

Description

The PNMTOF650V16 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.

Feature

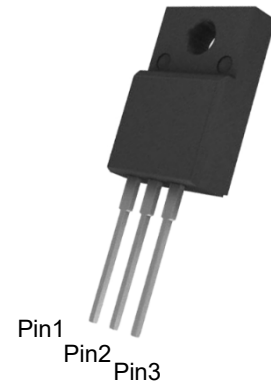
- $R_{DS(ON)} \leq 0.52 \Omega @ V_{GS}=10V, I_D=8A$
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Applications

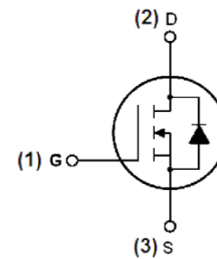
- Automotive applications
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

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".



TO-220F-3L (Top View)



Schematic diagram

Absolute maximum rating@25°C

Rating	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous	I_D	$T_C=25^\circ C$	16
		$T_C=100^\circ C$	11.3
Pulsed Drain Current	I_{DM}	64	A
Single Pulse Avalanche Energy	E_{AS}	780	mJ
Peak Diode Recovery dv/dt	dv/dt	50	V/ns
Maximum Power Dissipation	P_D	51	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C
Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	2.44	°C/W

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$	-	0.62	0.85	Ω
Forward Transfer Conductance	g_{fs}	$V_{DS}=15V, I_D=6A$	-	12	-	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1MHz$	-	2000	-	pF
Output Capacitance	C_{oss}		-	160	-	
Reverse Transfer Capacitance	C_{rss}		-	5.0	-	
Gate Resistance	R_G	-	-	2.8	-	Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=300V, V_{GS}=10V,$ $R_G=25\Omega, I_D=12A$	-	30	-	ns
Turn-on Rise Time	t_r		-	80	-	
Turn-Off Delay Time	$t_{d(off)}$		-	144	-	
Turn-Off Fall Time	t_f		-	77	-	
Total Gate Charge	Q_g	$V_{DS}=480V, I_D=12A,$ $V_{GS}=10V$	-	47	-	nC
Gate-Source Charge	Q_{gs}		-	6.7	-	
Gate-Drain Charge	Q_{gd}		-	18.5	-	
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t_{rr}	$I_S=12A, dI/dt=100A/\mu s,$ $V_{GS}=0V$	-	380	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	3.5	-	μC
Diode Forward Current	I_S	-	-	-	12	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=12A$	-	-	1.4	V

