



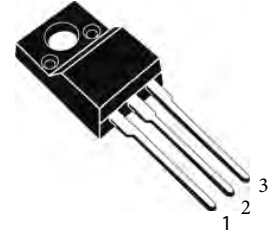
PJM50H20NTF

Silicon N-Channel Power MOSFET

Features

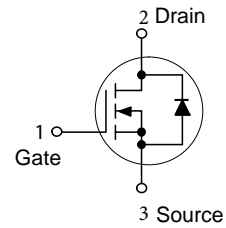
- Fast switching
- Low on resistance (max:0.26Ω)
- Low gate charge
- Avalanche energy specified
- Improved dv/dt capability

TO-220F



Applications

- Switching power supply
- Active power factor correction



Absolute Maximum Ratings

Ratings at $T_C = 25^\circ\text{C}$ unless otherwise specified.

Parameter	Symbol	Value	Units
Drain-to-Source Voltage	V_{DS}	500	V
Continuous Drain Current	I_D	20	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current	I_{DM}	80	A
Gate-to-Source Voltage	V_{GS}	± 30	V
Repetitive Avalanche Energy ^{Note 1}	E_{AR}	3.8	mJ
Single Pulse Avalanche Energy ^{Note 2}	E_{AS}	1110	mJ
Peak Diode Recovery dv/dt ^{Note 3}	dv/dt	4.5	V/ns
Power Dissipation	P_D	40	W
Derating Factor Above 25°C		0.3	
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.13	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$

Note: 1. Repetitive rating; Pulse width limited by maximum junction temperature.

2. $L = 5\text{mH}$, $I_{AS} = 20\text{A}$, $V_{DD} = 50\text{V}$, $R_g = 25\Omega$, start $T_J = 25^\circ\text{C}$.

3. $I_{SD} \leq 20\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DS}$, Start $T_J = 25^\circ\text{C}$.



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Electrical Characteristics

Ratings at $T_J = 25^\circ\text{C}$ unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	500	-	-	V
$V_{(BR)DSS}$ Temperature Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	$I_D = 250\mu A$, Reference 25°C	-	0.5	-	$V/^\circ\text{C}$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
Gate Leakage Current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 0.1	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 500V, T_J = 25^\circ\text{C}$	-	-	1.0	μA
		$V_{DS} = 400V, T_C = 125^\circ\text{C}$	-	-	10	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	-	0.23	0.26	Ω
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DD} = 400V, V_{GS} = 10V, I_D = 20A$, (Note 1、2)	-	70	-	nC
Gate-Source Charge	Q_{gs}		-	18	-	
Gate-Drain Charge	Q_{gd}		-	35	-	
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$	-	2700	-	pF
Output Capacitance	C_{oss}		-	400	-	
Reverse Transfer Capacitance	C_{rss}		-	40	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 250V, R_g = 25\Omega, V_{GS} = 10V, I_D = 20A$, (Note 1、2)	-	100	-	ns
Turn-On Rise Time	t_r		-	400	-	
Turn-Off Delay Time	$t_{d(off)}$		-	100	-	
Turn-Off Fall Time	t_f		-	100	-	
Source-Drain Diode Characteristics						
Diode Forward Continuous Current	I_{SD}		-	-	20	A
Diode Forward Pulsed Current	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$I_S = 20A, V_{GS} = 0V$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$I_S = 20A, T_J = 25^\circ\text{C}$ $di_F/dt = 100A/\mu s, V_{GS} = 0V$ (Note 1)	-	500	-	ns
Reverse Recovery Charge	Q_{rr}		-	7.2	-	μC

Note: 1. Pulse test: pulse width $< 300\mu s$, duty cycle $< 2\%$
 2. Essentially independent of operating temperature.



