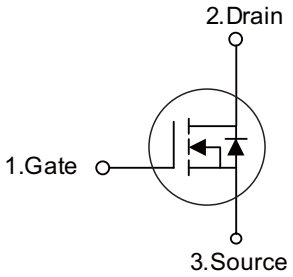
■ PRODUCT CHARACTERISTICS

VDSS	650V
R_{DS}(on)typ(@V_{GS}=10 V)	1.15Ω
Qg@type	29nC
ID	7A

Symbol



■ APPLICATIONS

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

■ FEATURES

* Ultra low gate charge
* Low reverse transfer Capacitance
* 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	MOT7N65YF	TO-220F	50 pieces/Tube
N/A	MOT7N65YA	TO-220	50 pieces/Tube

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	±30	V
Avalanche Current (Note 2)		I_{AR}	7	A
Drain Current	Continuous	I_D	7	A
	Pulsed (Note 2)	I_{DM}	29.6	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	530	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		48	
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

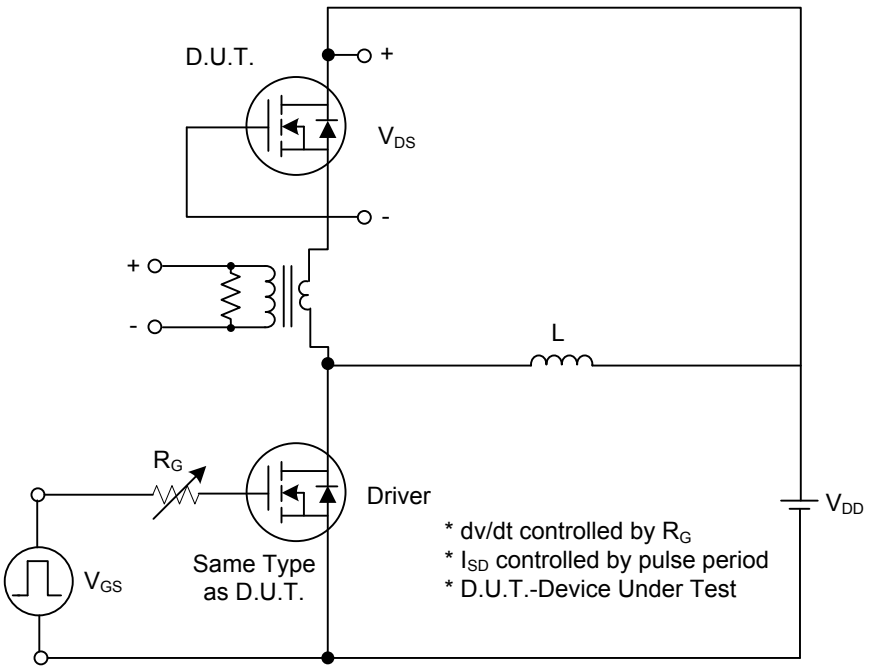
Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating : Pulse width limited by maximum junction temperature
3. L = 19.5mH, I_{AS} = 7A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD}≤7A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_J = 25°C

