Description

JMP N-channel Enhancement Mode Power MOSFET

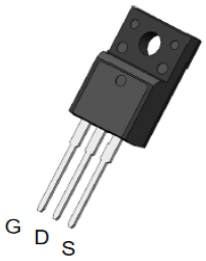
Features

- 500V, 15A
  $R_{DS(ON)}$ < 0.51Ω @ V_{GS} = 10V
- Fast Switching
- Improved dv/dt Capability

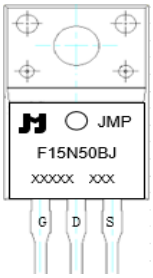
Applications

- Load Switch
- PWM Application
- Power Management

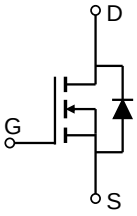
100% UIS TESTED!
100% ΔVds TESTED!



TO-220FP-3L Top View



Marking and Pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	TUBE (pcs)	Inner Box (pcs)	Per Carton (pcs)
JMPF15N50BJ	JMPF15N50BJ	TUBE	TO-220FP-3L	50	1000	5000

Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		500	V
V_{GS}	Gate-to-Source Voltage		±30	V
I_D	Continuous Drain Current	T_C = 25°C	15	A
		T_C = 100°C	9	
I_{DM}	Pulsed Drain Current (1)		60	A
E_{AS}	Single Pulsed Avalanche Energy (2)		551	mJ
P_D	Power Dissipation	T_C = 25°C	27	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)		53	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		4.6	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	500	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±30V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2	3	4	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = 10V, I_D = 8A	-	0.39	0.51	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz	-	2122	-	pF
C_{oss}	Output Capacitance		-	196	-	pF
C_{rss}	Reverse Transfer Capacitance		-	21	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 250V, I_D = 15A	-	43	-	nC
Q_{gs}	Gate Source Charge		-	12.3	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	13.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 247.5V I_D= 15A, R_{GEN} = 24Ω	-	32	-	ns
t_r	Turn-On Rise Time		-	45	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	119	-	ns
t_f	Turn-Off Fall Time		-	49	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	15	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	60	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 15A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 15A, di/dt = 100A/us	-	398	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4.6	-	μC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=50V, V_G=10V, R_G=25ohm, L=10mH, I_{AS}=10.5A
3. $R_{\theta JA}$ is measured with the device mounted on a minimum recommended pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