Typical Characteristics

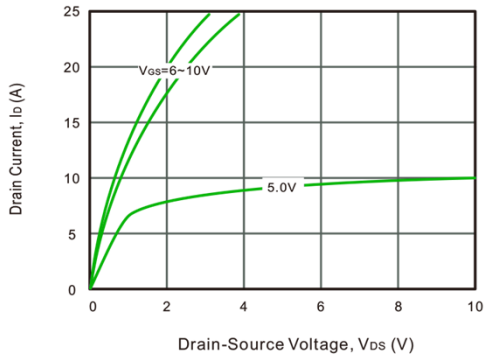


Fig.1 Output characteristics

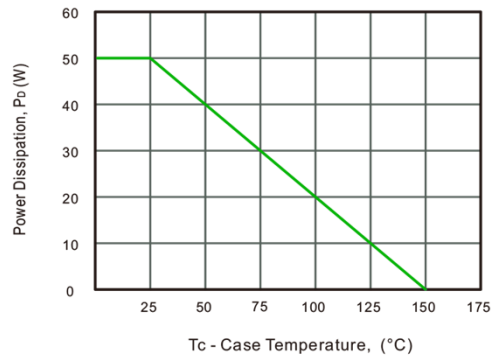


Fig.2 Power Dissipation

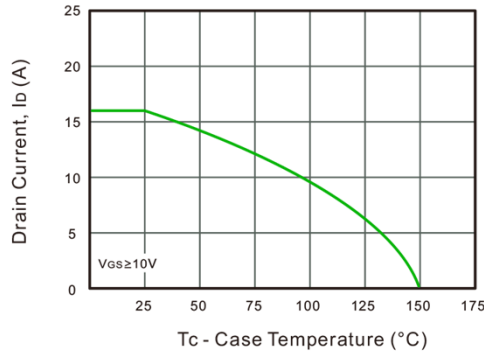


Fig.3 Drain Current Derating

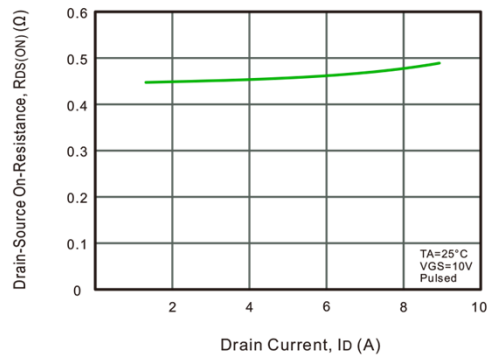


Fig.4 Drain-Source On-Resistance vs. Drain Current

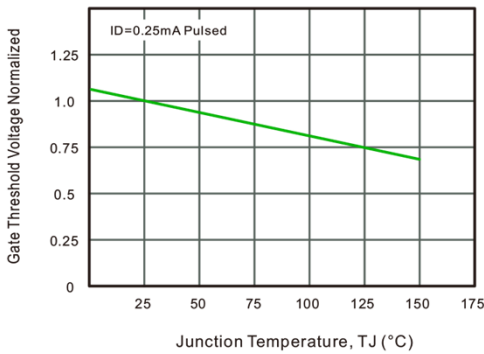


Fig.5 Gate Threshold Voltage vs. Junction Temperature

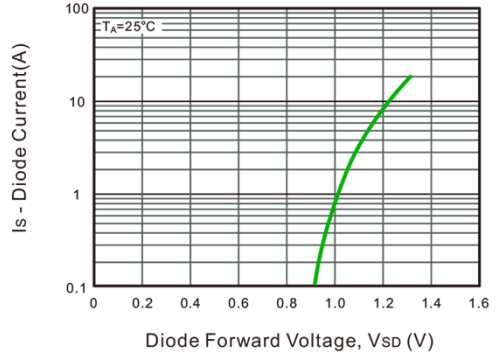


Fig.6 Body-diode Forward Characteristics

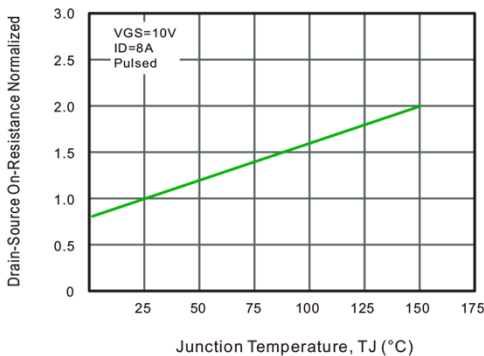


