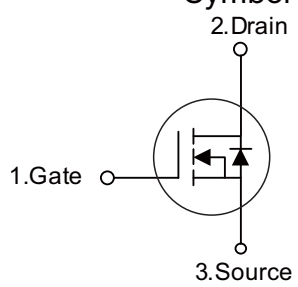
■ PRODUCT CHARACTERISTICS

VDSS	600V
R_{DS}(on)Typ(@V_{GS}=10 V)	1.1Ω
Qg@type	32nC
ID	7A

Symbol



■ APPLICATIONS

* High frequency switching mode power supply
* Electronic ballast
* LED power supply

■ FEATURES

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



TO-220



TO-220F

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT7N60F	TO-220F	50 pieces/Tube
N/A	MOT7N60A	TO-220	50 pieces/Tube

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Avalanche Current (Note 2)		I_{AR}	7.0	A
Drain Current	Continuous	I_D	7.0	A
	Pulsed (Note 2)	I_{DM}	28	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	580	mJ
	Repetitive (Note 2)	E_{AR}	14.2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P_D	142	W
	TO-220F		50	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

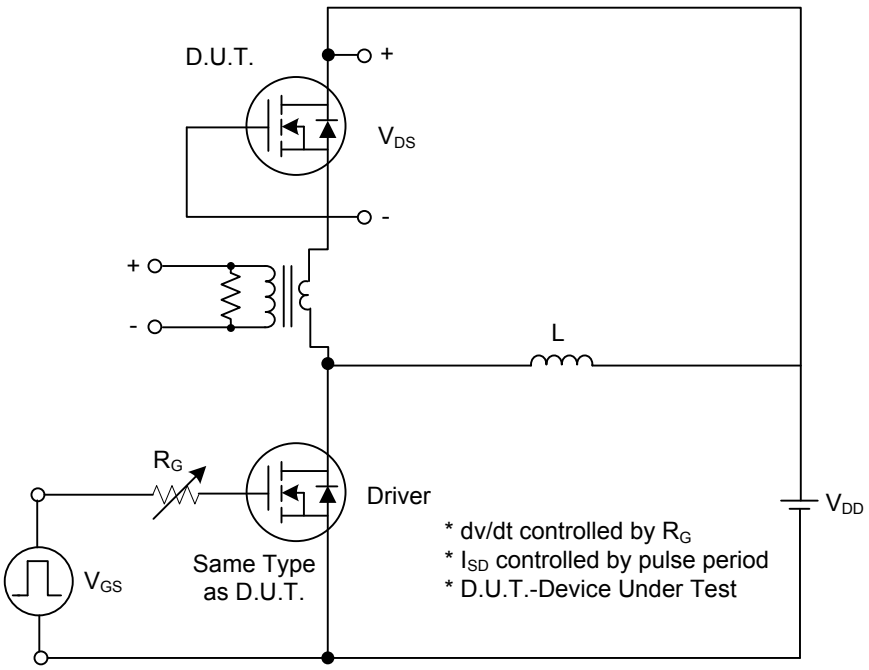
Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating : Pulse width limited by maximum junction temperature
3. L = 19.5mH, I_{AS} = 7.0A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD}≤7.4A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_J = 25°C

