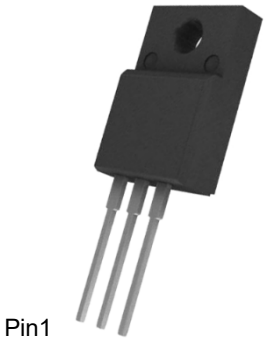
Prisemi®

PNMTOF650V20

N-Channel MOSFET

Description

The PNMTOF650V20 is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adaptors.



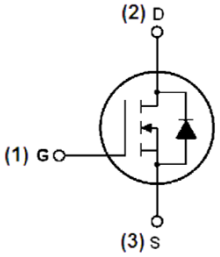
TO-220F-3L (Top View)

Feature

- $R_{DS(ON)} \leq 0.47\ \Omega$ @ V_{GS}=10V, I_D=10A
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Applications

- Automotive applications
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram

Mechanical data

- Case: TO-220F-3L
- Approx. Weight: 1.767g (0.062oz)
- Lead free finish, RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.

Absolute maximum rating@25℃

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Drain Current-Continuous	Tc=25℃	I_D	20	A
	Tc=100℃		14.4	
Pulsed Drain Current		I_{DM}	80	A
Single Pulse Avalanche Energy		E_{AS}	1200	mJ
Peak Diode Recovery dv/dt		dv/dt	50	V/ns
Maximum Power Dissipation		P_D	80	W
Junction and Storage Temperature Range		T_J,T_{STG}	-55~+150	℃
Junction-to-Ambient		$R_{\theta JA}$	63	℃/W
Junction-to-Case		$R_{\theta JC}$	4.0	℃/W

Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D= 250μA	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 650V,V_{GS}= 0V	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	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-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D= 10A	-	0.33	0.47	Ω
Forward Transfer Conductance	g_{fs}	V_{DS}= 40V, I_D= 10A	-	18	-	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}= 25V,V_{GS}= 0V, f= 1MHz	-	2400	-	pF
Output Capacitance	C_{oss}		-	225	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Gate Resistance	R_G	-	-	1.8	-	Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 325V, V_{GS}= 10V, R_G = 25Ω,I_D = 20A	-	35	-	ns
Turn-on Rise Time	t_r		-	82	-	
Turn-Off Delay Time	$t_{d(off)}$		-	180	-	
Turn-Off Fall Time	t_f		-	90	-	
Total Gate Charge	Q_g	V_{DS}= 325V,I_D= 20A, V_{GS}= 10V	-	65	-	nC
Gate-Source Charge	Q_{gs}		-	11	-	
Gate-Drain Charge	Q_{gd}		-	26	-	
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t_{rr}	I_S =20A, dI/dt = 100A/μs, V_{GS}= 0V	-	690	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	9.0	-	μC
Diode Forward Current	I_S	-	-	-	20	A
Diode Forward Voltage	V_{SD}	V_{GS}= 0V,I_S= 20A	-	-	9.0	V