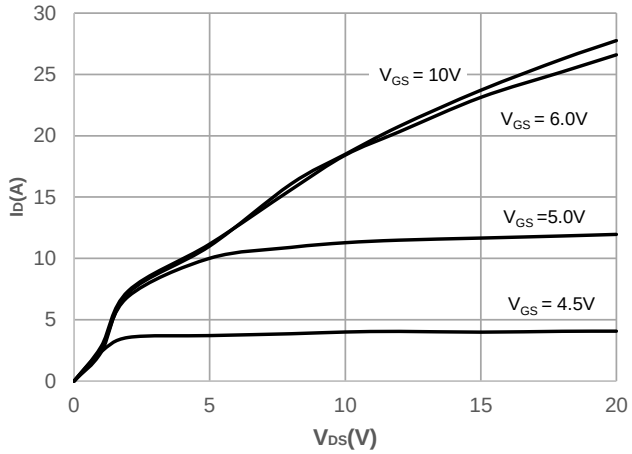


Figure 2: Typical Transfer Characteristics

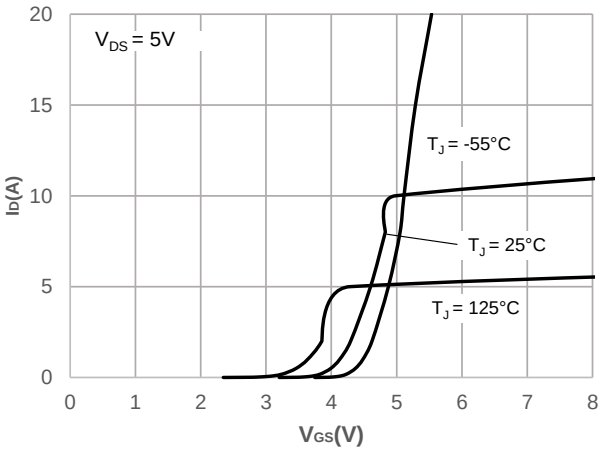


Figure 3: On-resistance vs. Drain Current

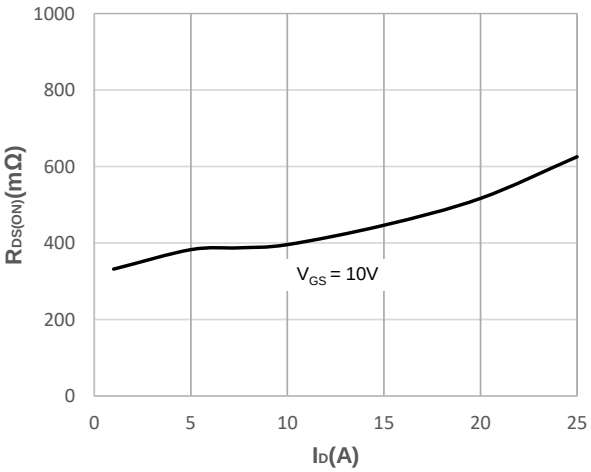