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

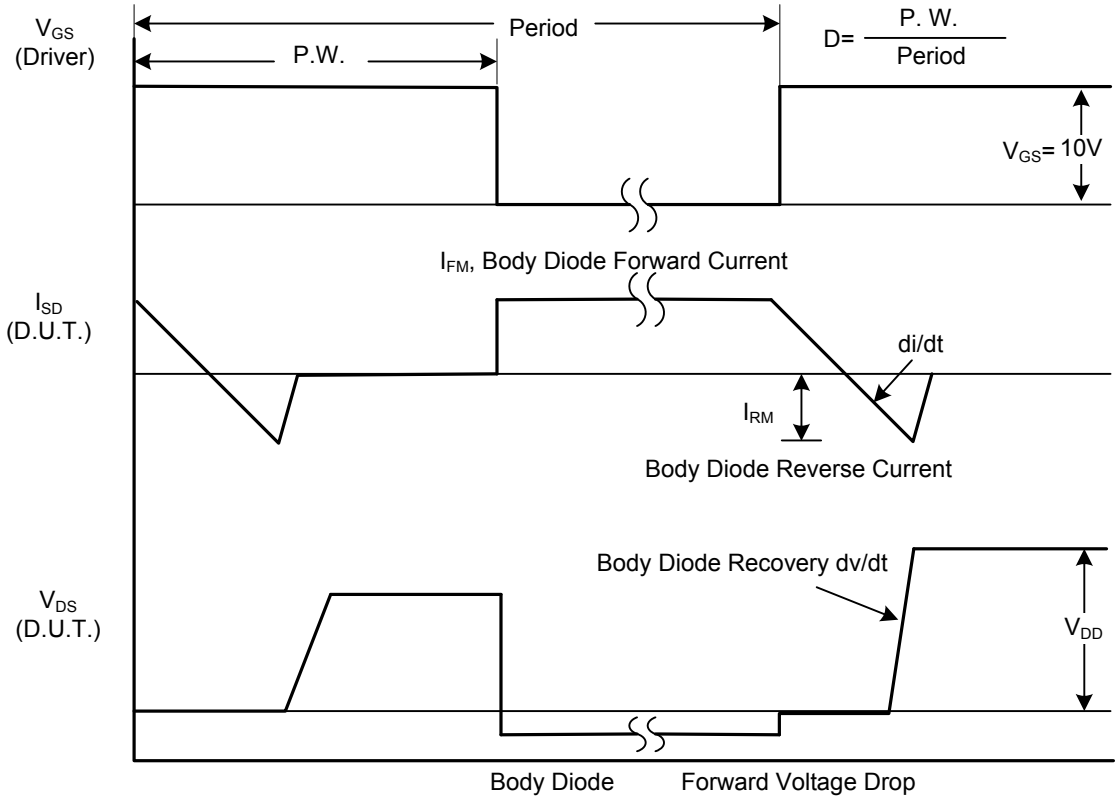
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characterisrtics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS} = 0V, I_D = 250μA	600	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS} = 600V, V_{GS} = 0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS} = 30V, V_{DS} = 0V	-	-	100	nA
	Reverse		V_{GS} = -30V, V_{DS} = 0V	-	-	-100	nA
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS}/\triangle T_J$	I_D=250μA,Referenced to 25°C	-	0.67	-	V/°C
On characterisrtics							
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 = 3.5A	-	1.1	1.2	Ω
Dynamic characterisrtics							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0 MHz	-	1000	-	pF
Output Capacitance		C_{OSS}		-	120	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	17	-	pF
Switching characterisrtics							
Turn-On Delay Time		$t_{D(ON)}$	V_{DD} =300V, I_D =7.0A, R_G =25Ω (Note 1, 2)	-	55	-	ns
Turn-On Rise Time		t_R		-	110	-	ns
Turn-Off Delay Time		$t_{D(OFF)}$		-	220	-	ns
Turn-Off Fall Time		t_F		-	180	-	ns
Switching characterisrtics							
Total Gate Charge		Q_G	V_{DS}=480V, I_D=7.0A, V_{GS}=10V (Note 1, 2)	-	32	-	nC
Gate-Source Charge		Q_{GS}		-	9	-	nC
Gate-Drain Charge		Q_{GD}		-	22	-	nC
Drain-source diode characteristics and maximum ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS} = 0V, I_S = 7.0 A	-	-	1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	7	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}		-	-	28	A
Reverse Recovery Time		t_{rr}	V_{GS} = 0V, I_S = 7.0 A, dI_F / dt = 100A/μs (Note 1)	-	320	-	ns
Reverse Recovery Charge		Q_{RR}		-	2.4	-	μC

