

■ PRODUCT CHARACTERISTICS

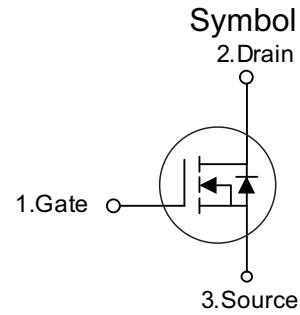
VDSS	600V
$R_{DS(on)Typ} (@V_{GS}=10V)$	1.1Ω
Qg@type	32nC
ID	7A

■ 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



■ 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 ($T_C = 25^\circ\text{C}$, 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. $L = 19.5\text{mH}$, $I_{AS} = 7.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 7.4\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

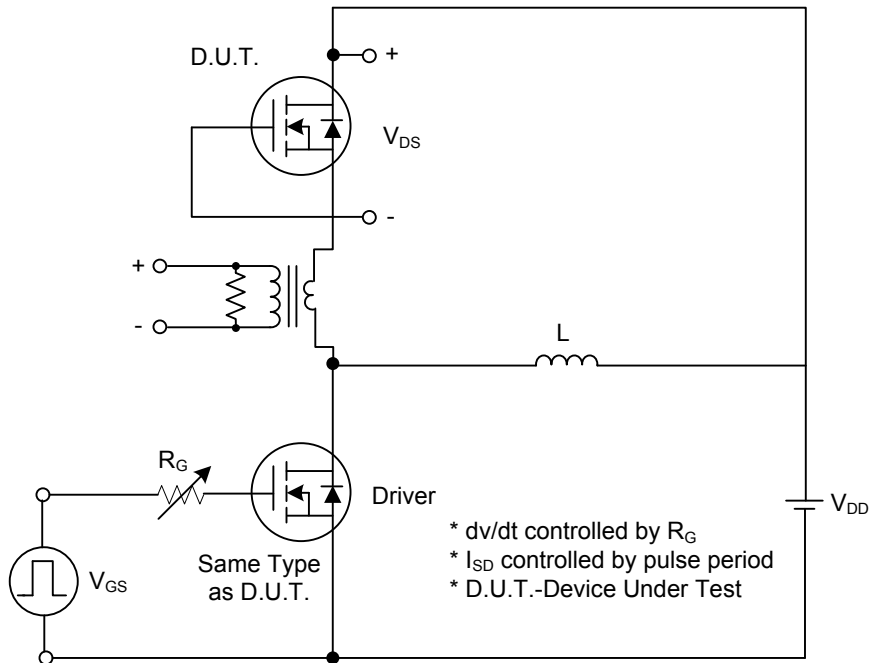
■ ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	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		ΔBV _{DSS} /ΔT _J	I _D =250μA,Referenced to 25°C	-	0.67	-	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 = 3.5A	-	1.1	1.2	Ω
Dynamic characteristics							
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 characteristics							
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 characteristics							
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,	-	320	-	ns
Reverse Recovery Charge		Q _{RR}	dl _F / dt = 100A/μs (Note 1)	-	2.4	-	μC