Figure 4: Body Diode Characteristics

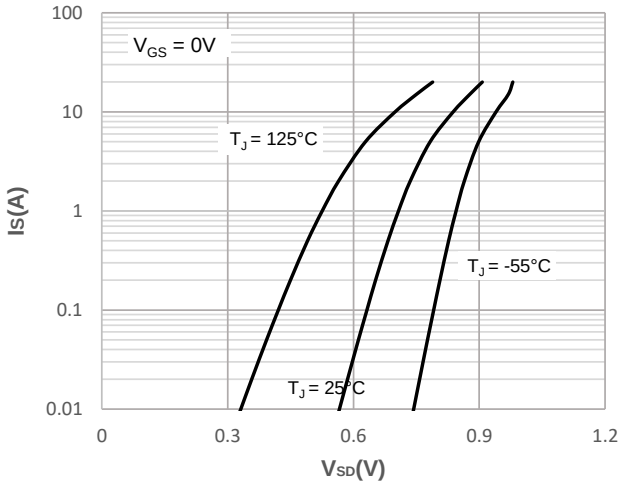


Figure 5: Gate Charge Characteristics

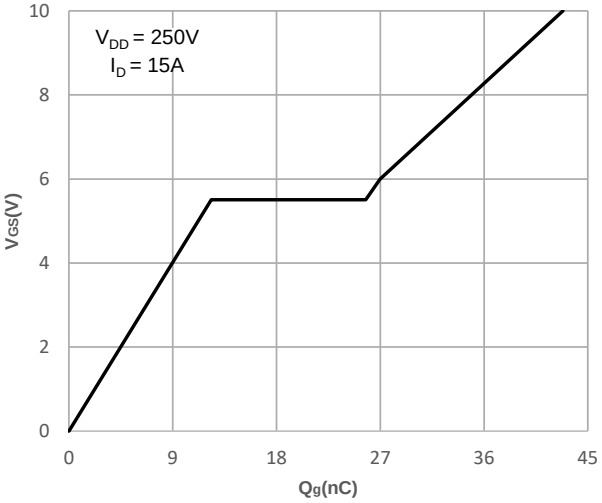
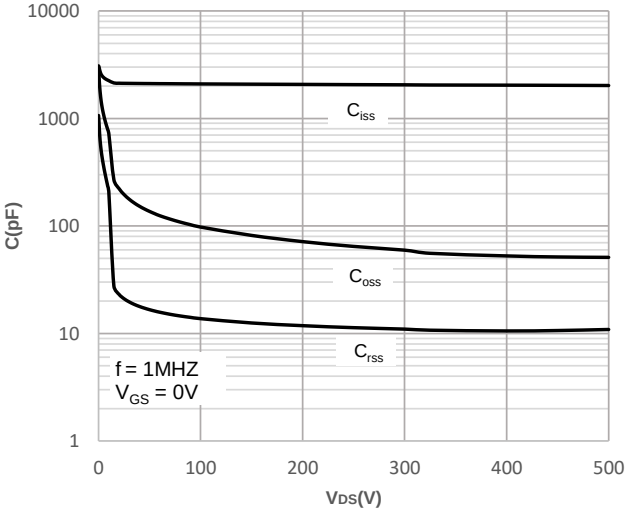