Notes: 1. Pulse Test: Pulse width≤300μs, Duty cycle≤2%
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

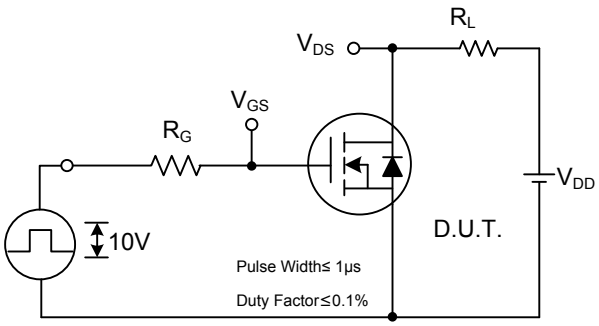


Peak Diode Recovery dv/dt Test Circuit

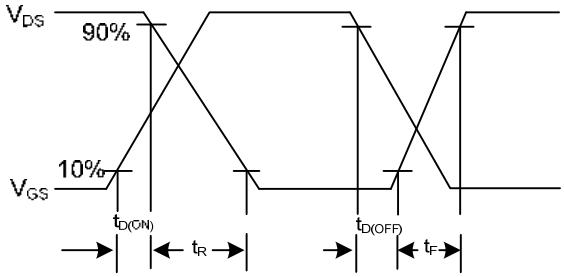


Peak Diode Recovery dv/dt Waveforms

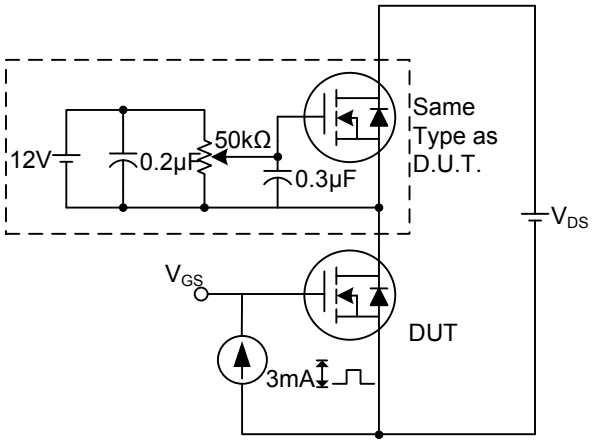
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