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

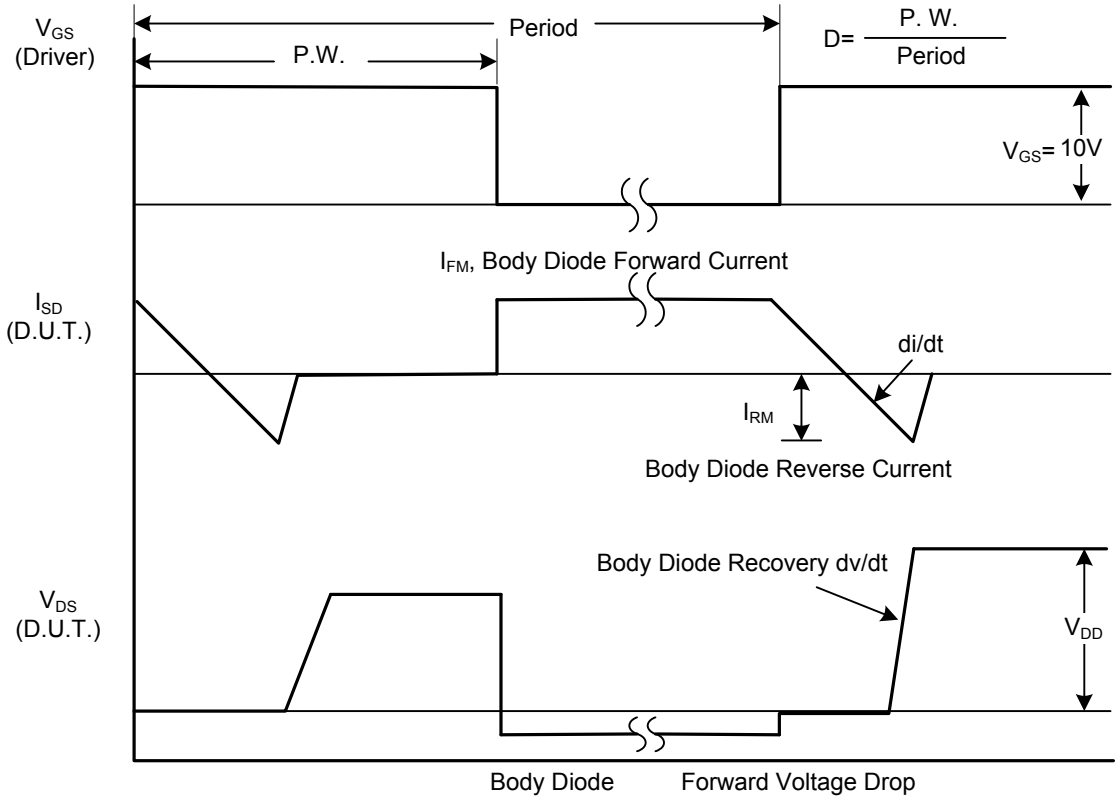
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS} = 0V, I_D = 250μA	650	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS} = 650V, V_{GS} = 0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS} = 30V, V_{DS} = 0V	-	-	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
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	-	1.15	1.25	Ω
Dynamic characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0 MHz	-	-	1400	pF
Output Capacitance		C_{OSS}		-	-	180	pF
Reverse Transfer Capacitance		C_{RSS}			16	21	pF
Switching characteristics							
Turn-On Delay Time		$t_{D(ON)}$	V_{DD} =325V, I_D =7.4A, R_G =25Ω (Note 1, 2)	-	-	70	ns
Turn-On Rise Time		t_R		-	-	170	ns
Turn-Off Delay Time		$t_{D(OFF)}$		-	-	140	ns
Turn-Off Fall Time		t_F		-	-	130	ns
Switching characteristics							
Total Gate Charge		Q_G	V_{DS}=520V, I_D = 7A, V_{GS}=10 V (Note 1, 2)	-	29	38	nC
Gate-Source Charge		Q_{GS}		-	7	-	nC
Gate-Drain Charge		Q_{GD}		-	14.5	-	nC
Source-drain diode ratings and characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS} = 0V, I_S = 7A	-	-	1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	7	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}		-	-	29.6	A
Reverse Recovery Time		t_{rr}	V_{GS} = 0V, I_S = 7A, 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