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

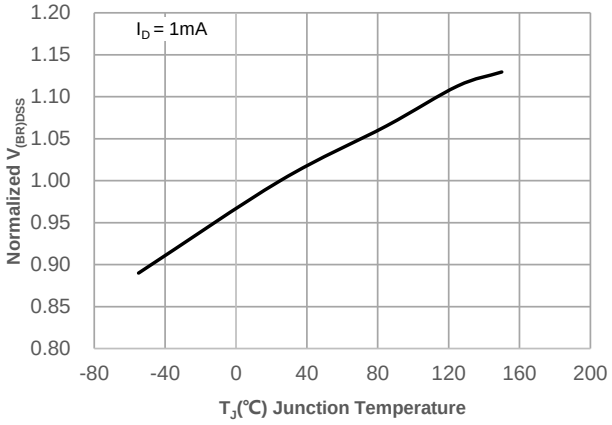


Figure 8: Normalized on Resistance vs. Junction Temperature

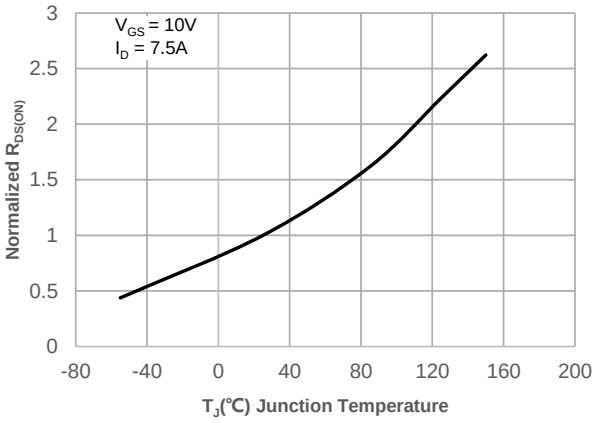


Figure 9: Maximum Safe Operating Area

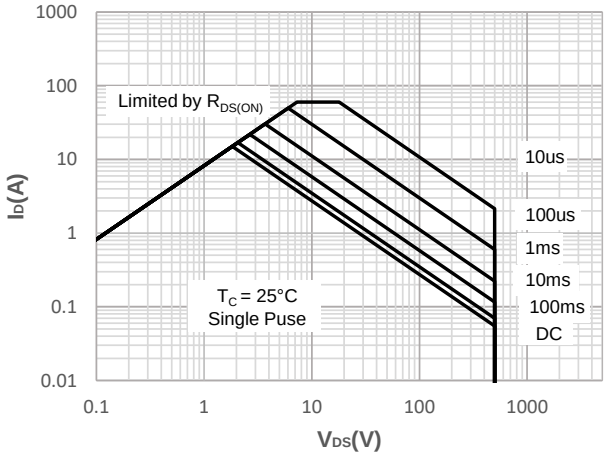


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

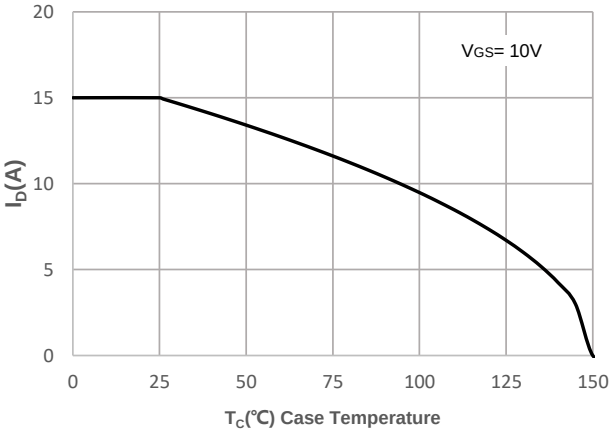


Figure 11: Normalized Maximum Transient Thermal Impedance

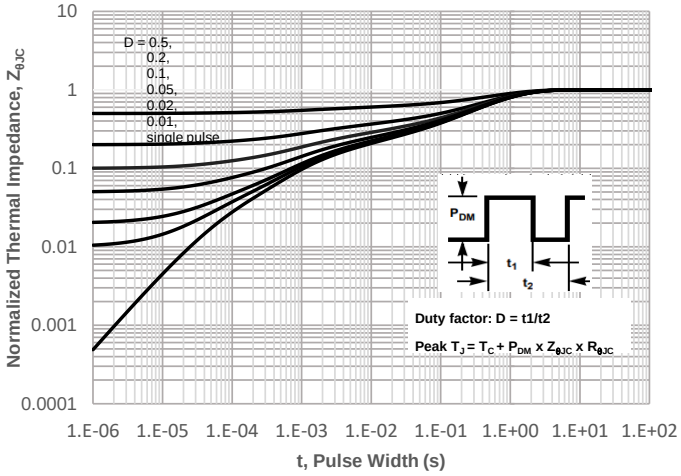
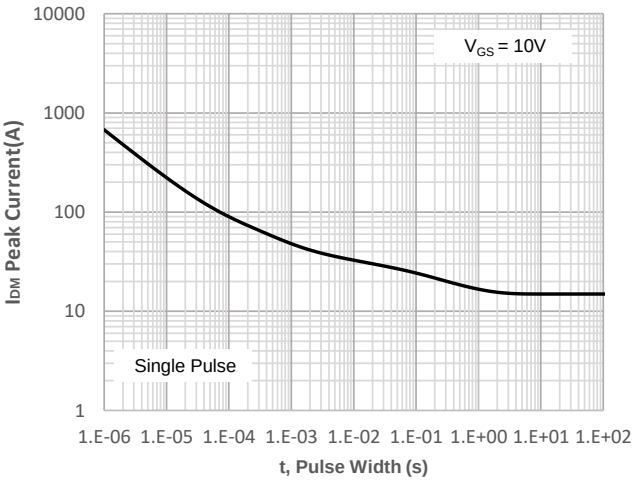