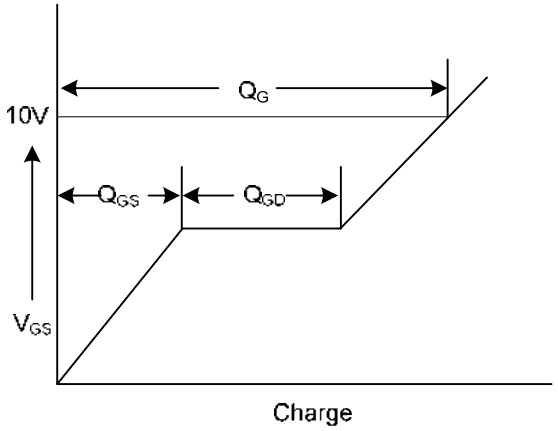
Switching Test Circuit



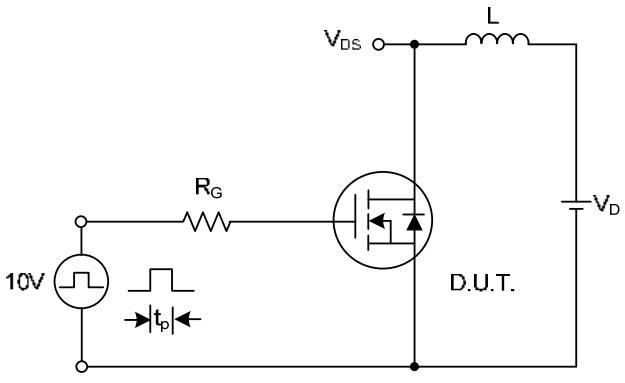
Switching Waveforms



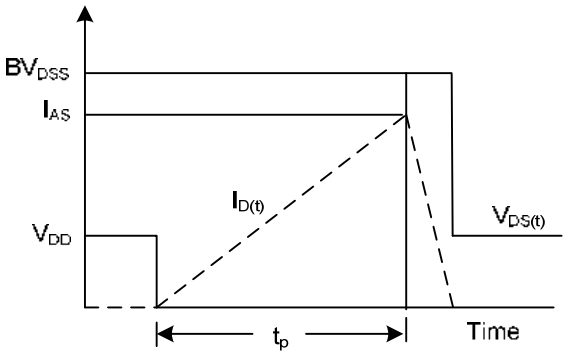
Gate Charge Test Circuit



Gate Charge Waveform



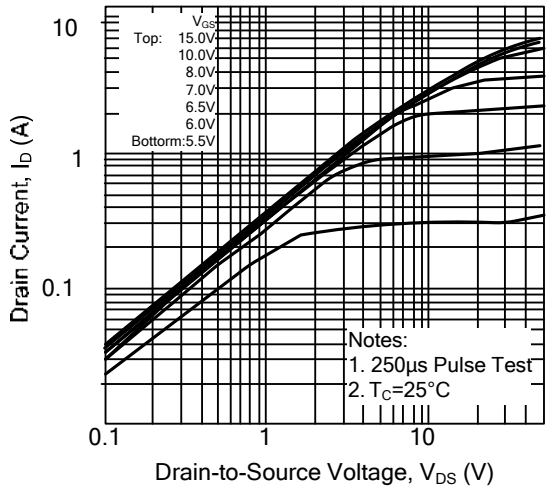
Unclamped Inductive Switching Test Circuit



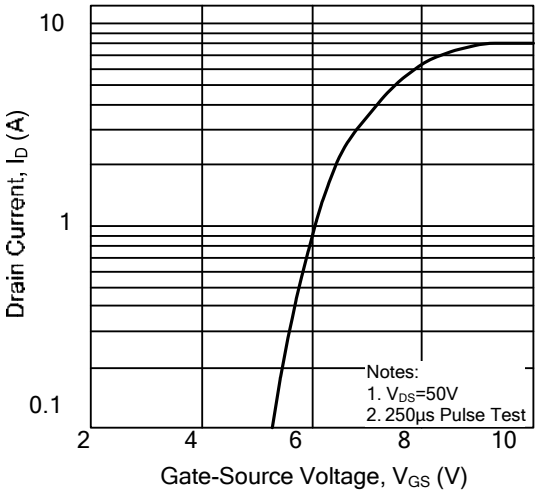
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