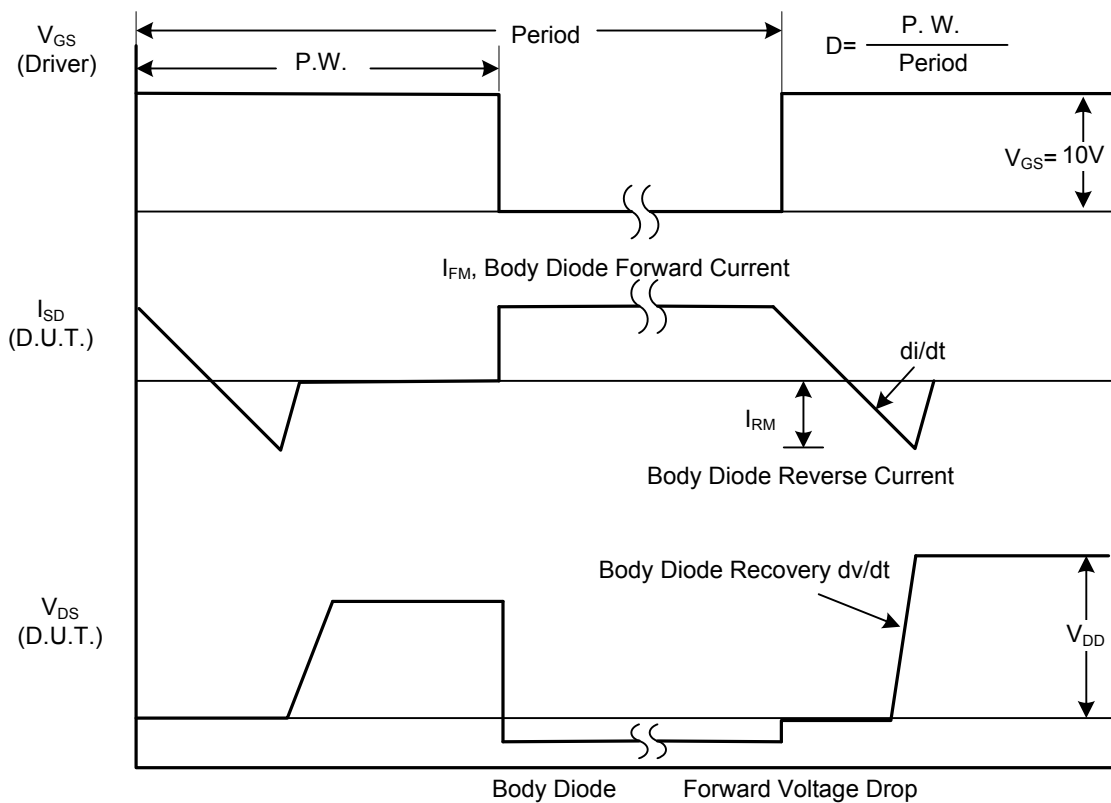
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

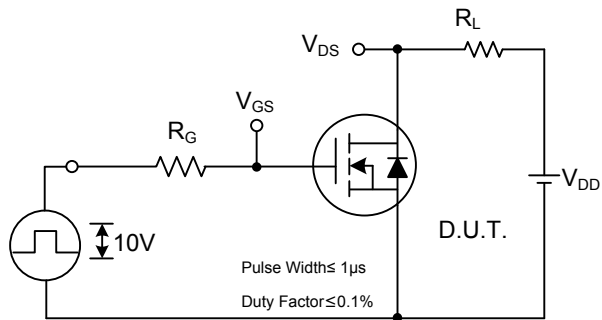


Peak Diode Recovery dv/dt Test Circuit

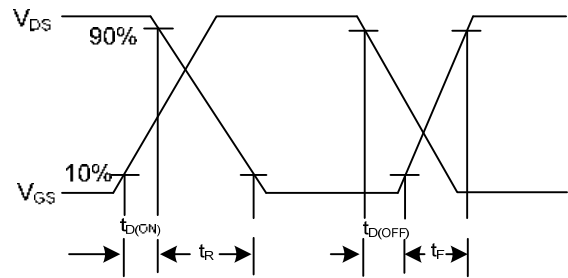


Peak Diode Recovery dv/dt Waveforms

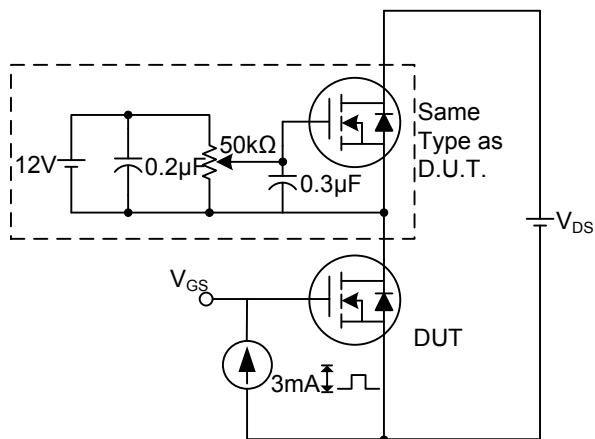
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