Typical Characteristics

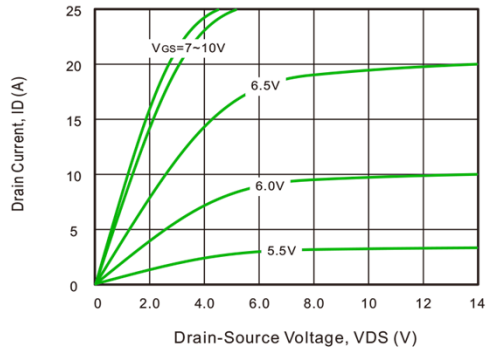


Fig.1 Typical Output Characteristics

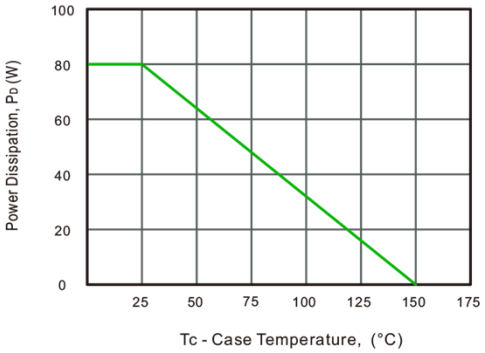


Fig.2 Power Dissipation

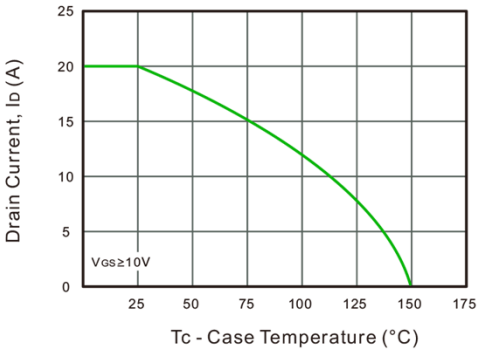


Fig.3 Drain Current Derating

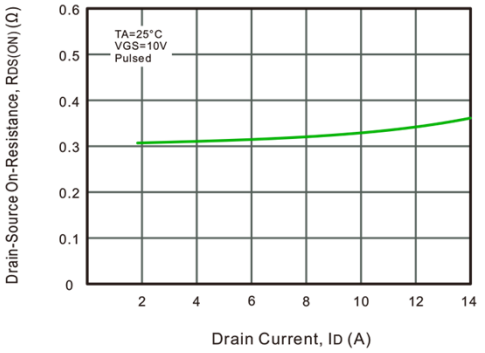


Fig.4 Drain-Source On-Resistance vs. Drain Current

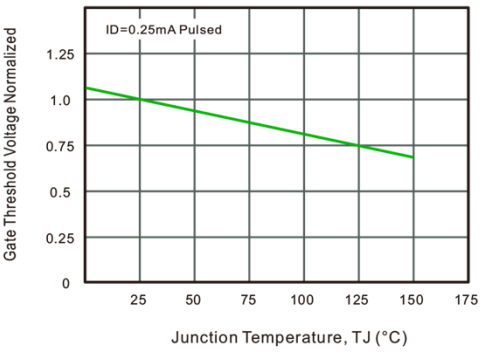


Fig.5 Gate Threshold Voltage vs. Junction Temperature

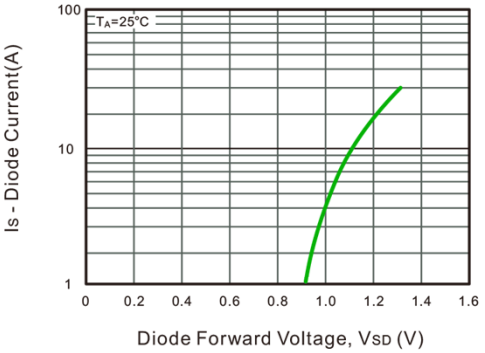


Fig.6 Body-diode Forward Characteristics

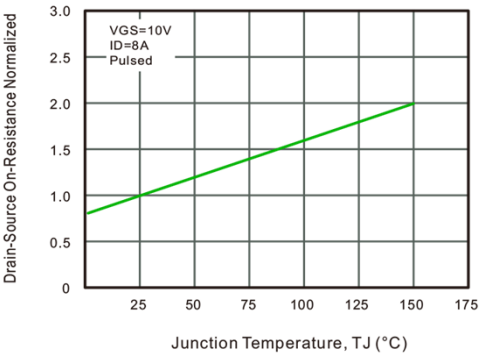


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

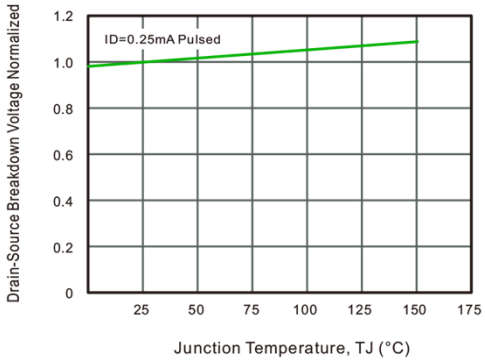


Fig.8 Breakdown Voltage vs. Junction Temperature

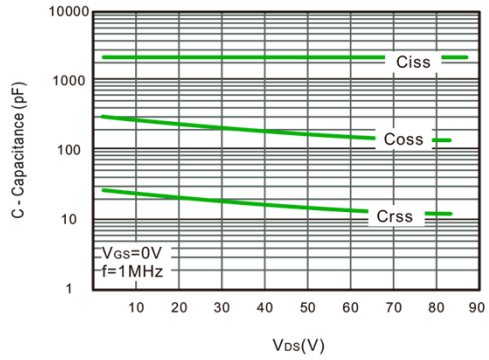


