

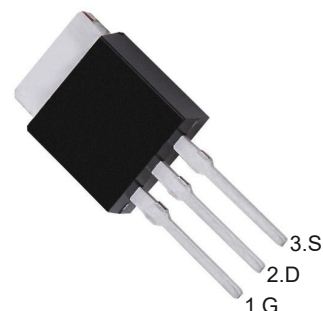
# PJM120N40TD

## N-Channel Enhancement Mode Power MOSFET

### Features

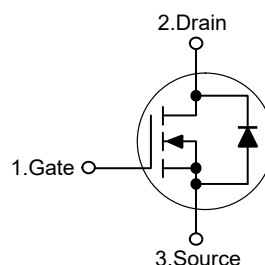
- High density cell design for ultra low  $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- $V_{DS} = 40V, I_D = 120A$   
 $R_{DS(on)} < 4.5m\Omega @ V_{GS} = 10V$

TO-251



1. Gate 2. Drain 3. Source

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	120	A
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	330	A
Single pulse avalanche energy <sup>Note4</sup>	$E_{AS}$	1100	mJ
Maximum Power Dissipation	$P_D$	120	W
Junction Temperature	$T_J$	175	°C
Storage Temperature Range	$T_{STG}$	-55 to +175	°C

### Thermal Characteristics

Maximum Junction-to-Case <sup>Note2</sup>	$R_{\theta JC}$	1.25	°C/W
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### Electrical Characteristics

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$	--	--	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	$\pm 100$	nA
Gate Threshold Voltage <sup>Note3</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.8	2.5	V
Drain-Source On-Resistance <sup>Note3</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	--	--	4.5	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	--	--	7	m $\Omega$
Forward Transconductance <sup>Note3</sup>	$g_{FS}$	$V_{DS}=10V, I_D=20A$	26	--	--	S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, f=1MHz$	--	5400	--	pF
Output Capacitance	$C_{oss}$		--	970	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	360	--	pF
<b>Switching Characteristics</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, I_D=2A,$ $R_L=1\Omega, V_{GS}=10V, R_{GEN}=3\Omega$	--	15	--	nS
Turn-on Rise Time	$t_r$		--	18	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	52	--	nS
Turn-off Fall Time	$t_f$		--	23	--	nS
Total Gate Charge	$Q_g$	$V_{DS}=20V, I_D=20A, V_{GS}=10V$	--	75	--	nC
Gate-Source Charge	$Q_{gs}$		--	10.5	--	nC
Gate-Drain Charge	$Q_{gd}$		--	17	--	nC
<b>Source-Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>Note3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=120A$	--	--	1.2	V
Diode Forward Current <sup>Note2</sup>	$I_S$		--	--	120	A

