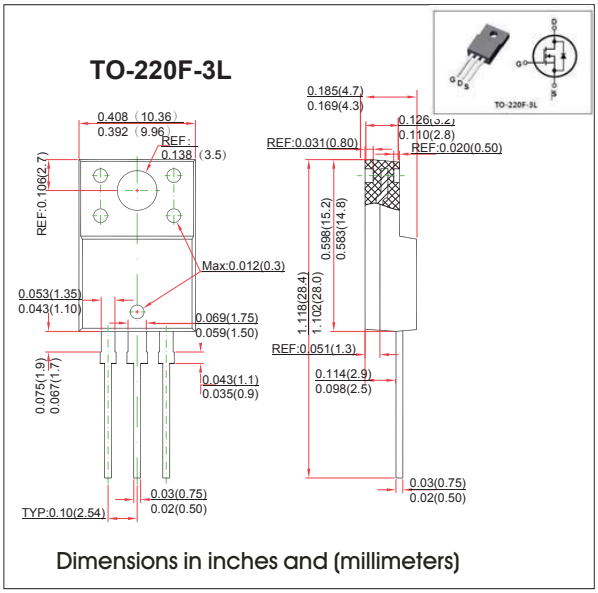
TO-220F-3L Plastic-Encapsulate MOSFETS

Features

- 600V N-Channel Power MOSFET
- RDS(ON) < 3.6Ω@ VGS = 10V, ID =1.5A
- Fast switching capability
- Lead free in compliance with EU RoHS directive.
- Improved dv/dt capability, high ruggedness

MECHANICAL DATA

- Case style:TO-220F-3L molded plastic
- Mounting position:any



MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Avalanche Current (Note 2)		I_{AR}	3.0	A
Continuous Drain Current		I_D	3.0	A
Pulsed Drain Current (Note 2)		I_{DM}	12	A
Avalanche Energy Single Pulsed (Note 3)		E_{AS}	200	mJ
Power Dissipation	TO-220/TO-262/TO-263	P_D	75	W
	ITO-220		34	W
	TO-251/TO-252		50	W
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-55 ~ +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 TJ.
3. L = 44.4mH, IAS=3A, VDD=50V, RG=25 Ω, Starting TJ = 25°C

THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambie nt	TO-220/ITO-220 TO-262/TO-263	θ_{JA}	62.5	°C/W
	TO-251/ TO-252		110	
Junction to Cas e	TO-220/TO-262/TO-263	θ_{JC}	1.70	°C/W
	ITO-220		3.70	
	TO-251/ TO-252		2.6	

RATINGS AND CHARACTERISTIC CURVES

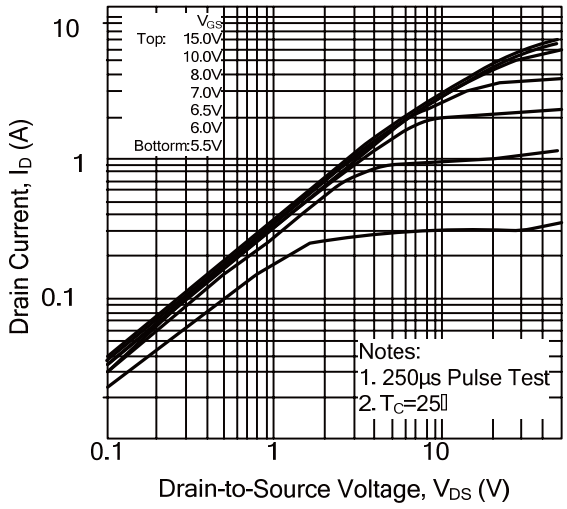
MOSFET ELECTRICAL CHARACTERISTICS T_A=25℃ unless otherwise specified

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS} = 0V, I_D = 250μA	600			V
Drain-Source Leakage Current		I_{DSS}	V_{DS} = 600V, 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}=10 V, I_D=1.5A			3.6	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz		350	450	pF
Output Capacitance		C_{OSS}			50	65	pF
Reverse Transfer Capacitance		C_{RSS}			5.5	7.5	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{D(ON)}$	V_{DD} =30V, I_D =0.5A, R_G=25Ω (Note 1, 2)		35	50	ns
Turn-On Rise Time		t_R			60	70	ns
Turn-Off Delay Time		$t_{D(OFF)}$			100	150	ns
Turn-Off Fall Time		t_F			65	75	ns
Total Gate Charge		Q_G	V_{DS}=50V, I_D=1.3 A, I_G=100μA		18.5	23	nC
Gate-Source Charge		Q_{GS}	V_{GS}=10V (Note 1, 2)				
Gate-Drain Charge		Q_{GD}			5.2	-	nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS					4.9	-	nC
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0 V, I_S=3.0A			1	V
Maximum Continuous Drain-Source Diode Forward Current		I_S				3.0	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				12	A
Reverse Recovery Time		t_{rr}	V_{GS} = 0 V, I_S = 3A, dI_F/dt = 100 A/μs (Note 1)		210		ns
Reverse Recovery Charge		Q_{RR}			1.2		μC