Fig.9 Capacitance Characteristics

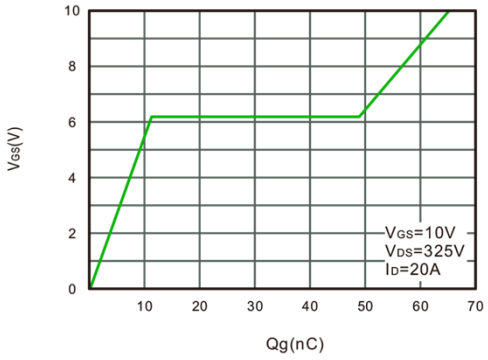


Fig.10 Gate Charge Characteristics

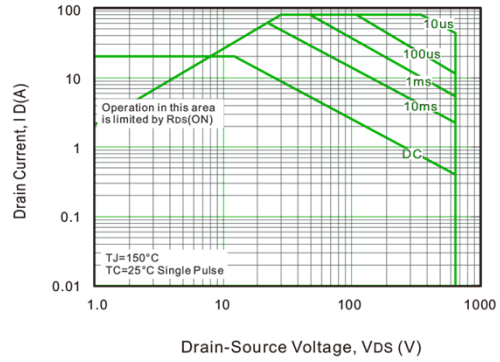


Fig.11 Safe Operating Area

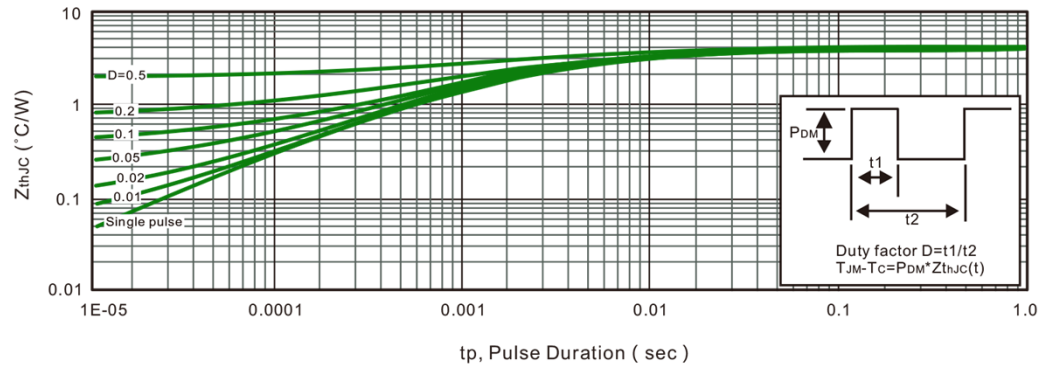
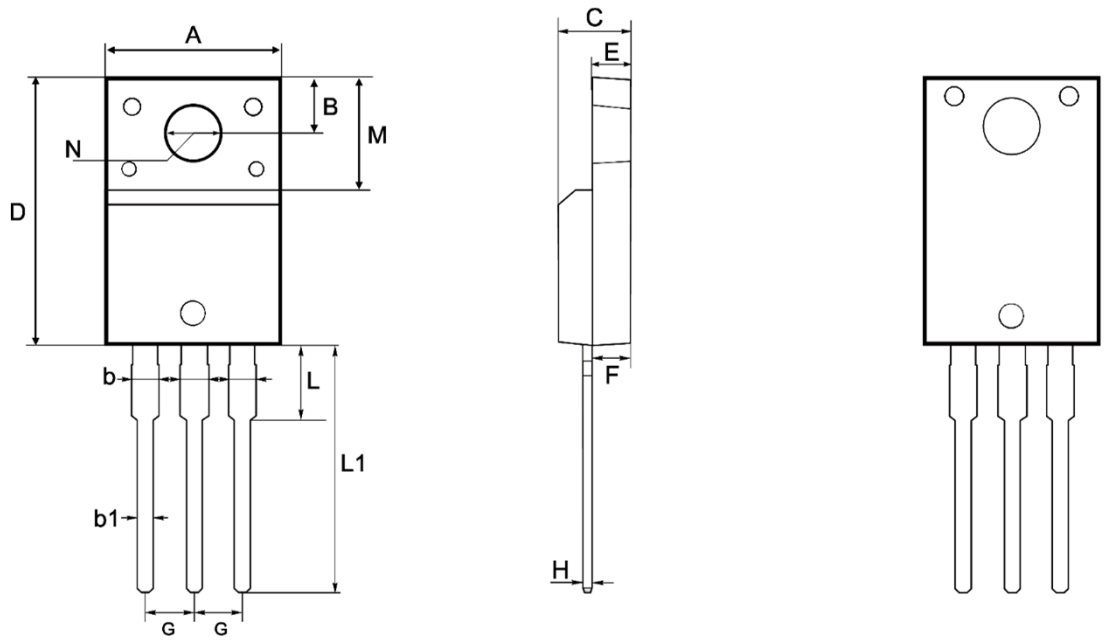


Fig.12 Max. Transient Thermal Impedance

Product dimension (TO-220F-3L)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	10.08	10.28	0.397	0.405
B	3.17	3.37	0.125	0.133
b	1.24	1.44	0.049	0.057
b1	0.70	0.90	0.028	0.035
C	4.50	4.90	0.177	0.193
D	15.67	16.07	0.617	0.633
E	2.34	2.74	0.092	0.108
F	2.34	2.74	0.092	0.108
G	2.44	2.64	0.096	0.104
H	0.40	0.60	0.016	0.024
L	2.98	3.38	0.117	0.133
L1	13.30	13.70	0.524	0.539
M	6.38	6.98	0.251	0.275
N	3.18 Typ.		0.125 Typ.	

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