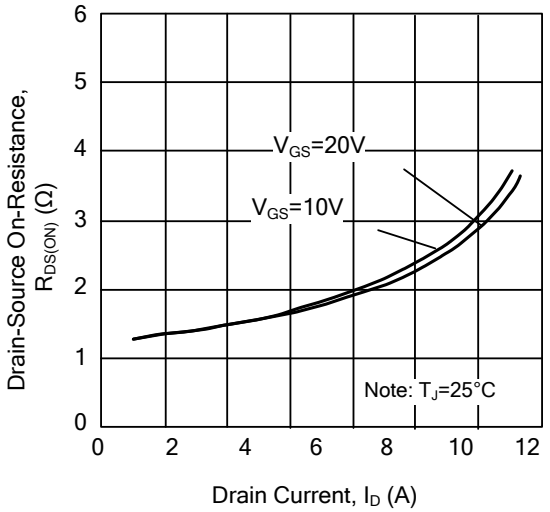
On-State Characteristics



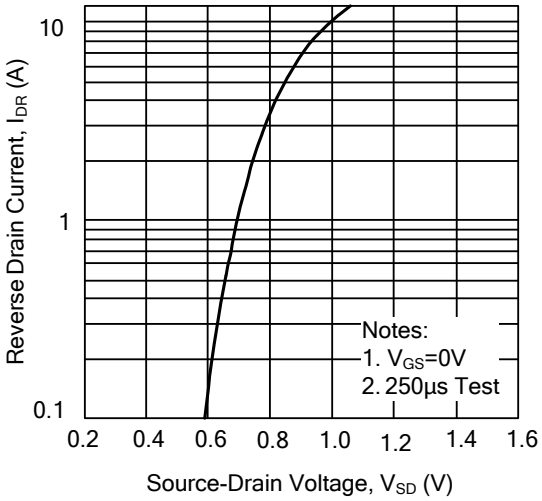
Transfer Characteristics



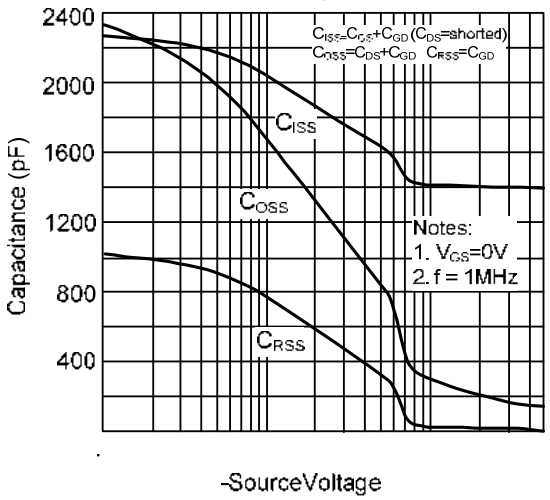
On-Resistance Variation vs.
Drain Current and Gate Voltage



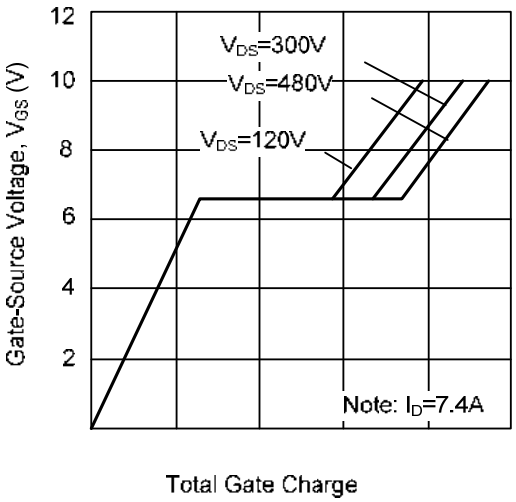
On State Current vs.
Allowable Case Temperature



Capacitance Characteristics
(Non-Repetitive)