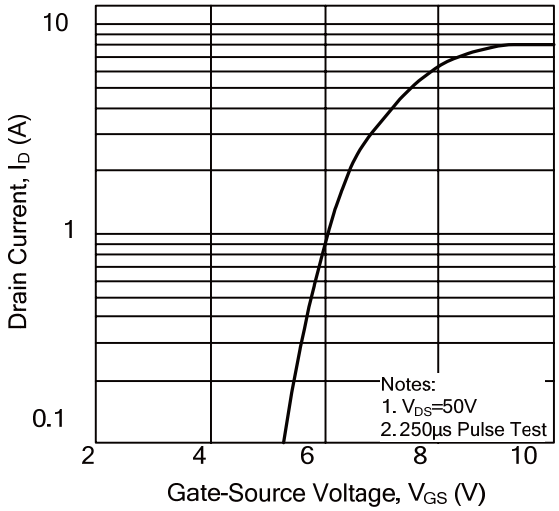
Notes: 1. Pulse Test: Pulse width≤300μs, Duty cycle≤2%
2. Essentially independent of operating temperature

RATINGS AND CHARACTERISTIC CURVES

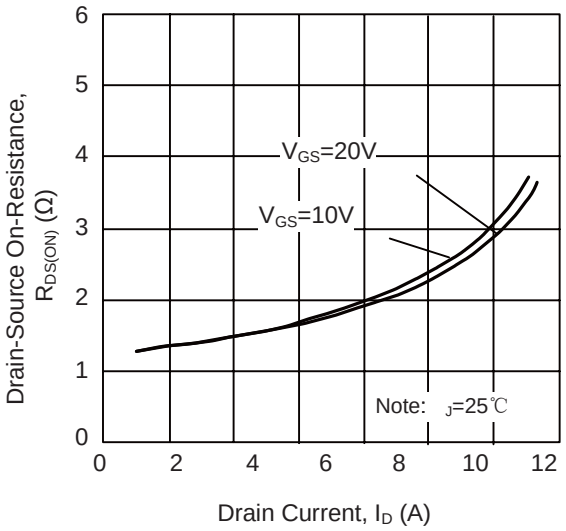
On-State Characteristics



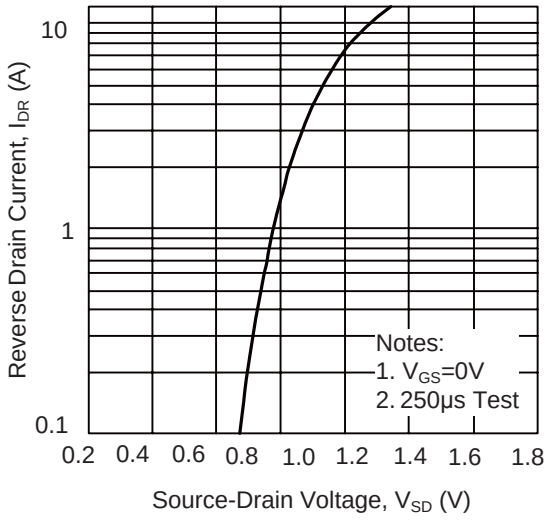
Transfer Characteristics



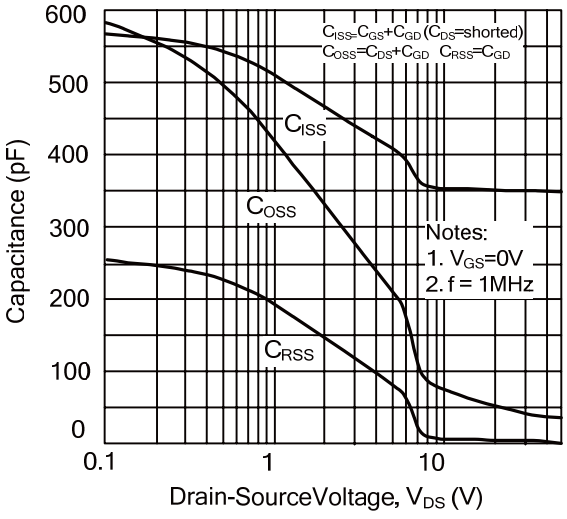
On-Resistance Variation vs.
Drain Current and Gate Voltage



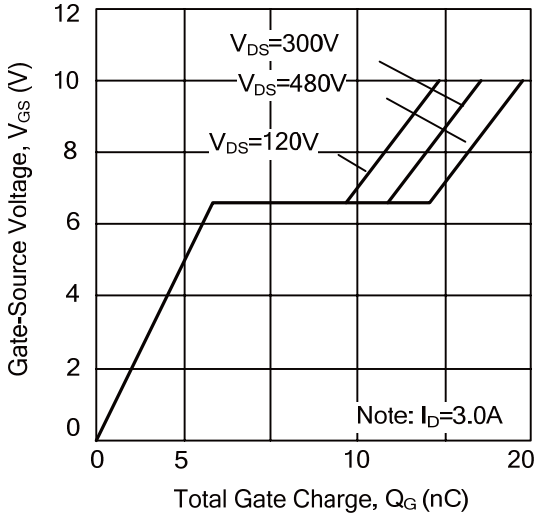
On State Current vs.
Allowable Case Temperature



Capacitance Characteristics
(Non-Repetitive)

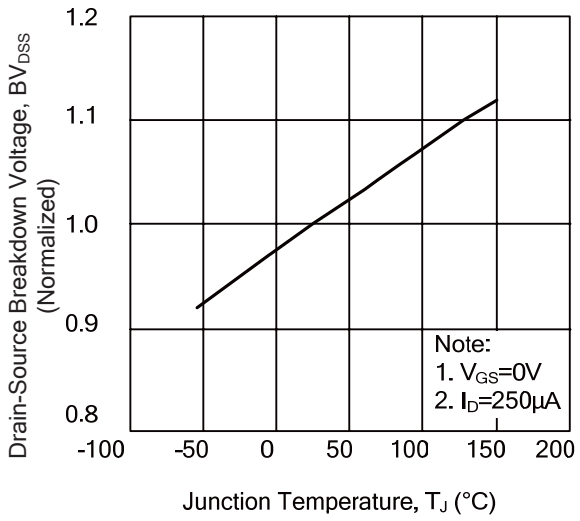


Gate Charge Characteristics

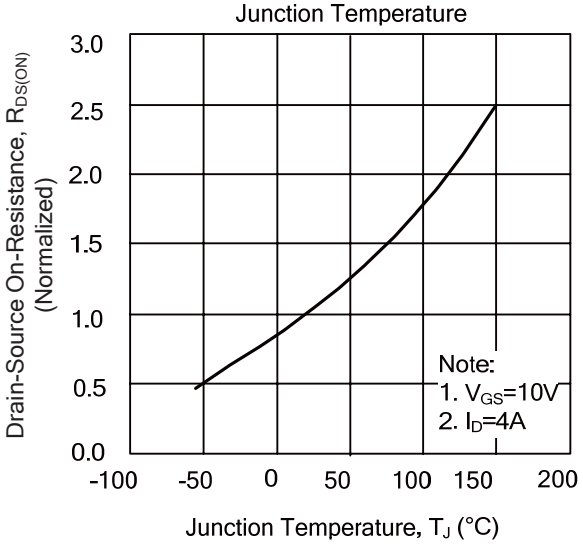


RATINGS AND CHARACTERISTIC CURVES

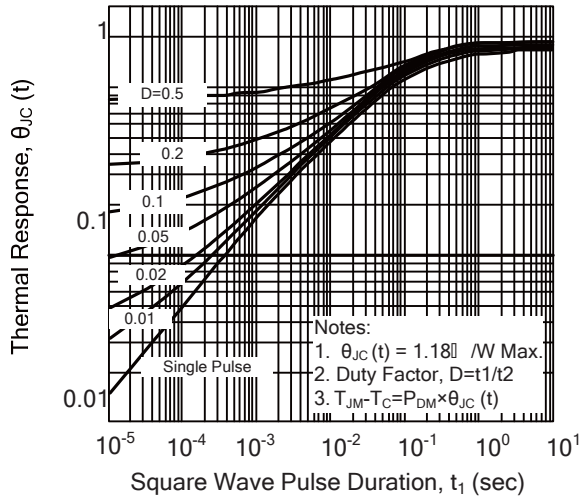
Breakdown Voltage Variation vs. Junction Temperature



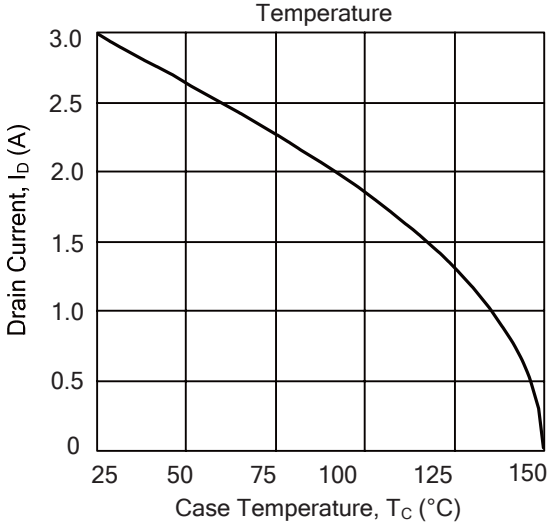
On-Resistance Variation vs. Junction Temperature



Transient Thermal Response Curve



Maximum Drain Current vs. Case Temperature



Safe Operating Area - 600V