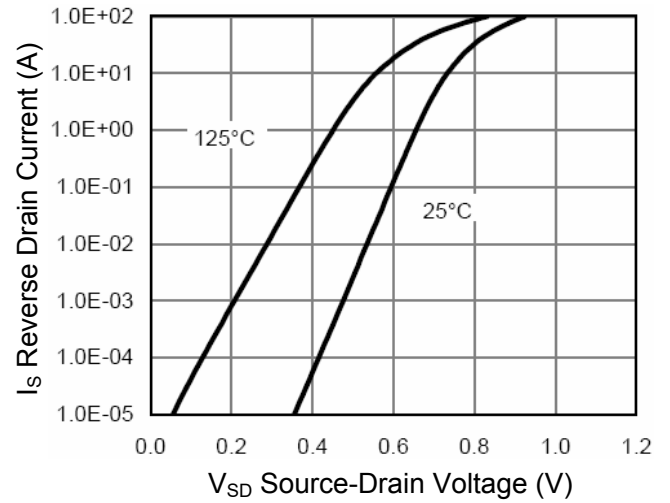
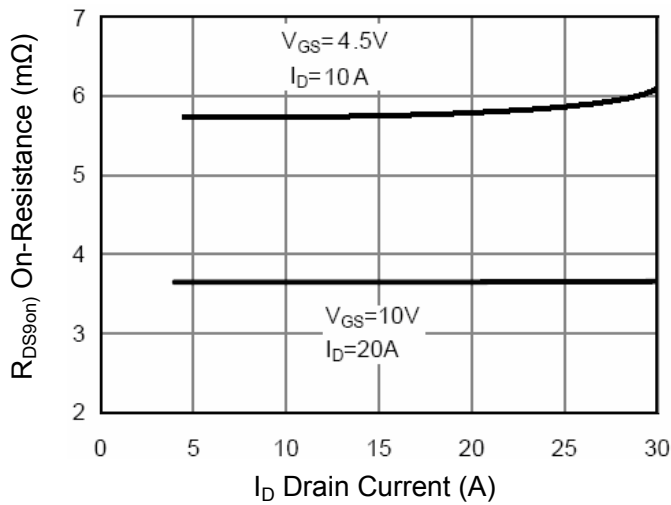
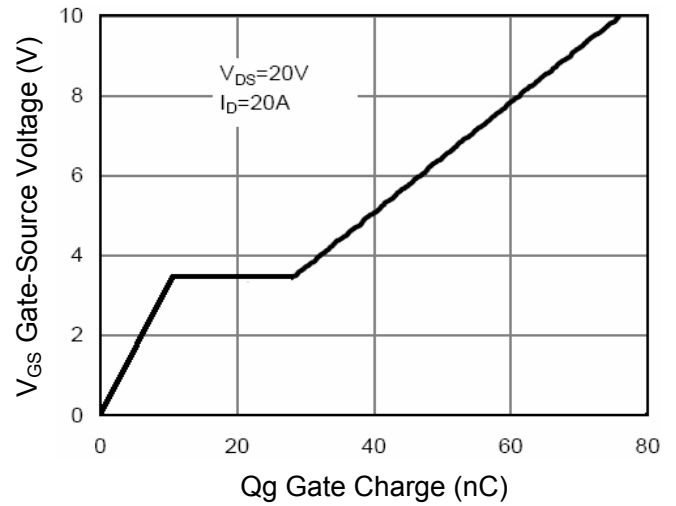
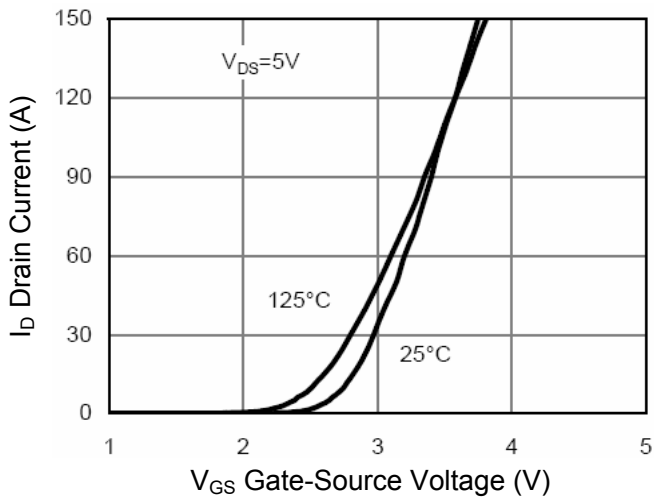
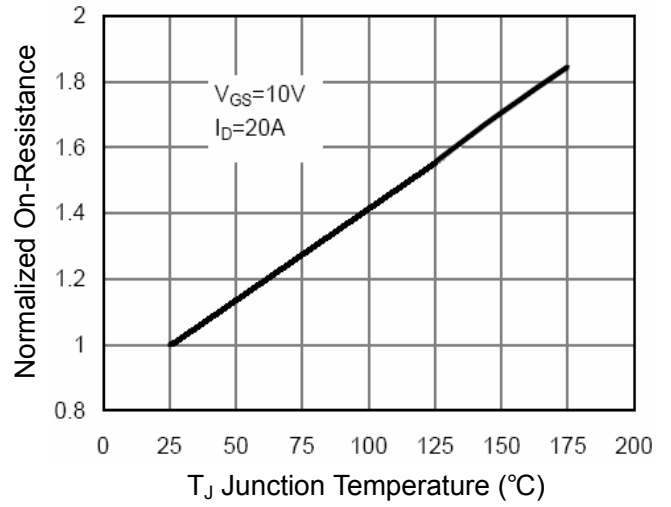
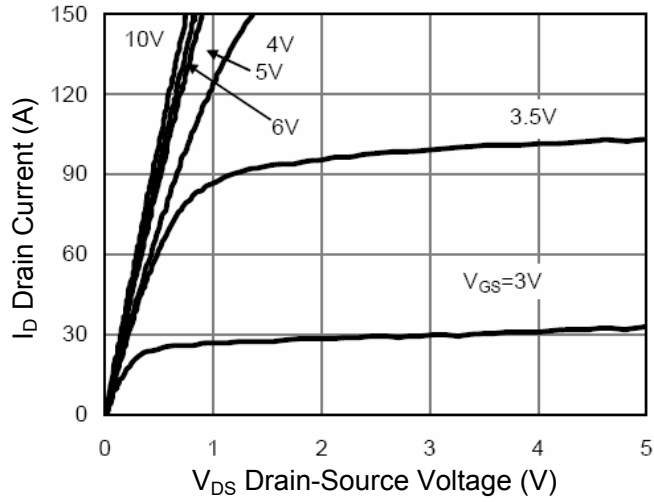
- Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.  
 2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.  
 3. Pulse Test: Pulse width  $\leq 380\mu s$ , duty cycle  $\leq 2\%$   
 4.  $E_{AS}$  Condition:  $V_{DD}=20V, V_{GS}=10V, L=1mH, R_g=25\Omega, I_{AS}=40A, Start T_j=25^\circ C$



