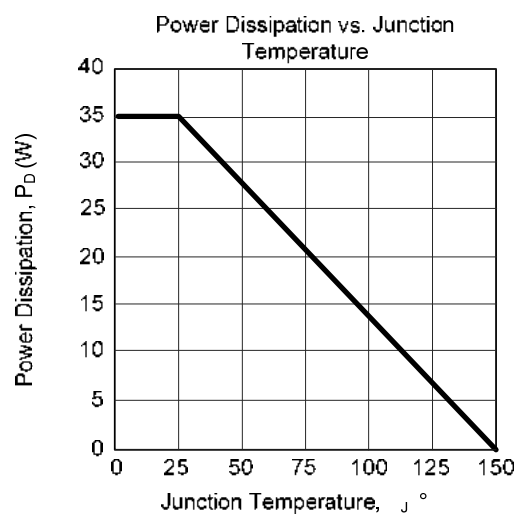
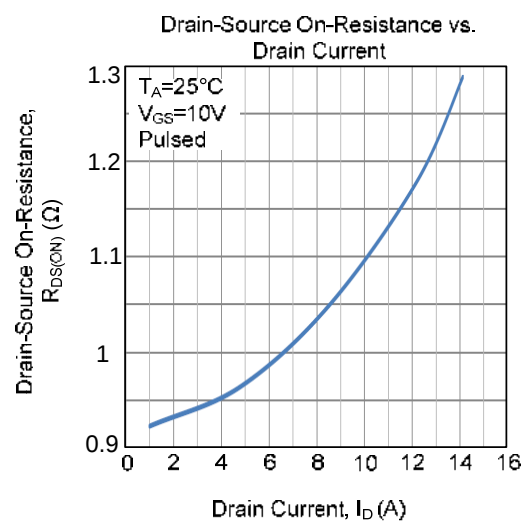
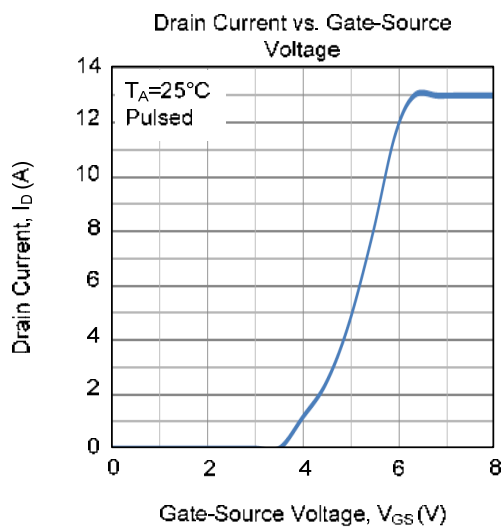
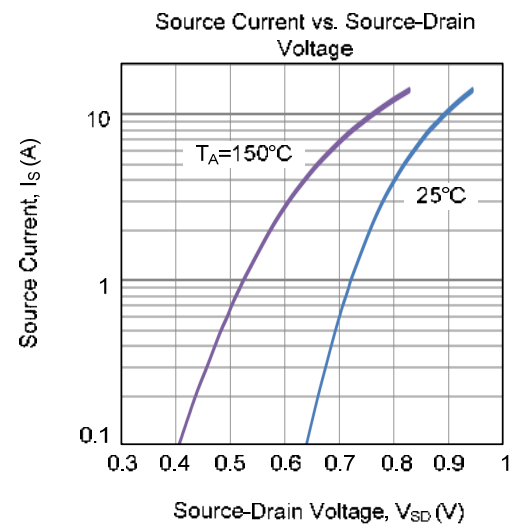
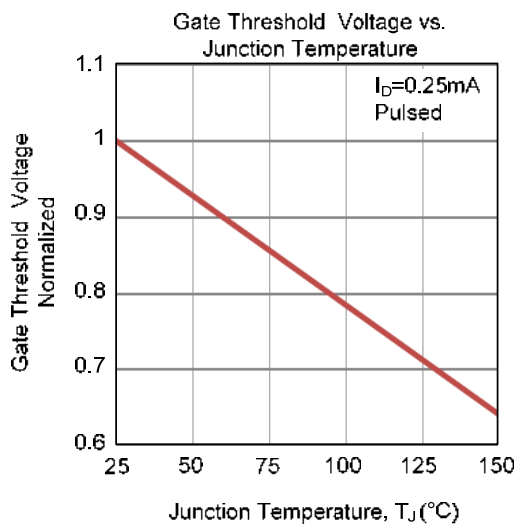