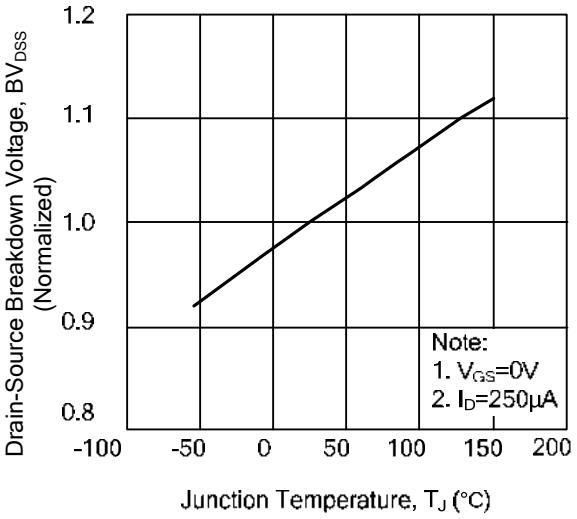


Gate Charge Characteristics

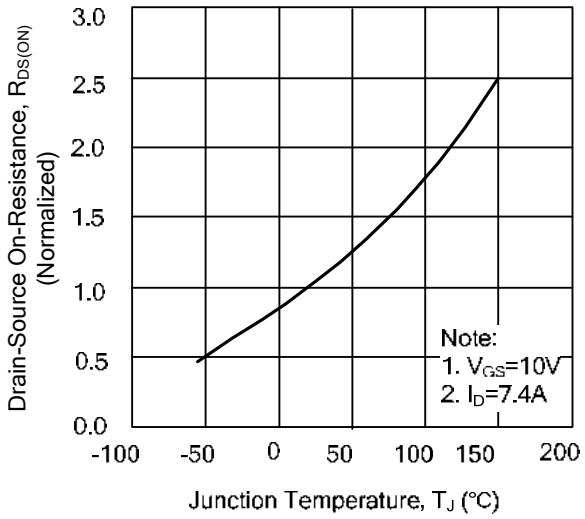


■ TYPICAL CHARACTERISTICS(Cont.)

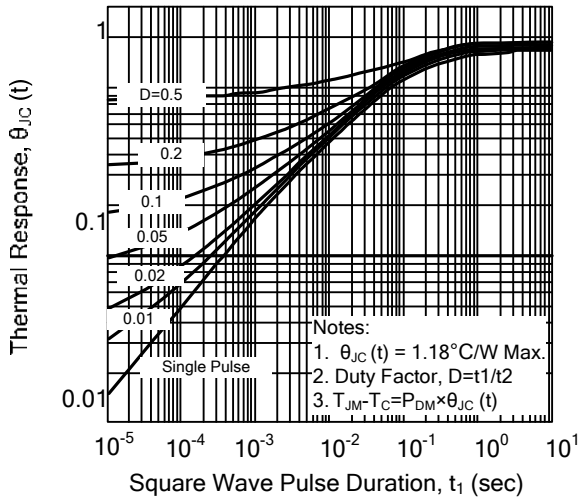
Breakdown Voltage Variation vs. Junction Temperature



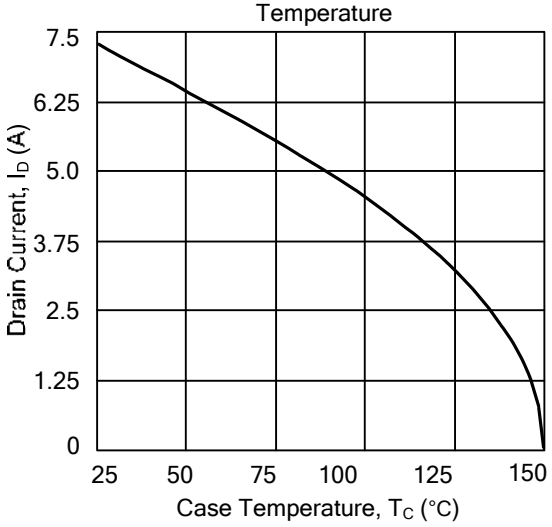
On-Resistance Variation vs. Junction Temperature