Figure 12: Peak Current Capacity



Test Circuit

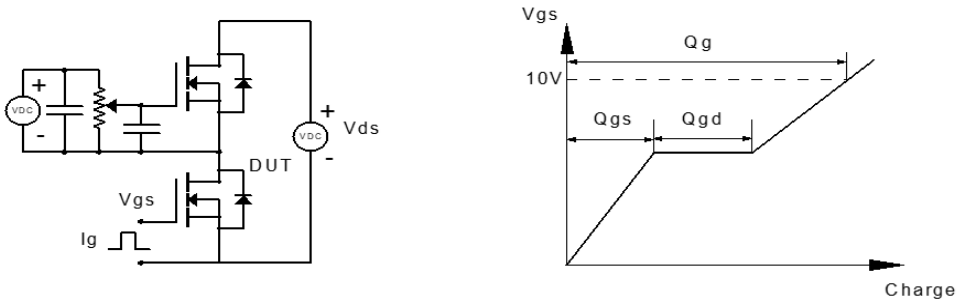


Figure 1: Gate Charge Test Circuit & Waveform

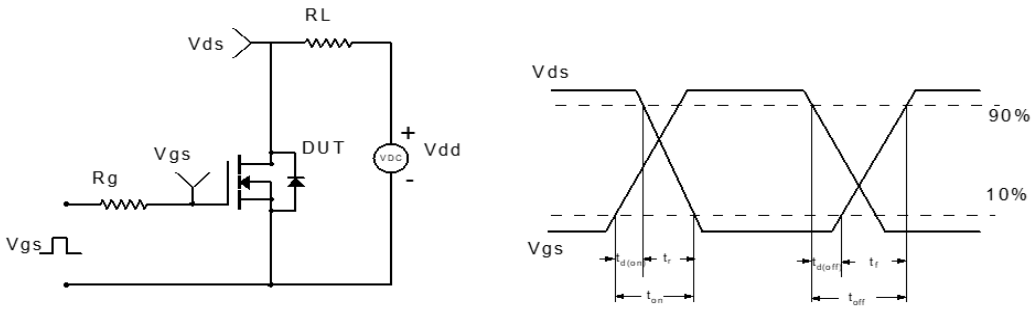


Figure 2: Resistive Switching Test Circuit & Waveform

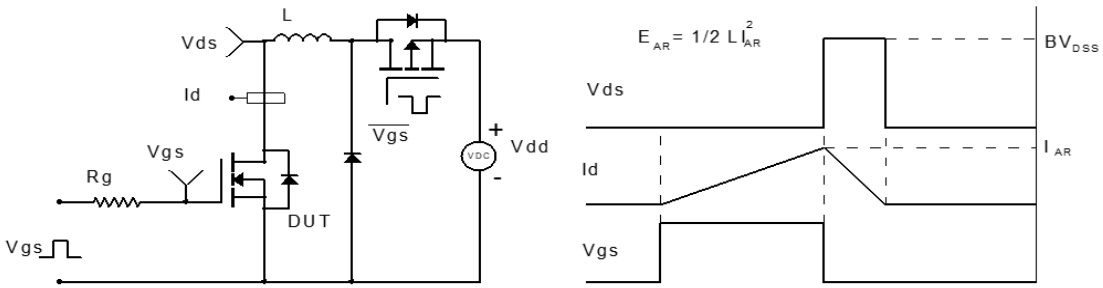


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

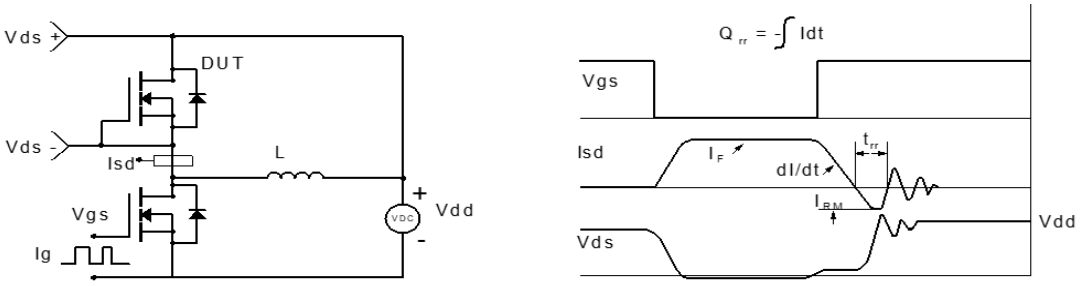
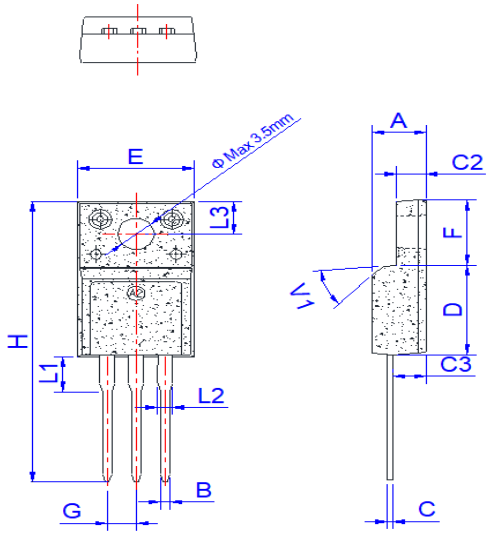


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(TO-220FP-3L)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	