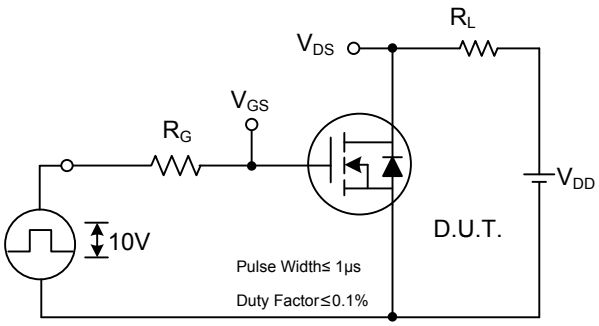


Peak Diode Recovery dv/dt Test Circuit

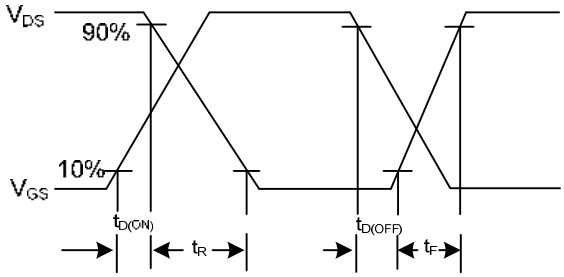


Peak Diode Recovery dv/dt Waveforms

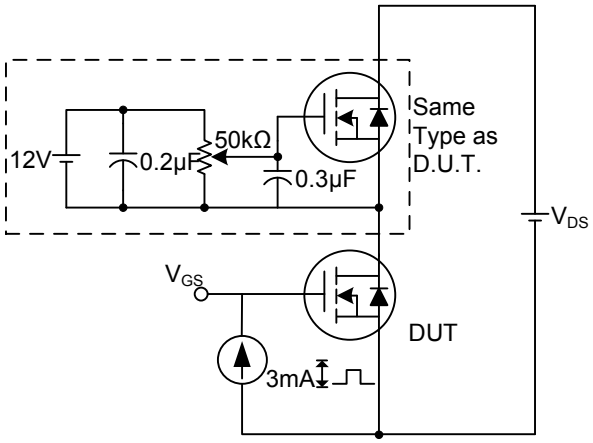
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