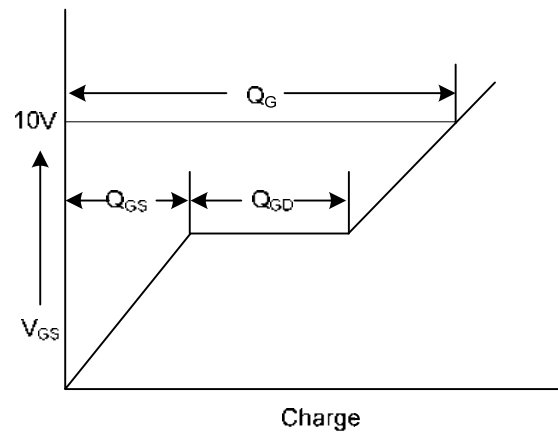
Switching Test Circuit



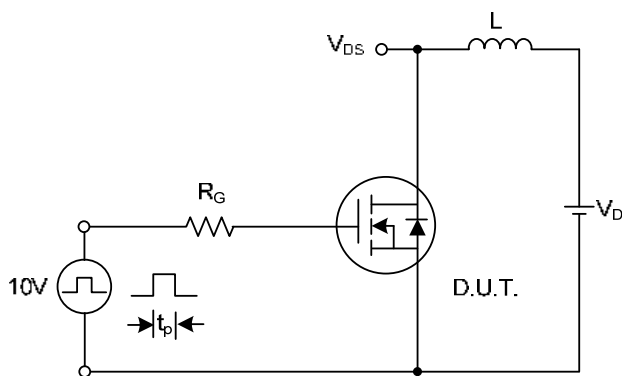
Switching Waveforms



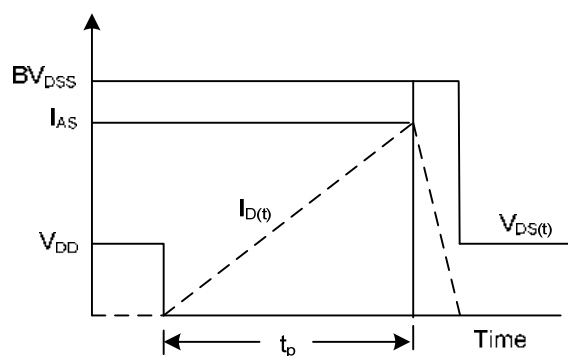
Gate Charge Test Circuit



Gate Charge Waveform



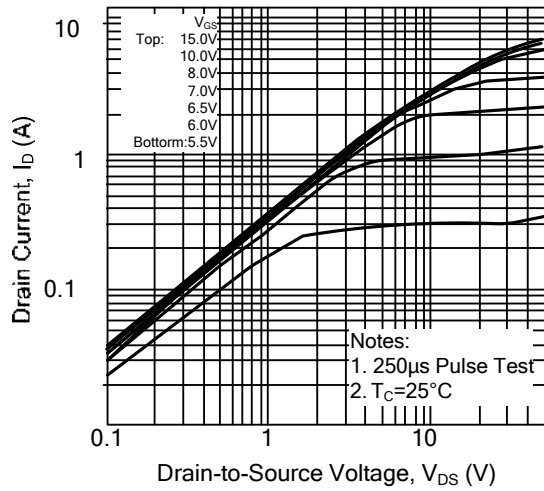
Unclamped Inductive Switching Test Circuit



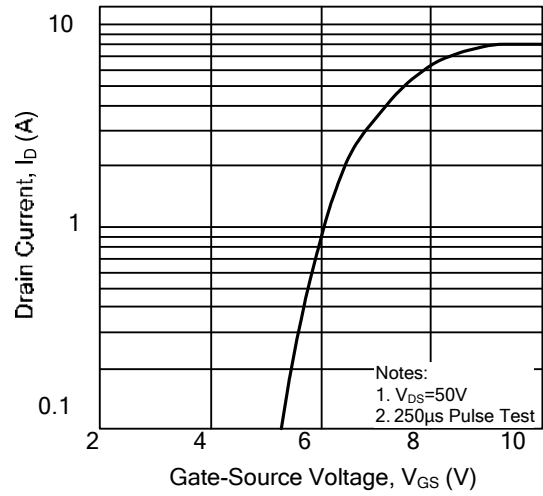
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