Unclamped Inductive Switching Waveforms

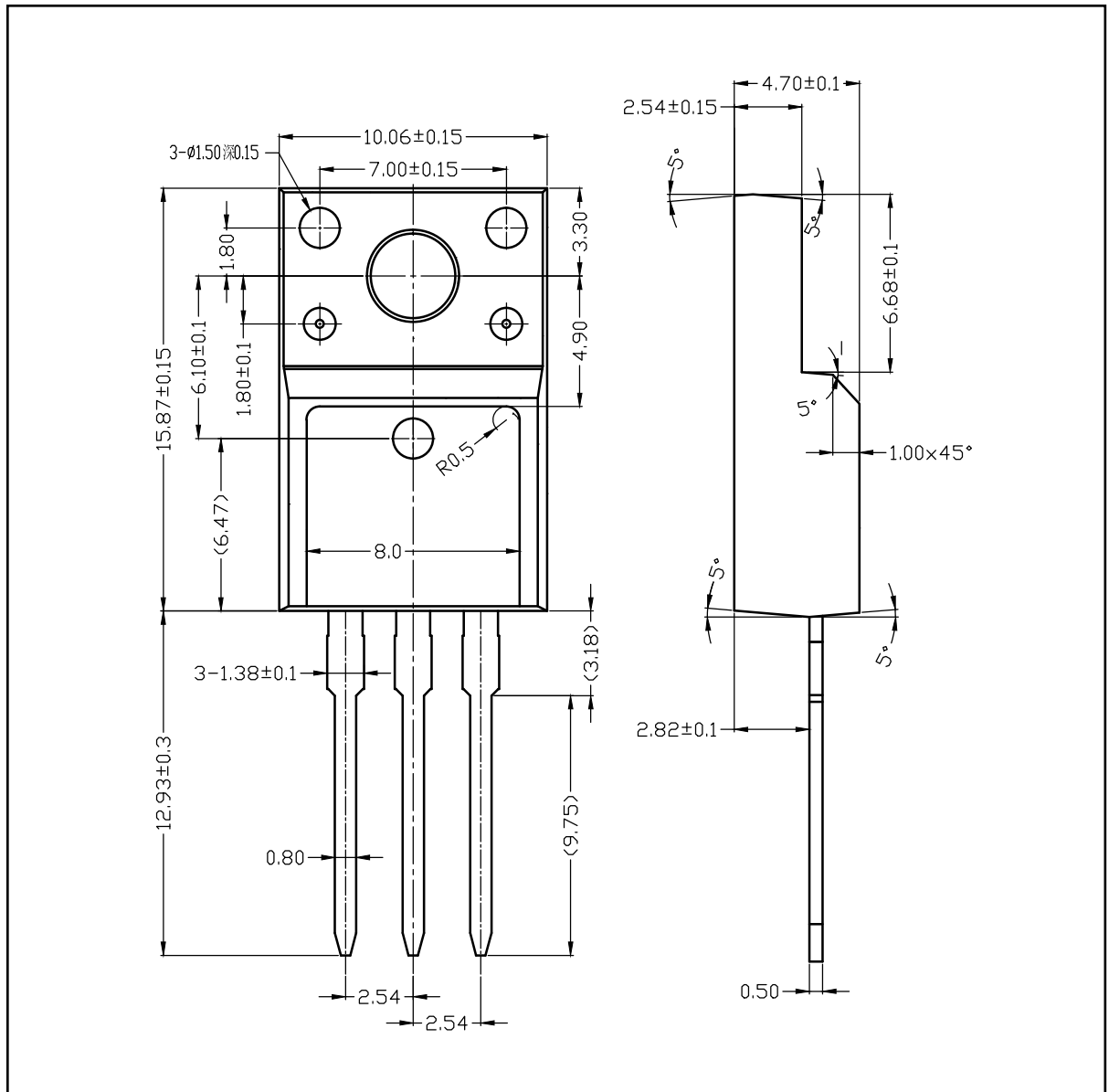
■ TYPICAL CHARACTERISTICS



PICAL CHARACTERISTICS(Cont.)



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