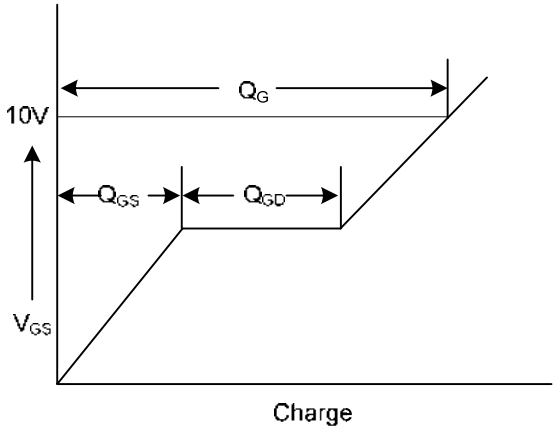
Switching Test Circuit



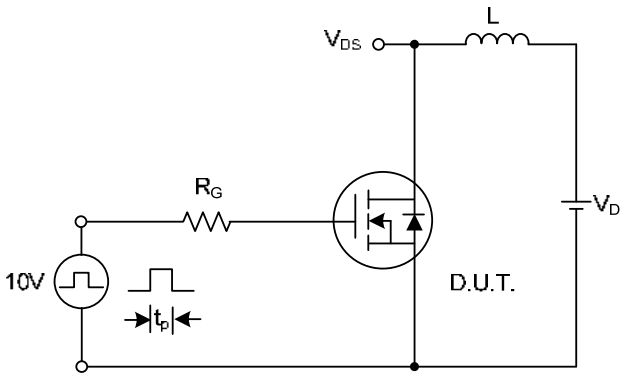
Switching Waveforms



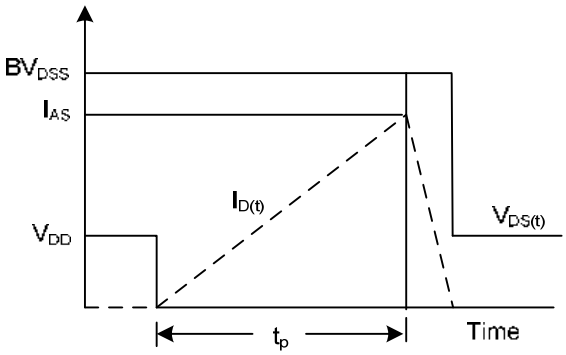
Gate Charge Test Circuit



Gate Charge Waveform



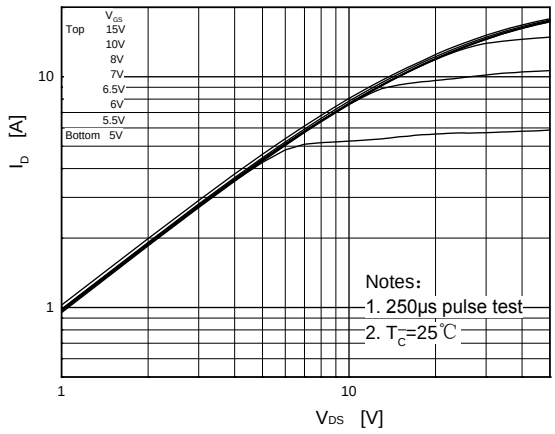
Unclamped Inductive Switching Test Circuit



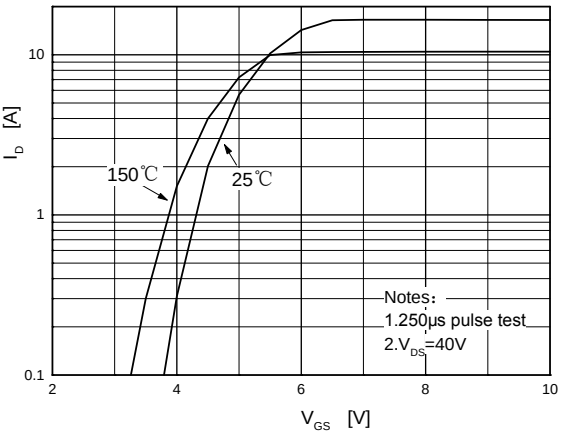
Unclamped Inductive Switching Waveforms

■ ELECTRICAL CHARACTERISTICS

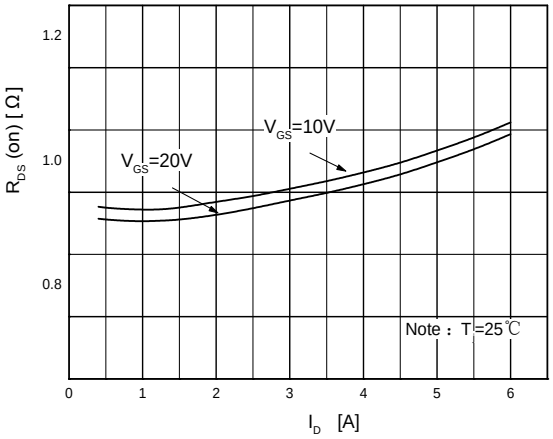
On-Region Characteristics



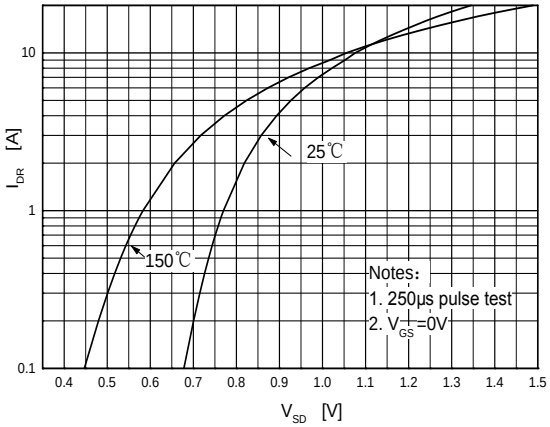
Transfer Characteristics



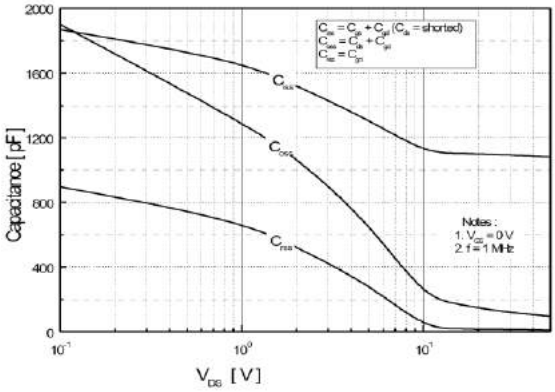
On-Resistance Variation vs. Drain Current and Gate Voltage