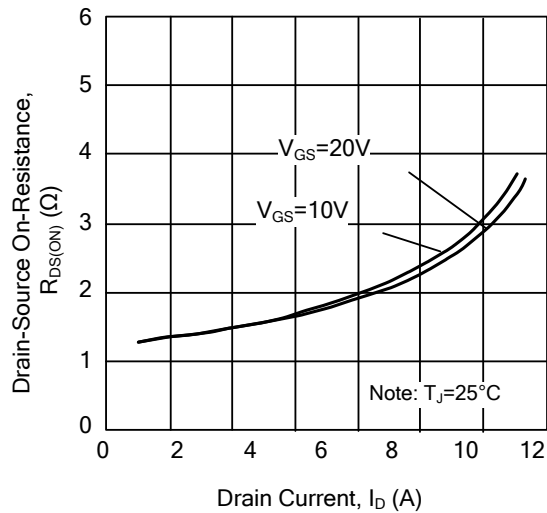
On-State Characteristics



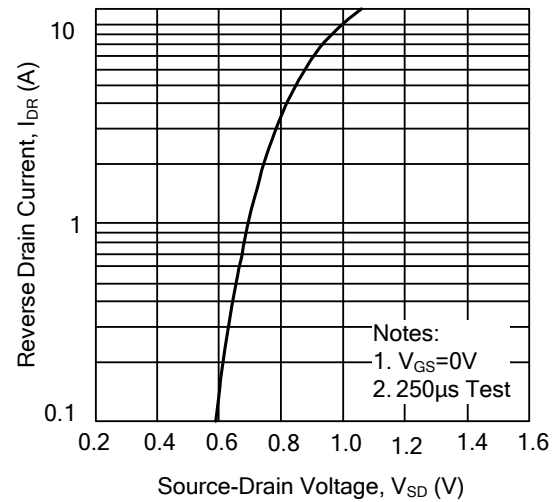
Transfer Characteristics



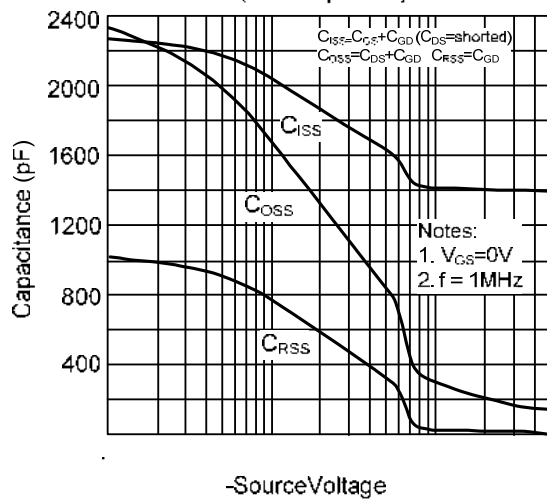
On-Resistance Variation vs. Drain Current and Gate Voltage



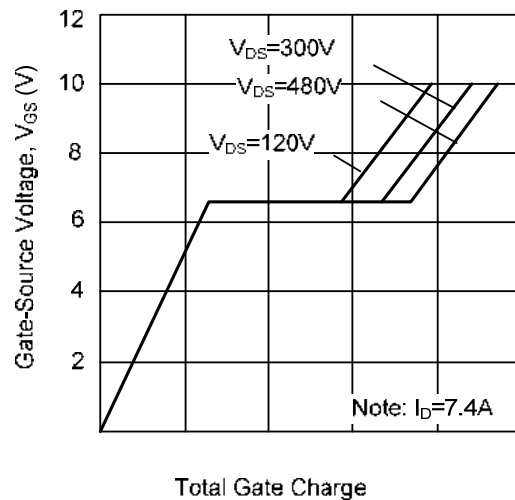
On State Current vs. Allowable Case Temperature



Capacitance Characteristics (Non-Repetitive)