Electrical Characteristics Curves

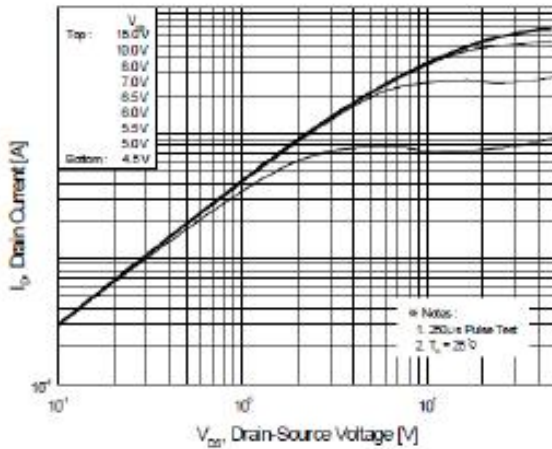


Figure 1. On-Region Characteristics

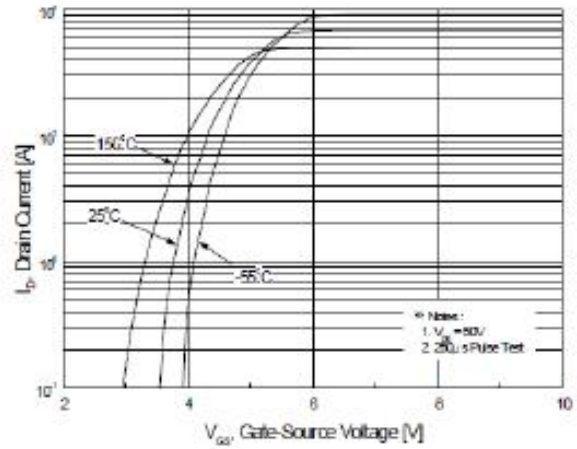


Figure 2. Transfer Characteristics

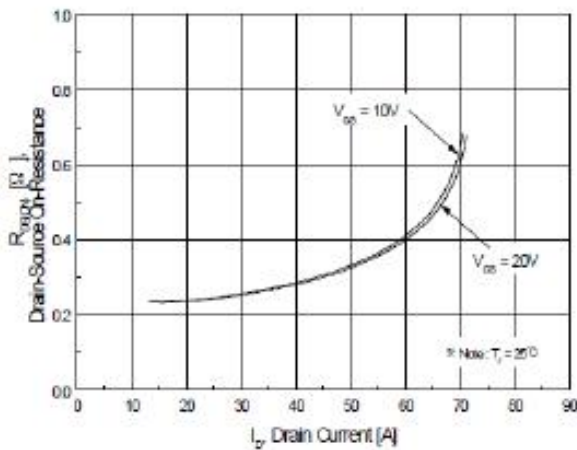


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

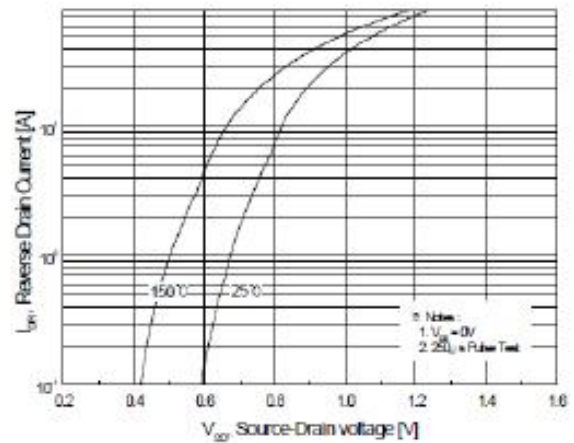


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

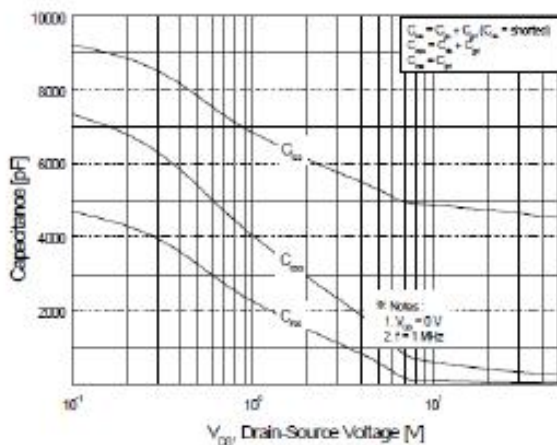


Figure 5. Capacitance Characteristics

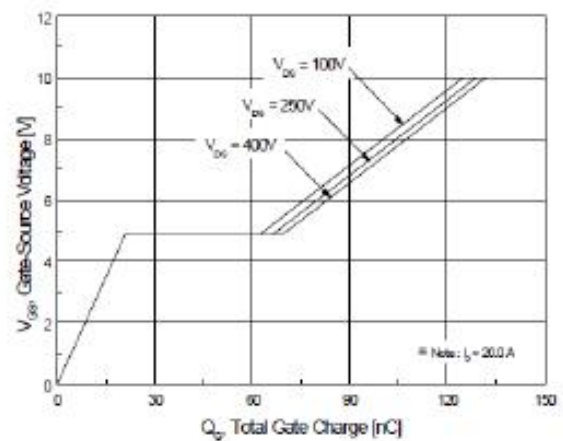


Figure 6. Gate Charge Characteristics



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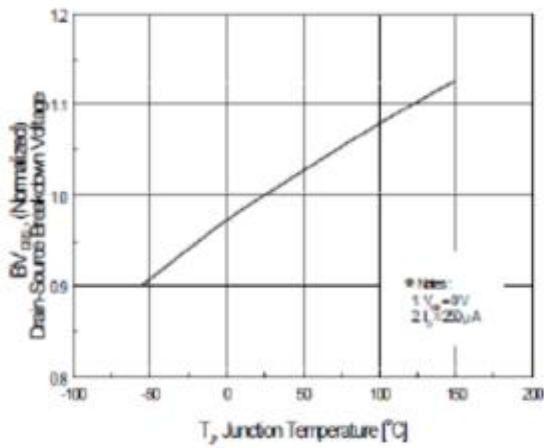