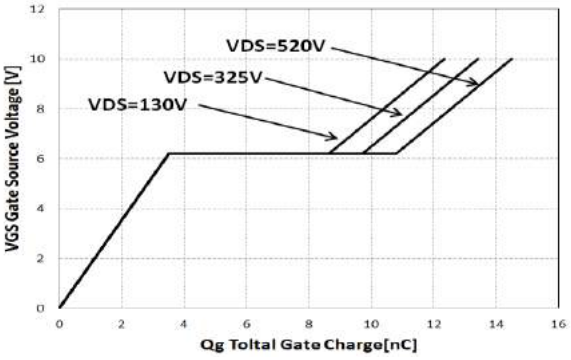
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics

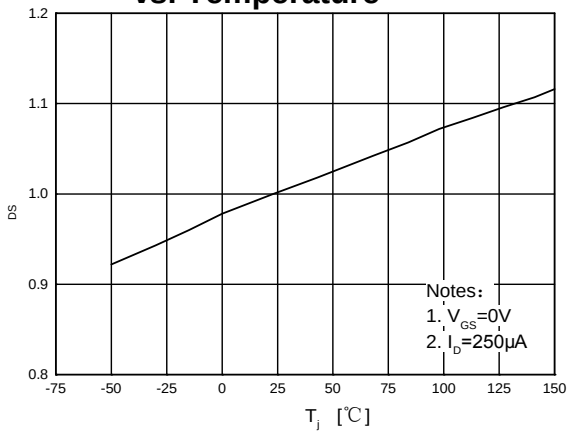


Gate Charge Characteristics

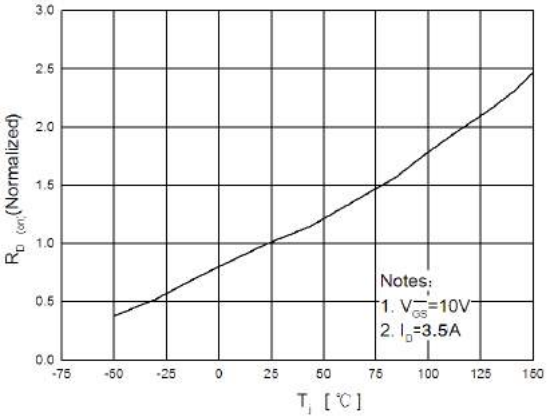


■ ELECTRICAL CHARACTERISTICS(Cont.)

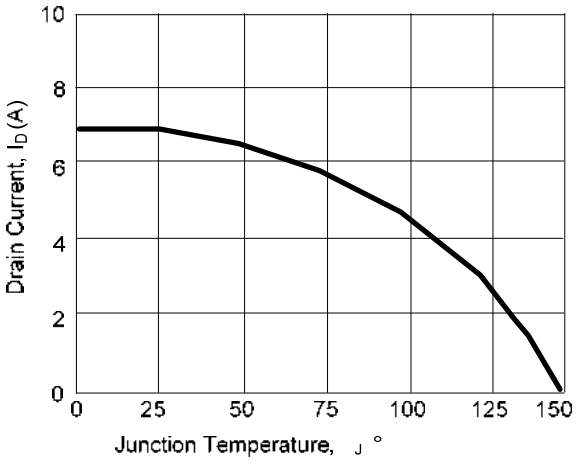
Breakdown Voltage Variation vs. Temperature