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

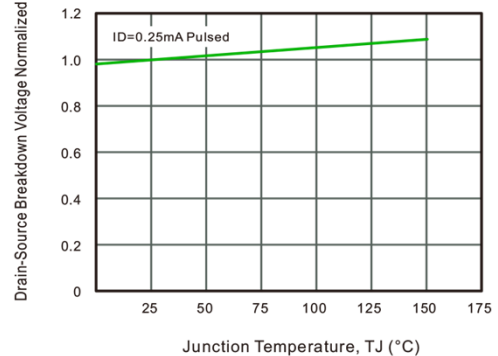


Fig.8 Breakdown Voltage vs. Junction Temperature

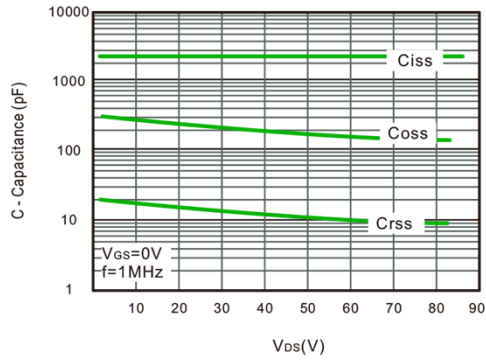


Fig.9 Capacitance Characteristics

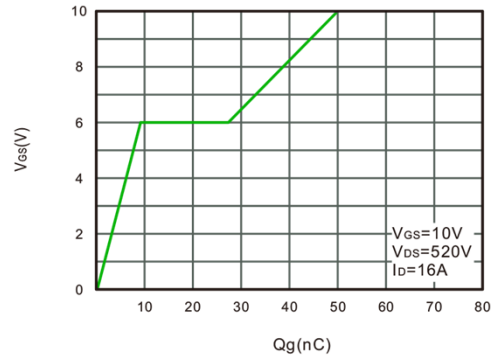


Fig.10 Gate Charge Characteristics

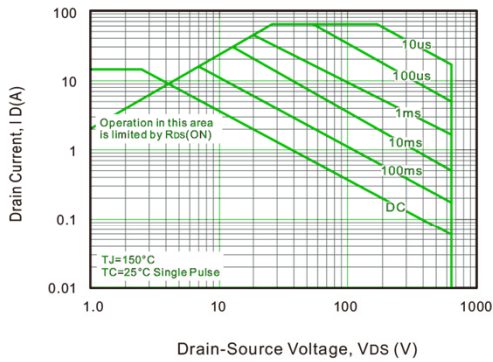


Fig.11 Safe Operating Area

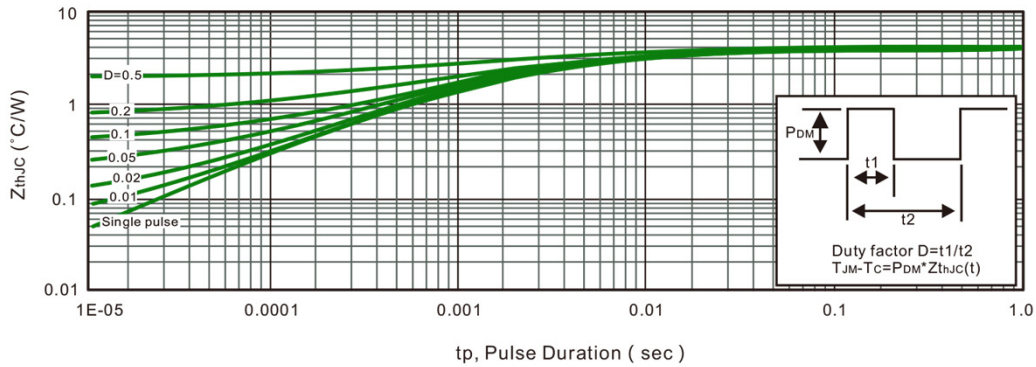
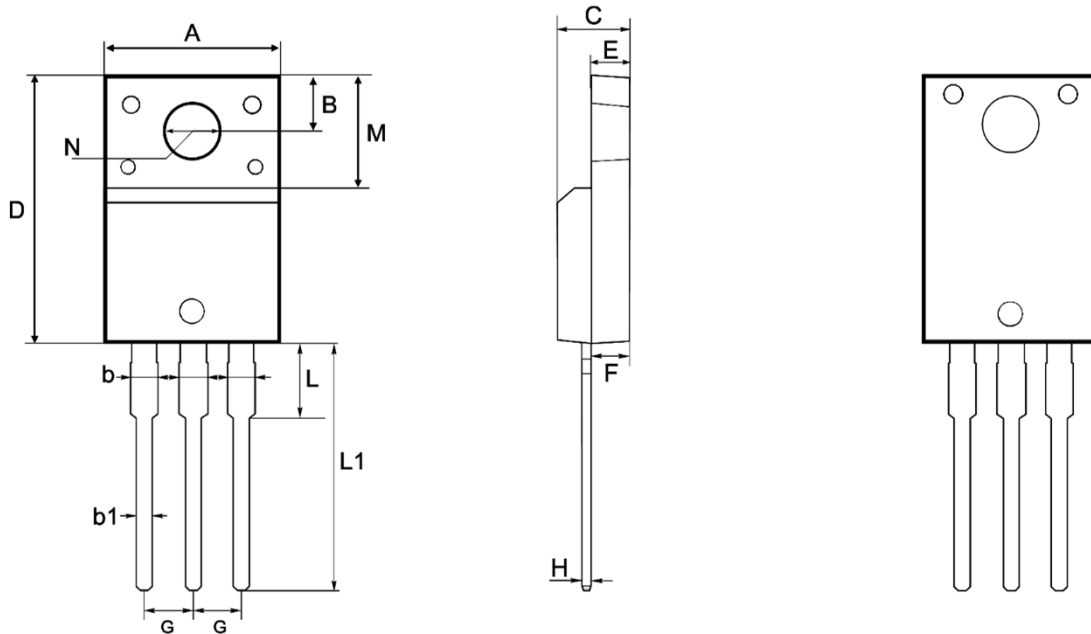



Fig.12 Max. Transient Thermal Impedance

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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