Figure 7. Breakdown Voltage Variation vs Temperature

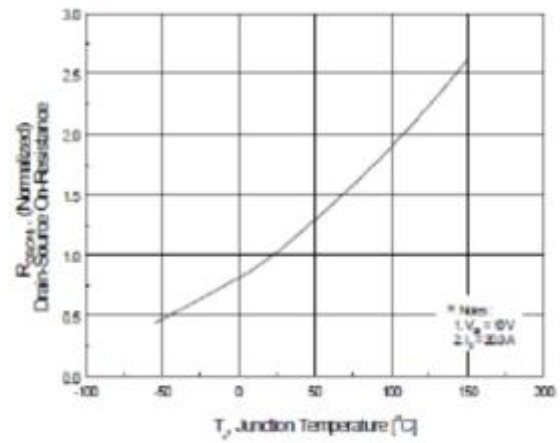


Figure 8. On-Resistance Variation vs Temperature

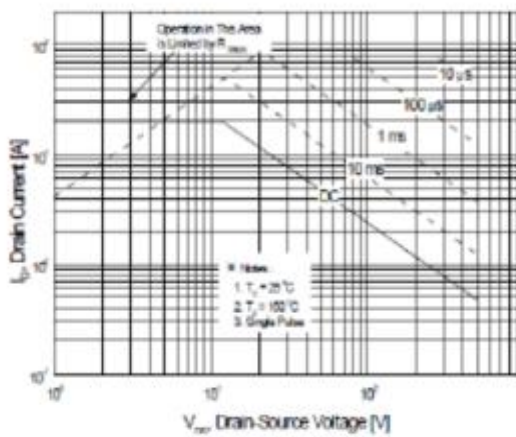


Figure 9. Maximum Safe Operating Area

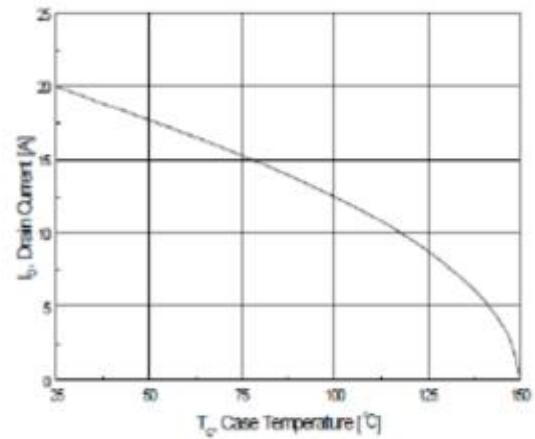


Figure 10. Maximum Drain Current vs Case Temperature

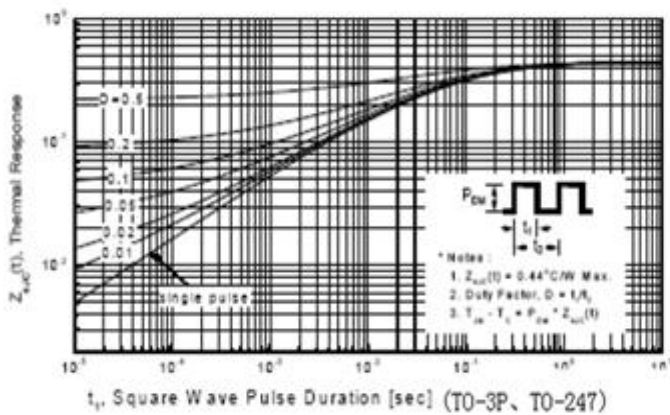