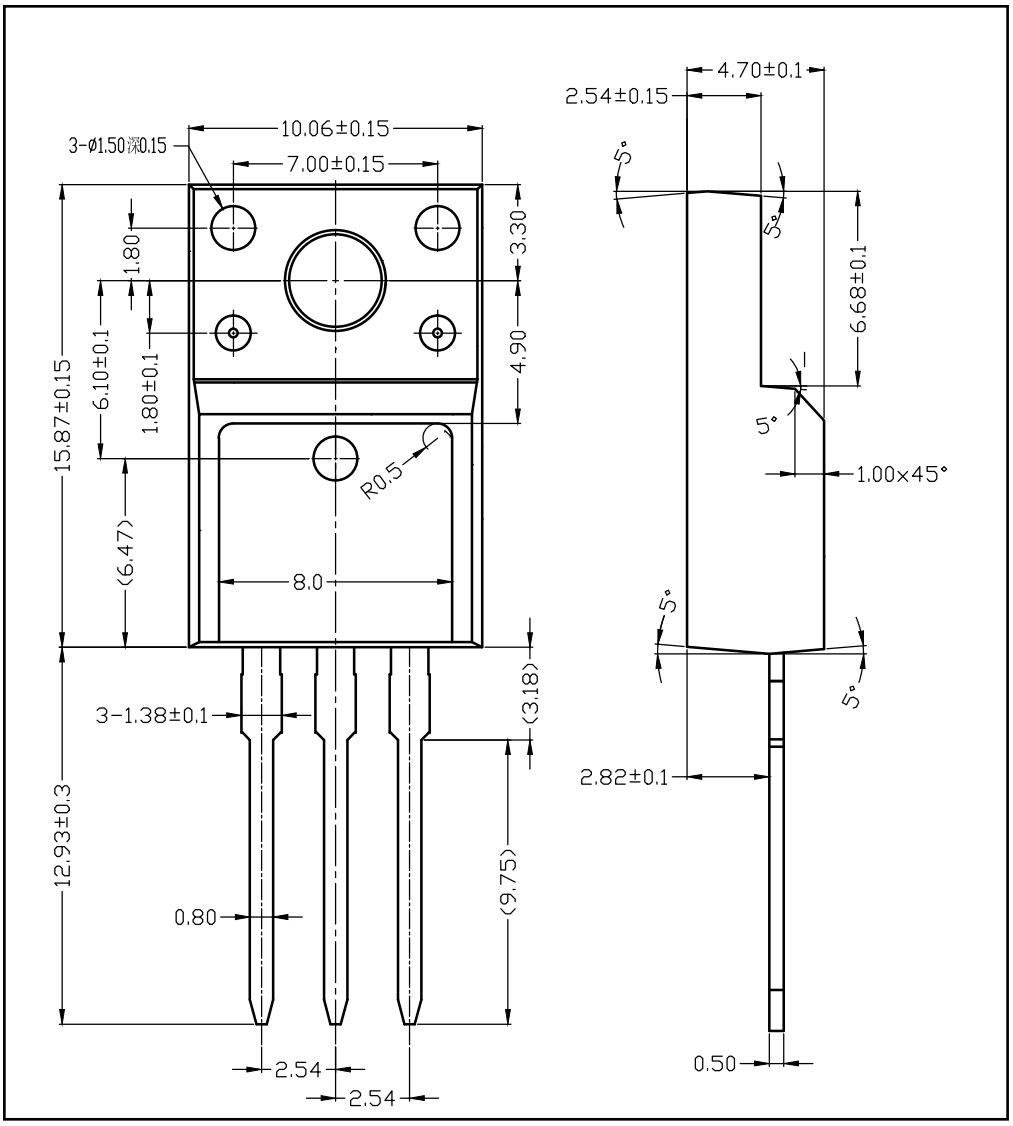
On-Resistance Variation vs. Temperature



Drain Current vs Junction Temperature



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS