



700V 350mΩ N-Ch Power MOSFET

Features

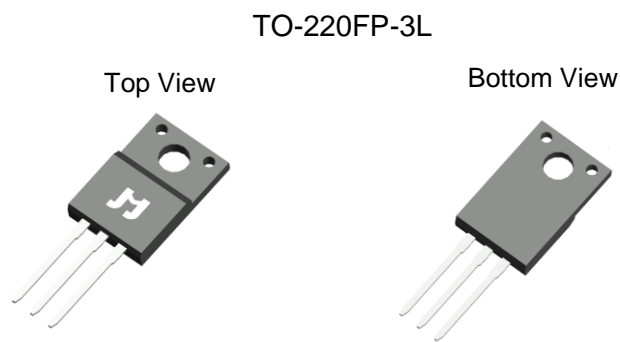
- Extremely Low Gate Charge
- Excellent Output Capacitance ( $C_{oss}$ ) Profile
- Fast Switching Capability
- 100% UIS Tested, 100% Rg Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

Product Summary

Parameter	Value	Unit
$V_{DS}$	700	V
$V_{GS(th)_{Typ}}$	3.5	V
$I_D$ (@ $V_{GS} = 10V$ ) <sup>(1)</sup>	11	A
$R_{DS(ON)_{Typ}}$ (@ $V_{GS} = 10V$ )	350	mΩ
$E_{oss@400V}$	3.6	μJ

Applications

- Telecom / Server Power Supplies
- Industrial Power Supplies
- UPS / Solar
- Lighting / Charger / Adapter

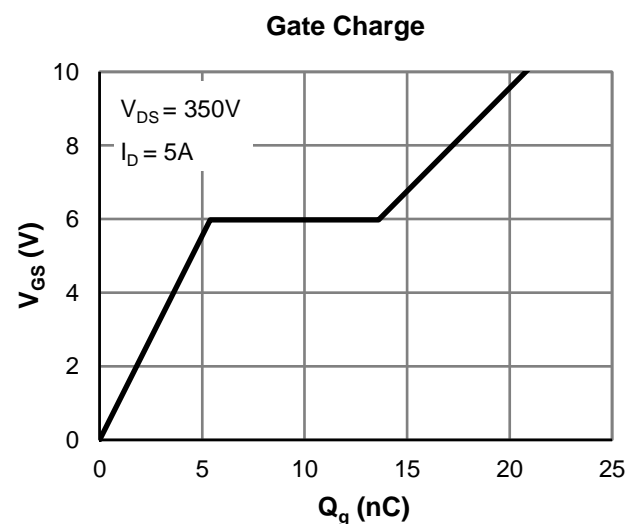
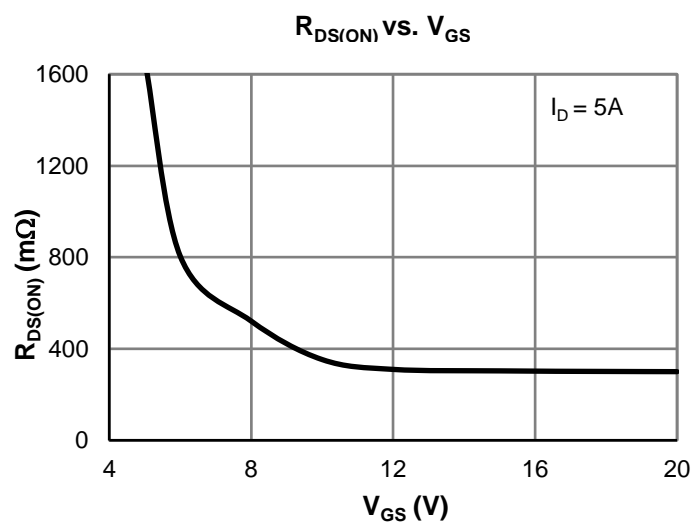


Ordering Information

Device	Package	# of Pins	Marking	MSL	$T_J$ (°C)	Media	Quantity (pcs)
JMH70R430AF-U	TO-220FP-3L	3	H70R430A	NA	-55 to 150	Tube	50

Absolute Maximum Ratings (@  $T_A = 25^\circ C$  unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DS}$	700	V
Gate-to-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	$T_C = 25^\circ C$	11.2
		$T_C = 100^\circ C$	3.0
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	17	A
Avalanche Energy <sup>(3)</sup>	$E_{AS}$	180	mJ
Power Dissipation <sup>(4)</sup>	$P_D$	$T_C = 25^\circ C$	35
		$T_C = 100^\circ C$	14
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C





**Electrical Characteristics** (@ T<sub>J</sub> = 25°C unless otherwise specified)

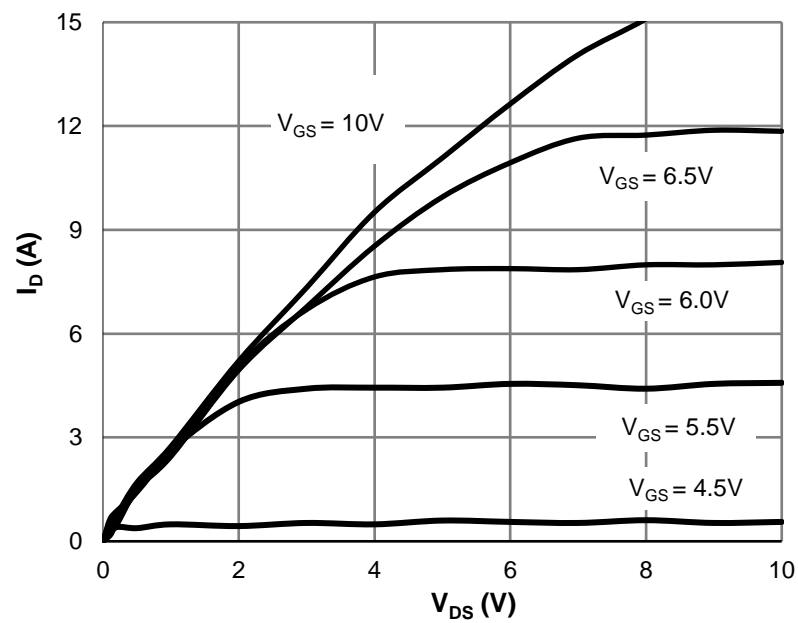
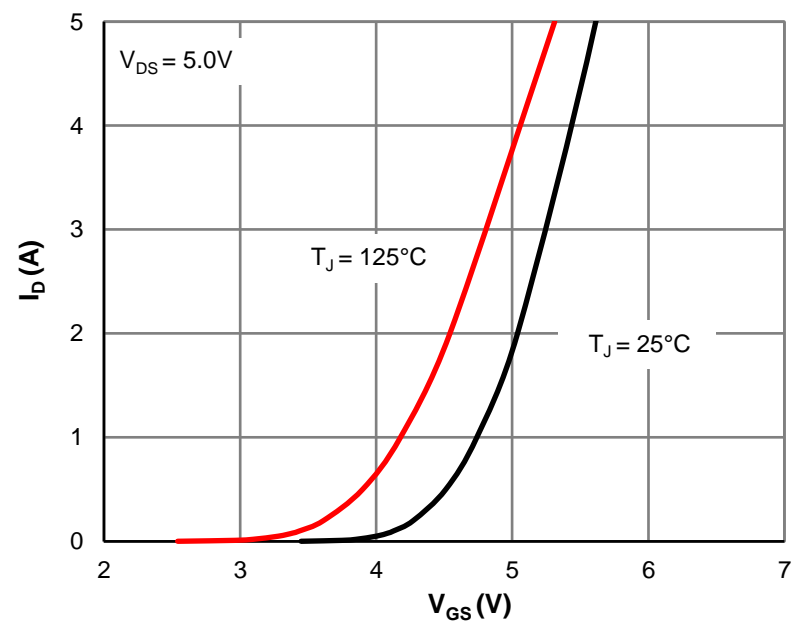
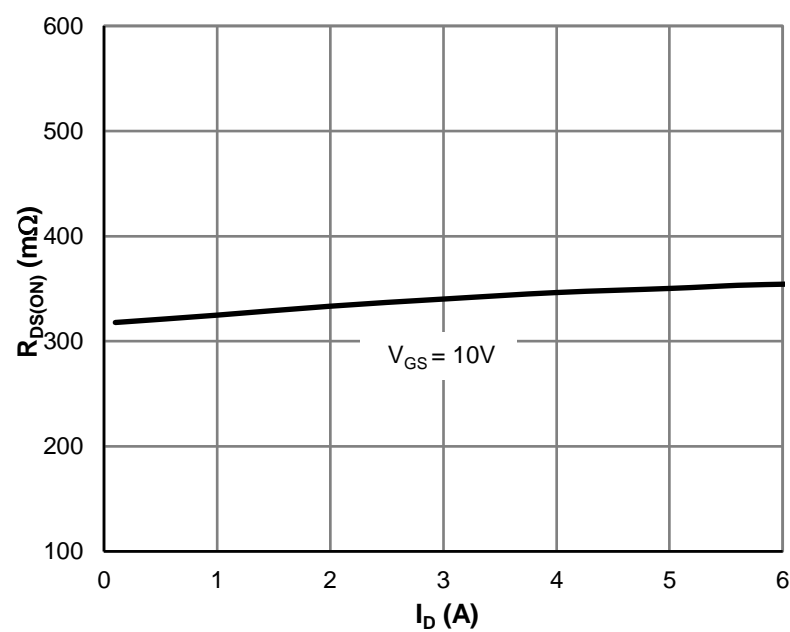
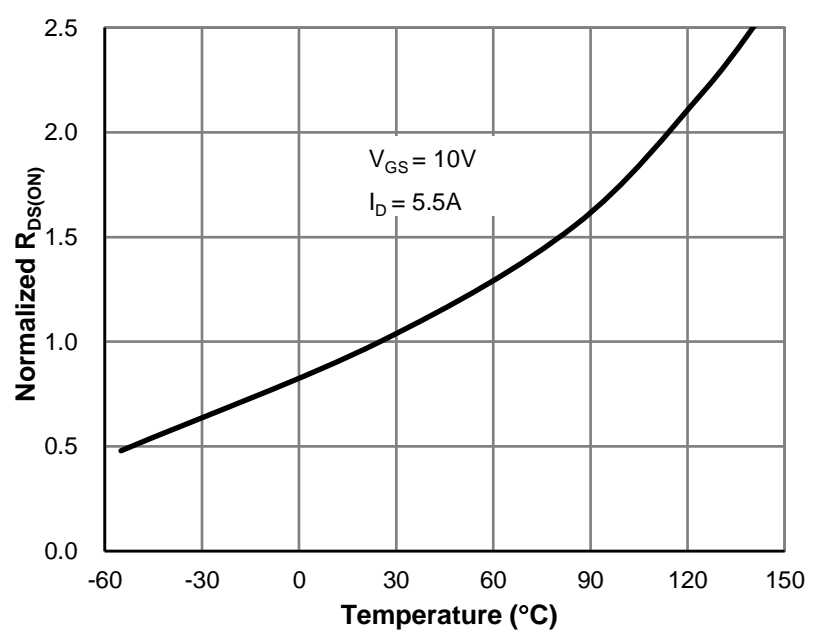
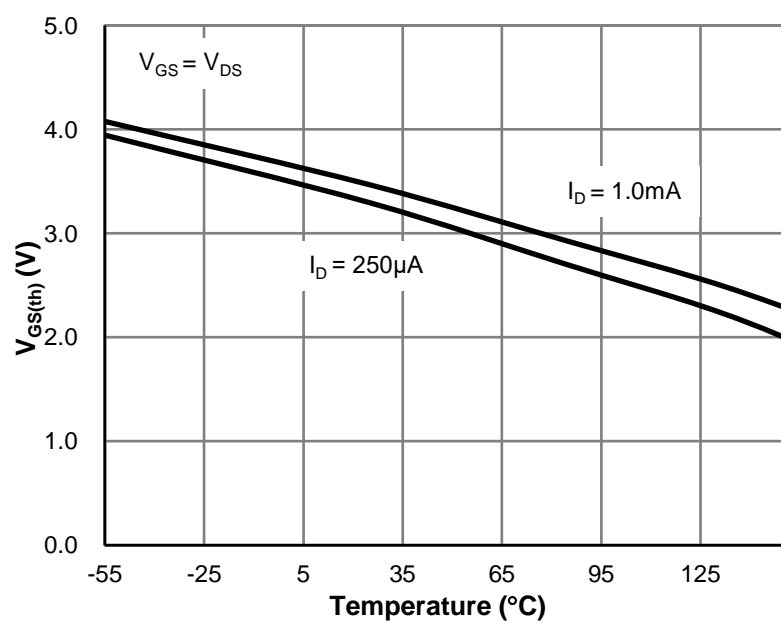
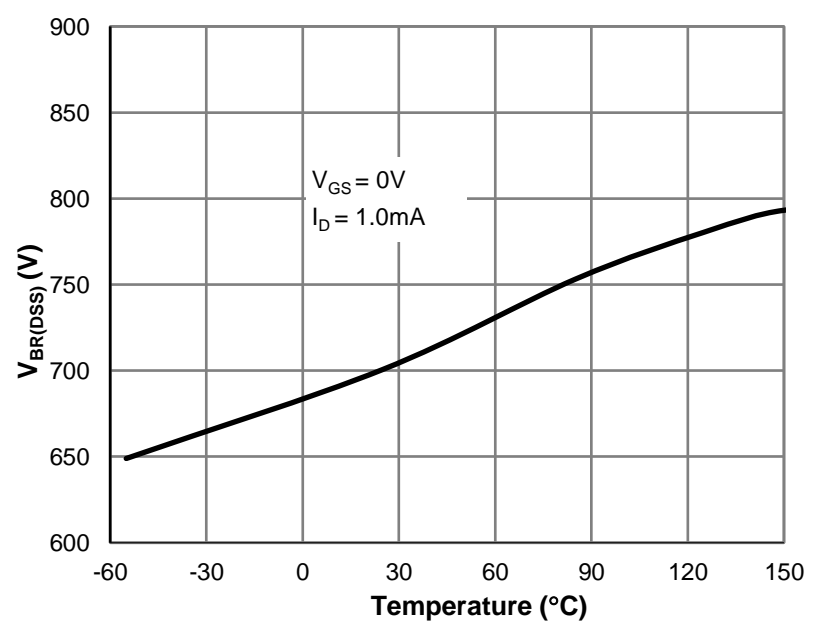
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	700			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 560V, V <sub>GS</sub> = 0V			1.0	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±30V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.5	3.5	4.5	V
Static Drain-Source ON-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.5A		350	420	mΩ
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V		0.70	1.0	V
Diode Continuous Current	I <sub>S</sub>	T <sub>C</sub> = 25°C			11	A
<b>DYNAMIC PARAMETERS <sup>(5)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 350V, f = 1MHz		810		pF
Output Capacitance	C <sub>oss</sub>			27		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			5.1		pF
Effective output capacitance, energy related	C <sub>o(er)</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0 to 400V		45		pF
Effective output capacitance, time related	C <sub>o(tr)</sub>			190		pF
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz		8.8		Ω
<b>SWITCHING PARAMETERS <sup>(5)</sup></b>						
Total Gate Charge (@ V <sub>GS</sub> = 10V)	Q <sub>g</sub>	V <sub>GS</sub> = 0 to 10V V <sub>DS</sub> = 700V, I <sub>D</sub> = 5A		21		nC
Total Gate Charge (@ V <sub>GS</sub> = 6.0V)	Q <sub>g</sub>			13.8		nC
Gate Source Charge	Q <sub>gs</sub>			5.4		nC
Gate Drain Charge	Q <sub>gd</sub>			8.2		nC
Turn-On DelayTime	t <sub>D(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 350V R <sub>L</sub> = 75Ω, R <sub>GEN</sub> = 6.0Ω		13.4		ns
Turn-On Rise Time	t <sub>r</sub>			19.4		ns
Turn-Off DelayTime	t <sub>D(off)</sub>			46		ns
Turn-Off Fall Time	t <sub>f</sub>			18.6		ns
JMH70R430AF-13	t <sub>rr</sub>	I <sub>F</sub> = 9A, di <sub>F</sub> /dt = 100A/μs		322		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = 9A, di <sub>F</sub> /dt = 100A/μs		4560		nC
Peak Diode Recovery Voltage Slope	dv/dt	I <sub>F</sub> ≤ 10A, di/dt = 200A/us, V <sub>DS</sub> = 400V		15		V/ns
MOSFET dv/dt Ruggedness	dv/dt	V <sub>DS</sub> = 0...400V		50		V/ns

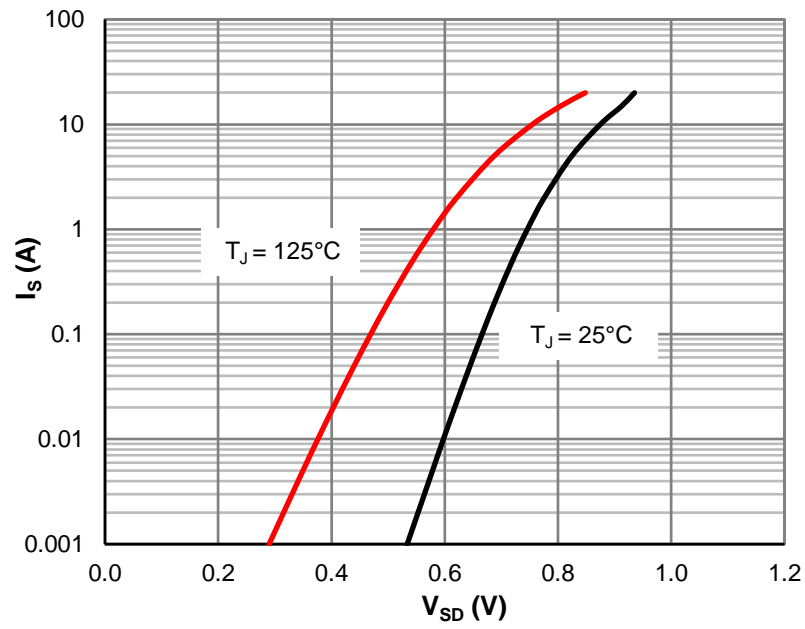
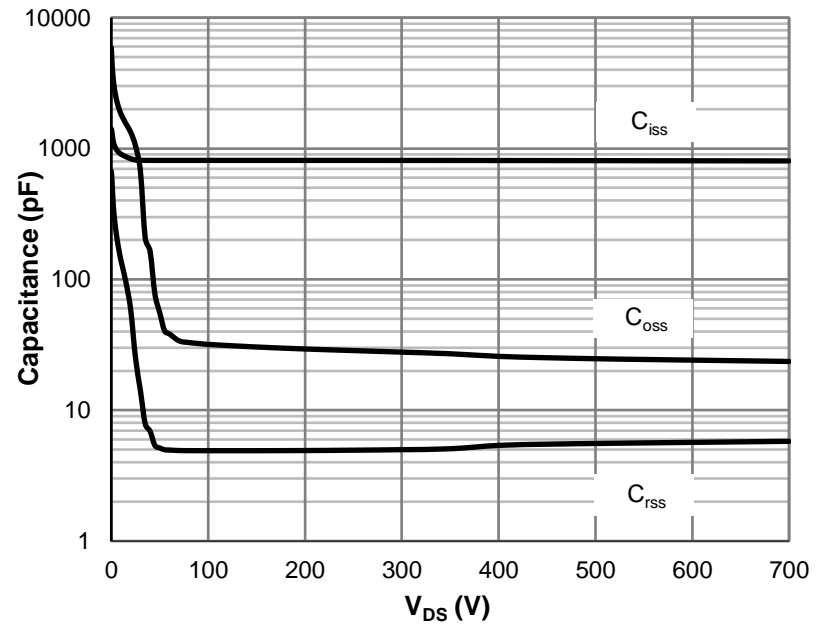
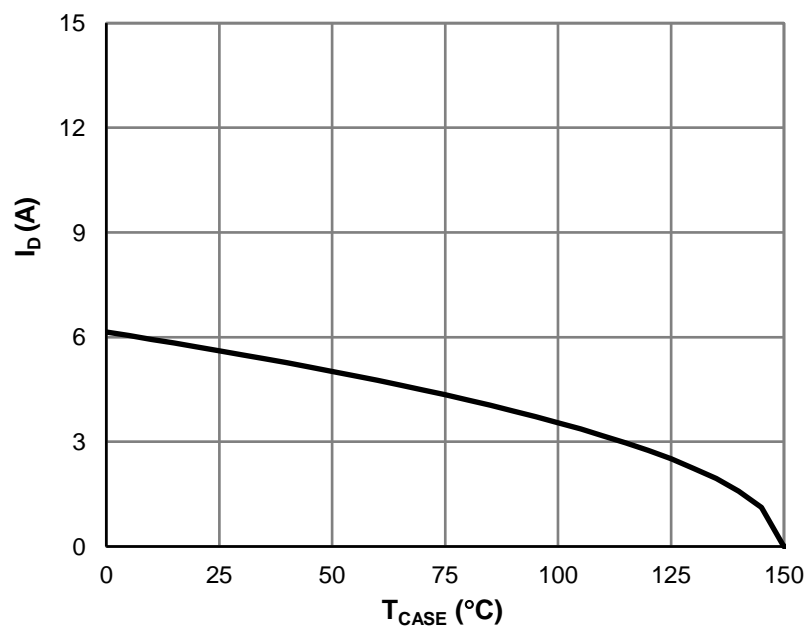
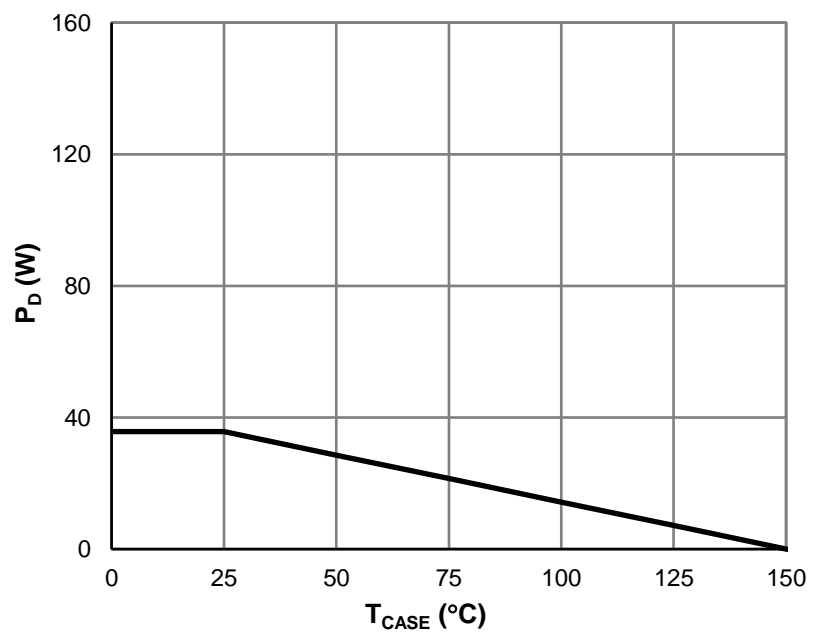
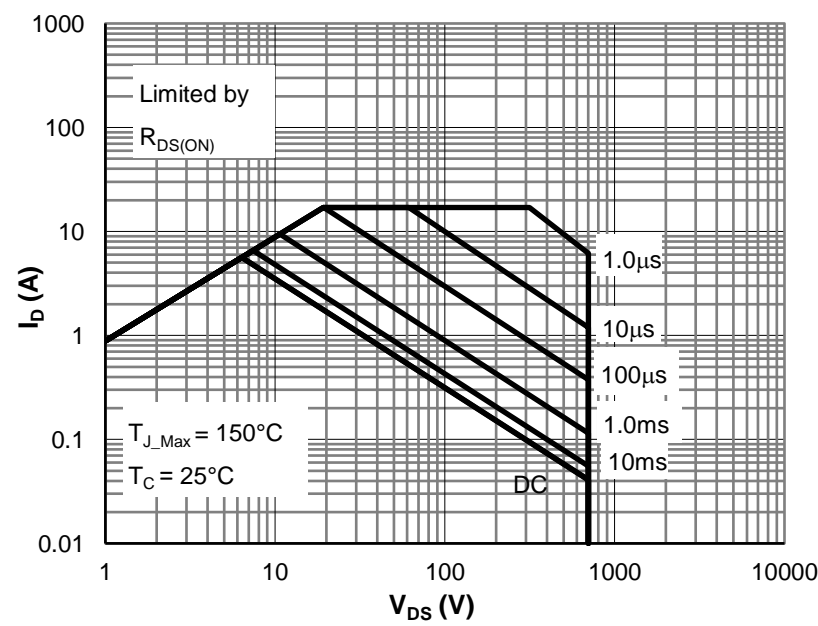
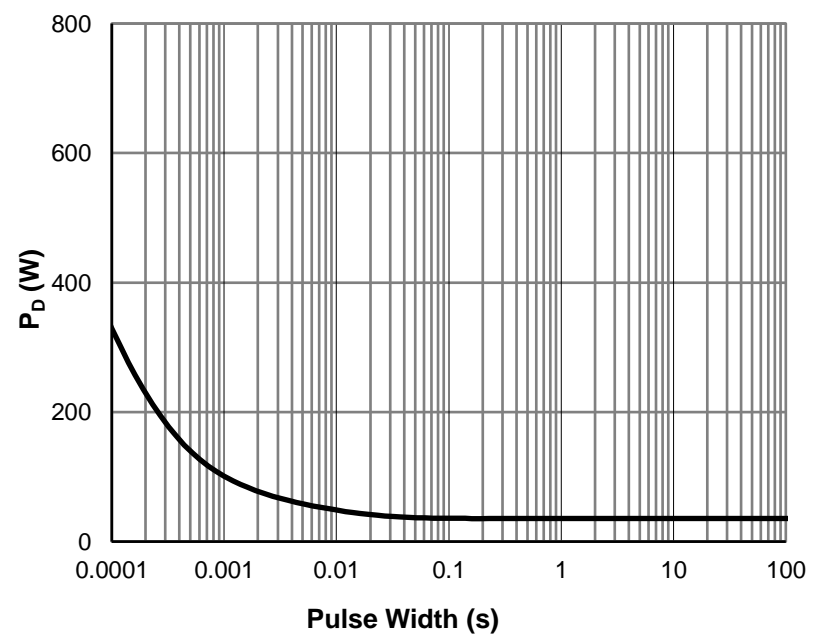
**Thermal Performance**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	52	62	°C/W
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	3.50	4.2	°C/W

**Notes:**

1. Computed continuous current assumes the condition of T<sub>J,Max</sub> while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T<sub>J,Max</sub> = 150°C.
3. E<sub>AS</sub> of 180 mJ is based on starting T<sub>J</sub> = 25°C, L = 10mH, I<sub>AS</sub> = 6.3A, V<sub>GS</sub> = 10V, V<sub>DD</sub> = 350V; 100% test at L = 10mH, I<sub>AS</sub> = 6.3A. T<sub>J,Max</sub> = 150°C.
4. The power dissipation P<sub>D</sub> is based on T<sub>J,Max</sub> = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

**Typical Electrical & Thermal Characteristics**

**Figure 1: Saturation Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3:  $R_{DS(ON)}$  vs. Drain Current**

**Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature**

**Figure 5:  $V_{GS(th)}$  vs. Junction Temperature**

**Figure 6:  $V_{BR(DSS)}$  vs. Junction Temperature**

**Typical Electrical & Thermal Characteristics**

**Figure 7: Body-Diode Characteristics**

**Figure 8: Capacitance Characteristics**

**Figure 9: Current De-rating**

**Figure 10: Power De-rating**

**Figure 11: Maximum Safe Operating Area**

**Figure 12: Single Pulse Power Rating, Junction-to-Case**



### Typical Electrical & Thermal Characteristics

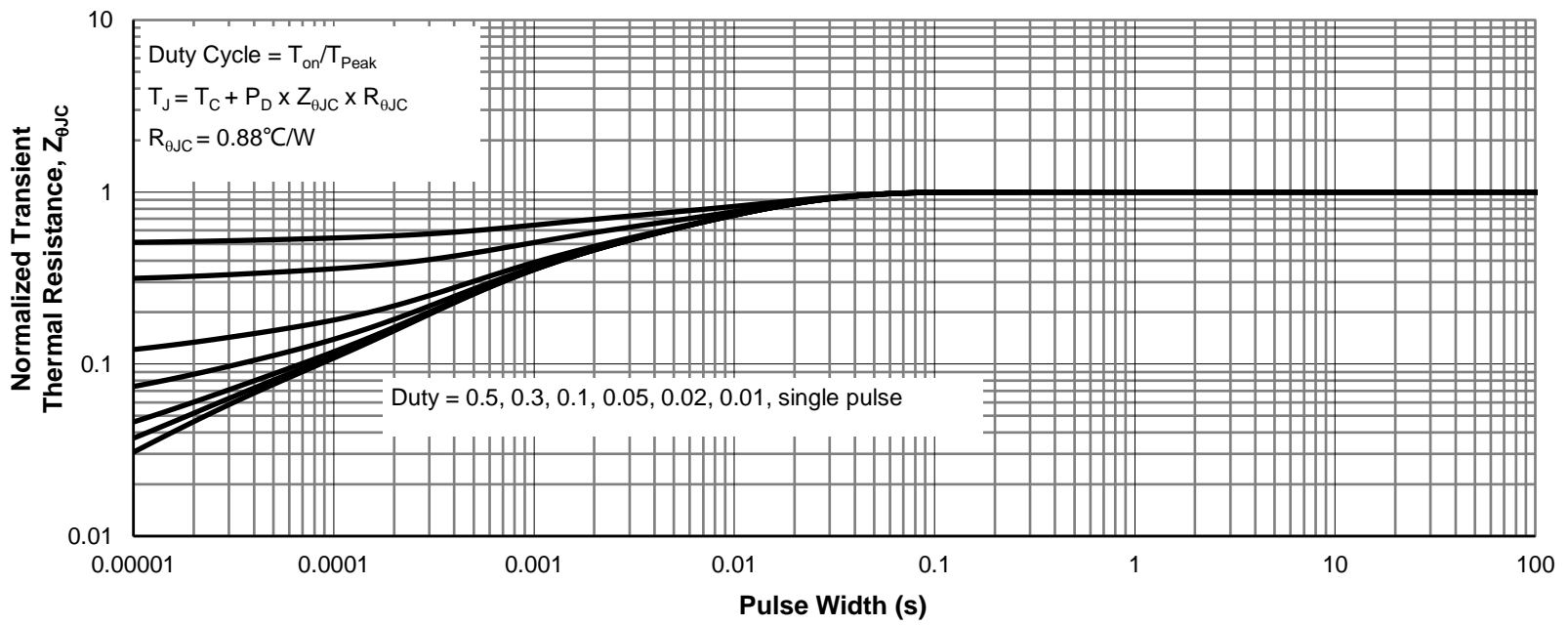
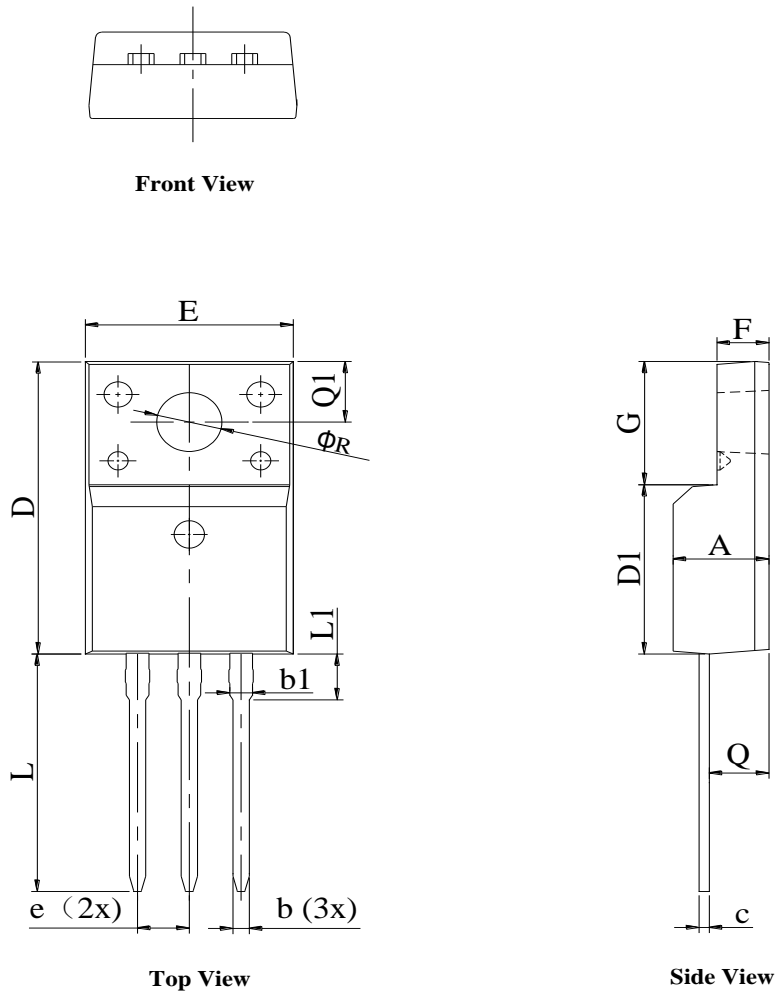


Figure 13: Normalized Maximum Transient Thermal Impedance

**TO-220FP-3L Package Information**
**Package Outline**


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.50	4.70	4.90
D	15.20	15.87	16.10
D1	8.80	--	9.50
E	9.70	10.10	10.40
F	2.44	--	2.75
b	0.70	0.80	0.91
b1	1.10	1.35	1.55
c	0.45	0.50	0.65
e	2.54 BSC		
G	6.40	6.70	6.90
L	12.00	13.10	14.50
L1	3.13	--	3.57
Q	2.60	2.75	2.85
Q1	3.20	3.30	3.40
R	3.05	--	3.28