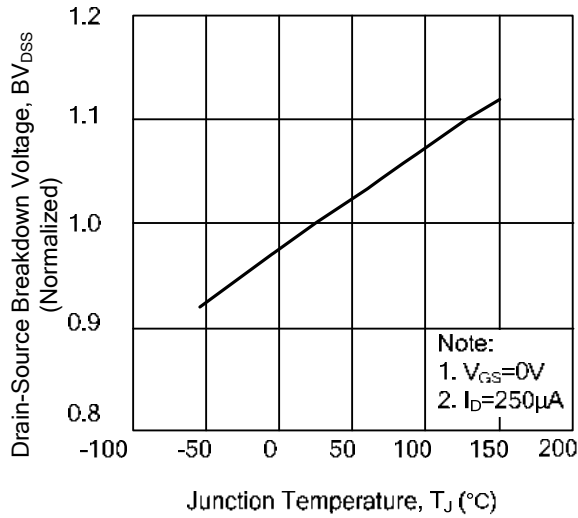


Gate Charge Characteristics

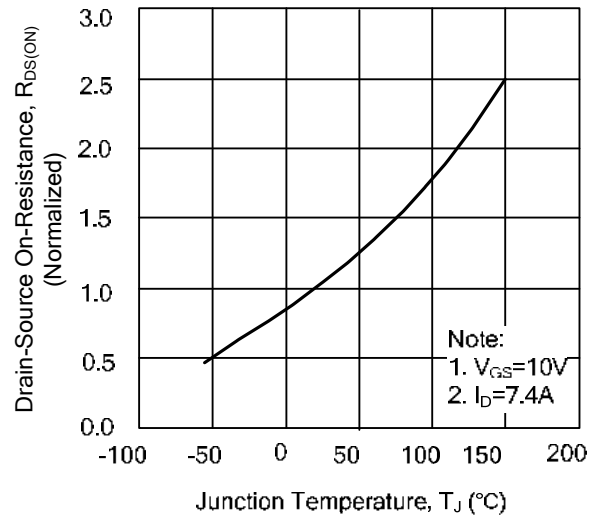


■ TYPICAL CHARACTERISTICS(Cont.)

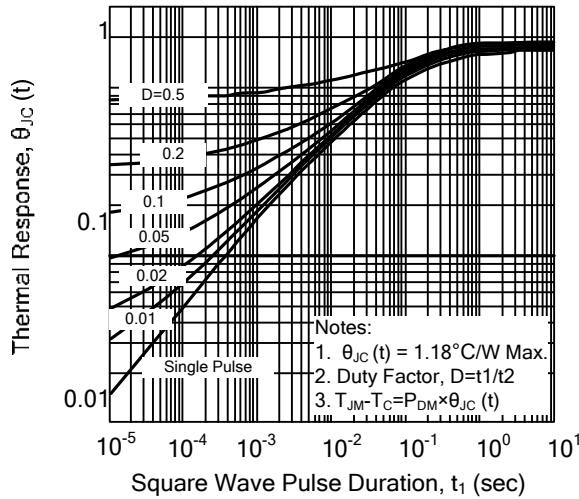
Breakdown Voltage Variation vs. Junction Temperature



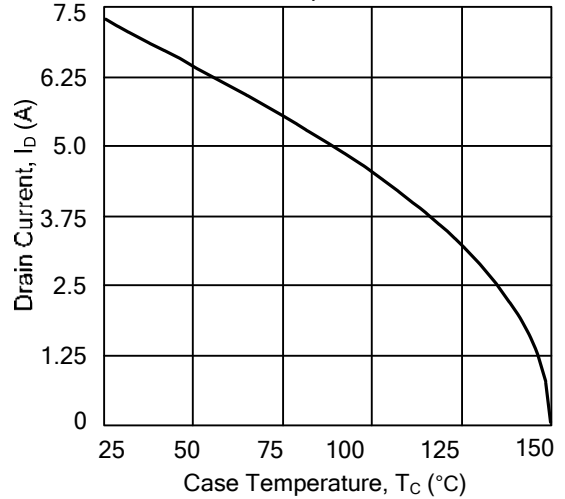
On-Resistance Variation vs. Junction Temperature