Figure 11 Transient Thermal Response Curve

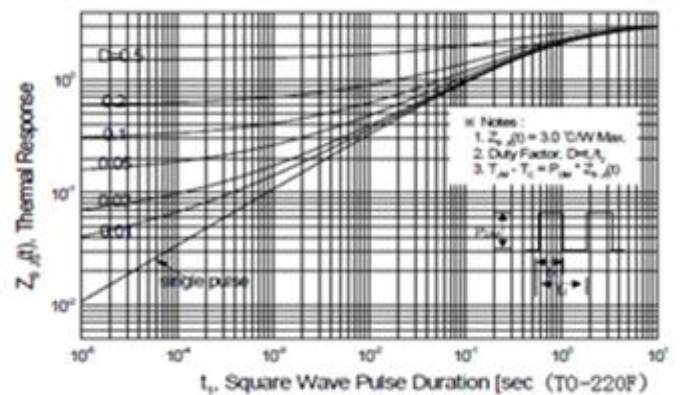


Figure 11-1. Transient Thermal Response Curve



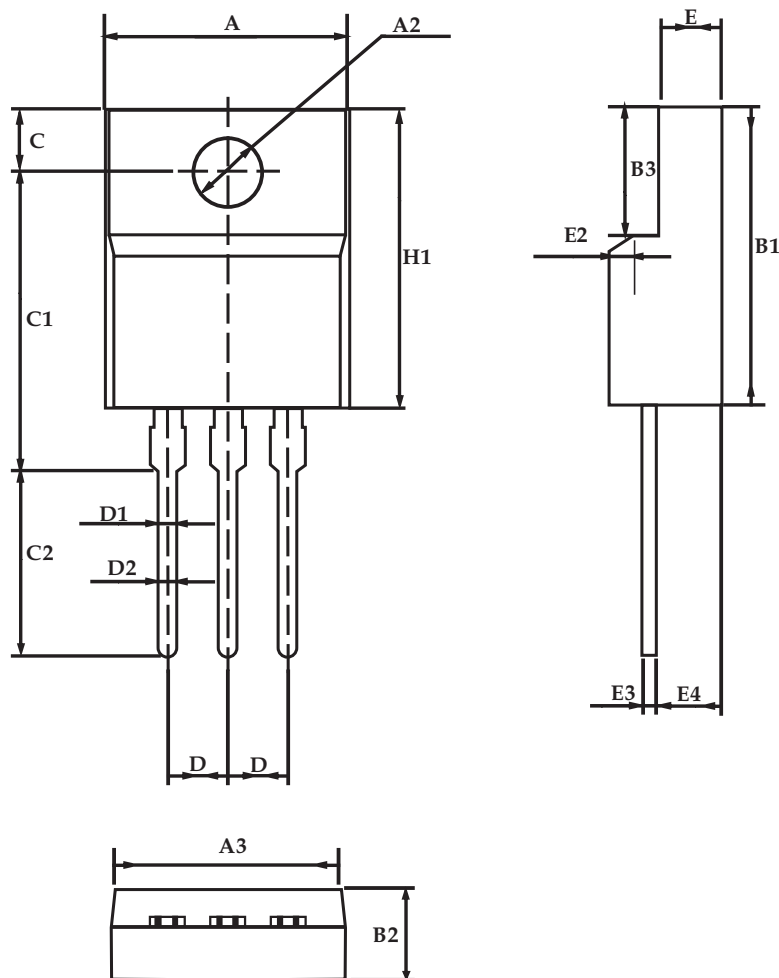
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Package Outline

TO-220F
UNIT : mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α (度)		30°	



Ordering information

Device	Package	Shipping
PJM50H20NTF	TO-220F	1000PCS