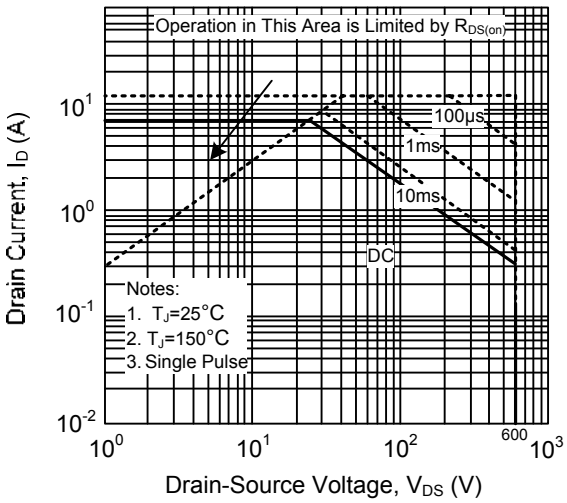
Transient Thermal Response Curve



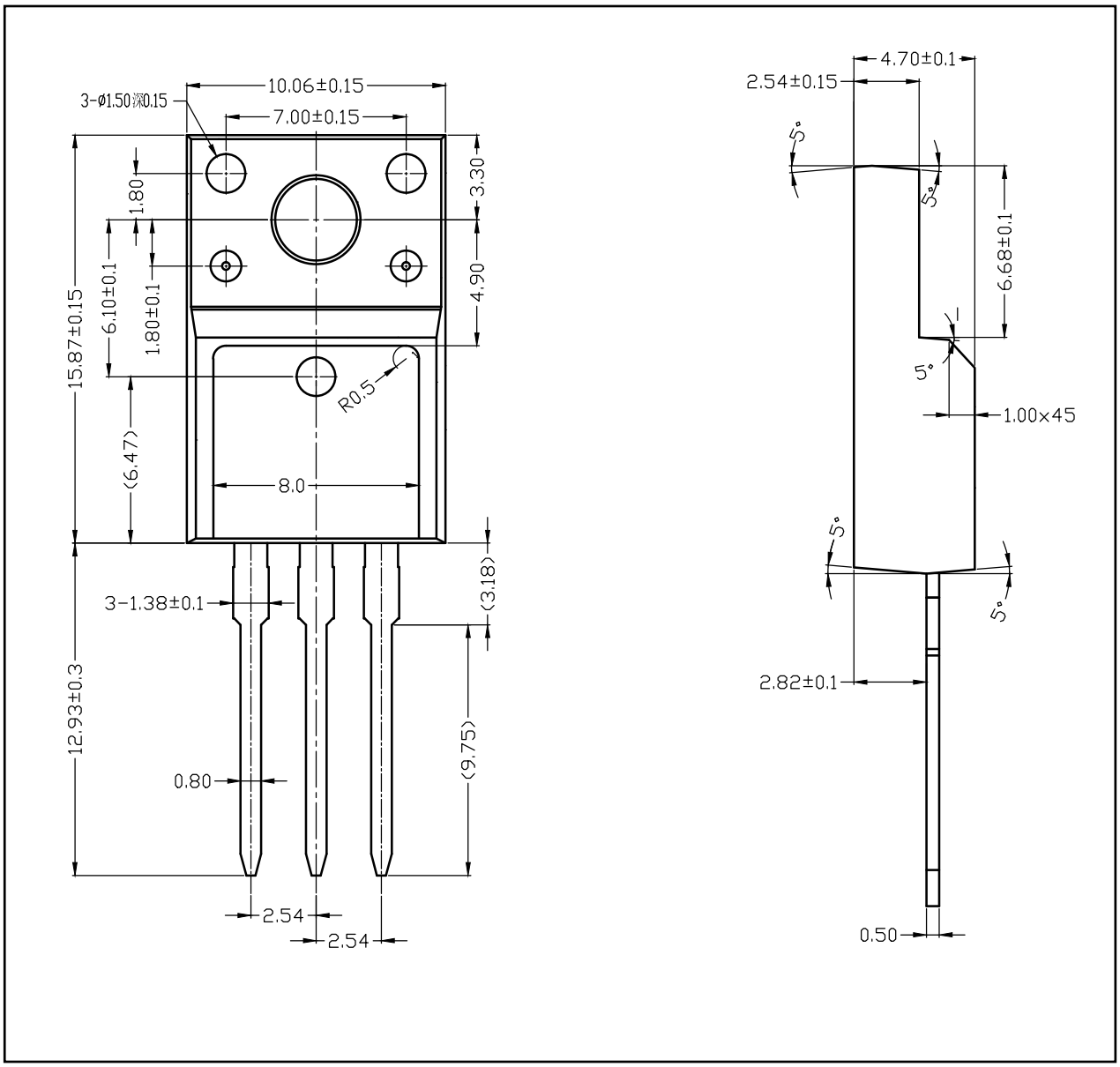
Maximum Drain Current vs. Case Temperature



Safe Operating Area – 600V



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