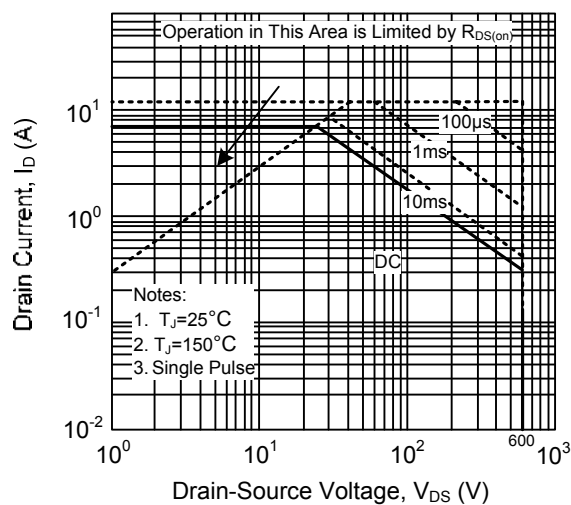
Transient Thermal Response Curve



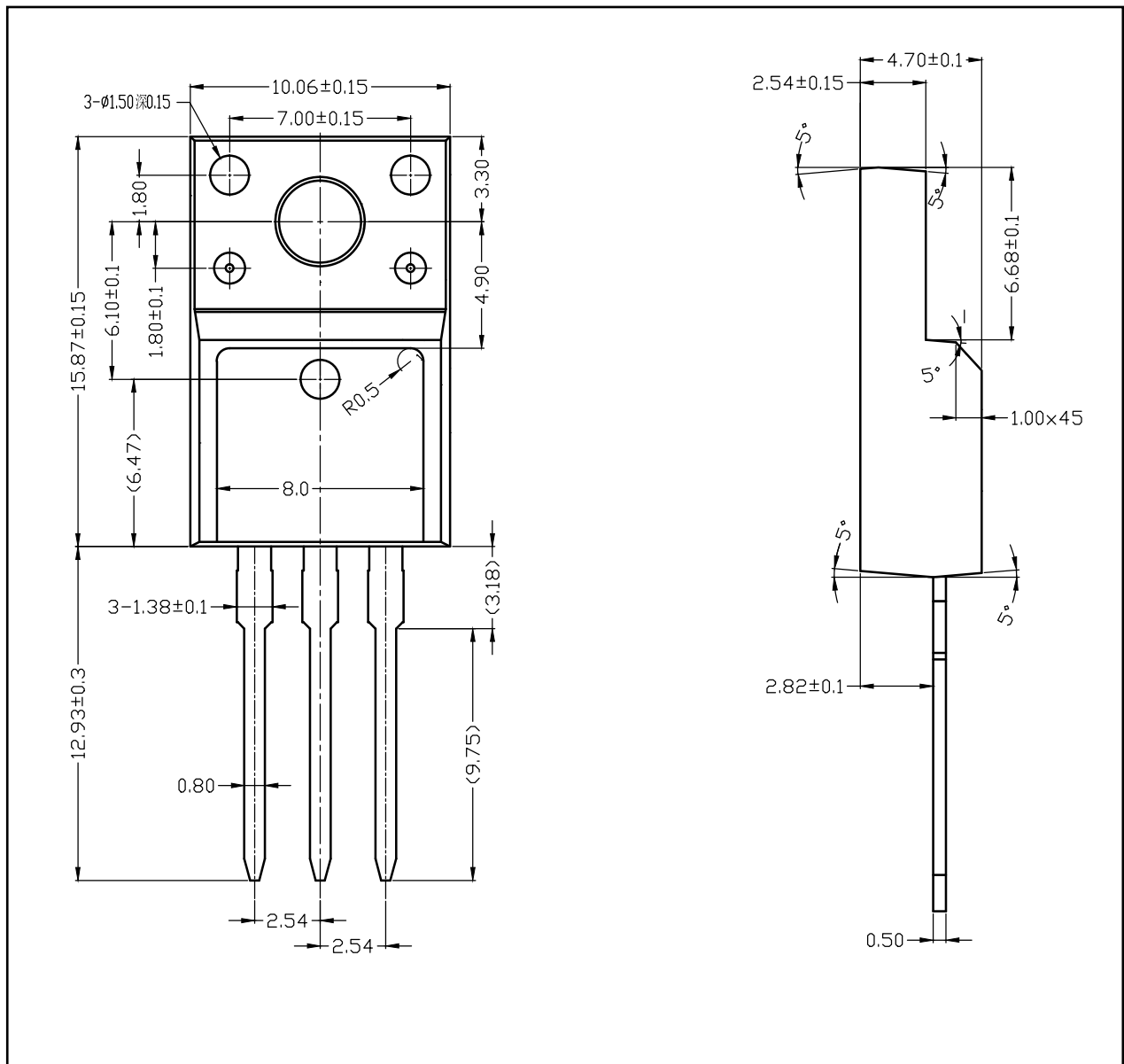
Maximum Drain Current vs. Case Temperature



Safe Operating Area - 600V



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