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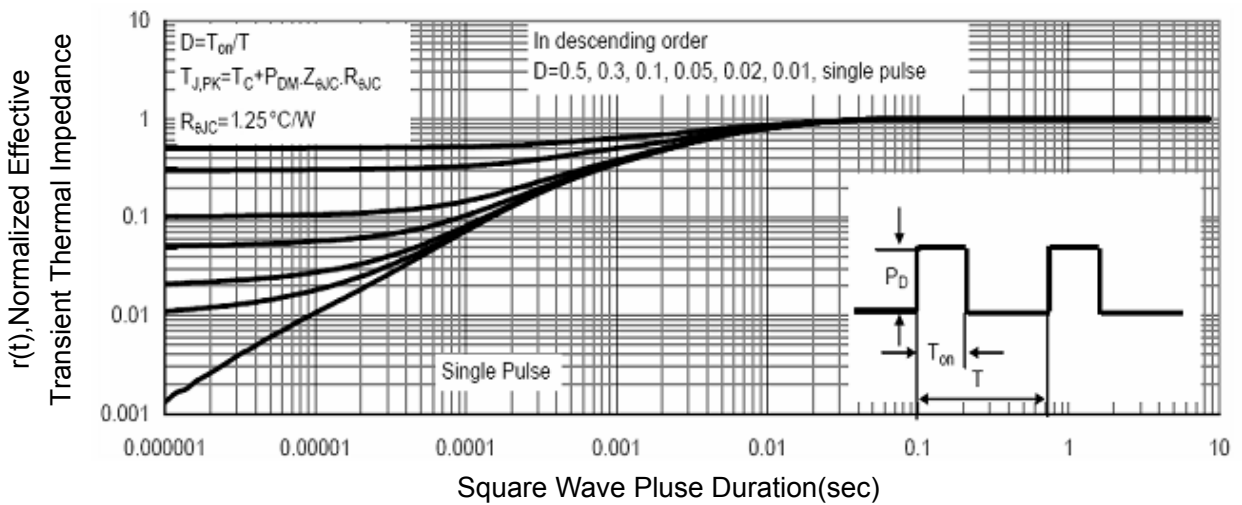
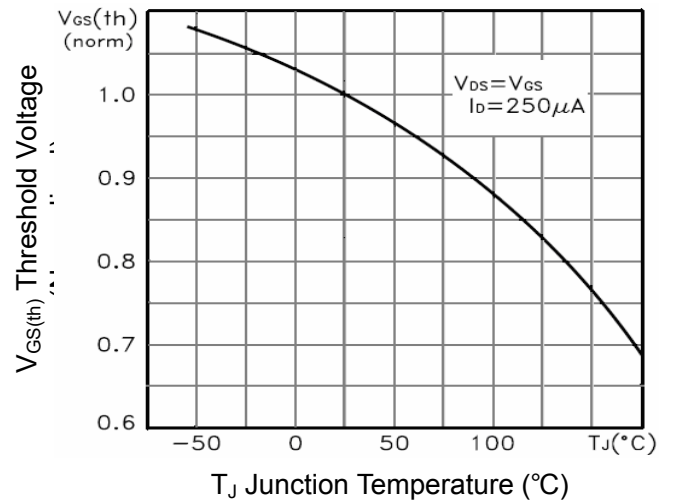
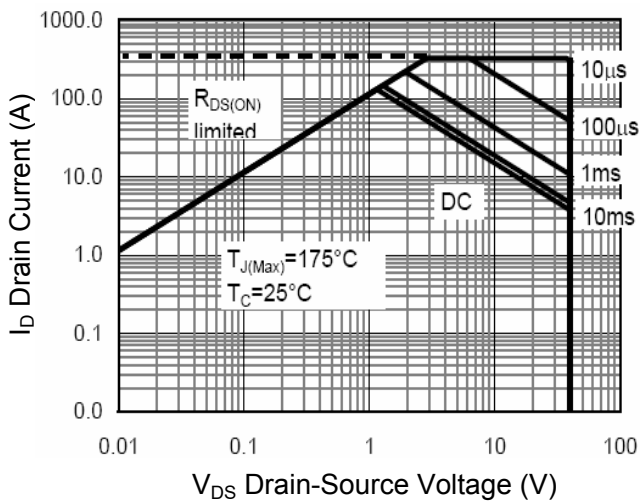
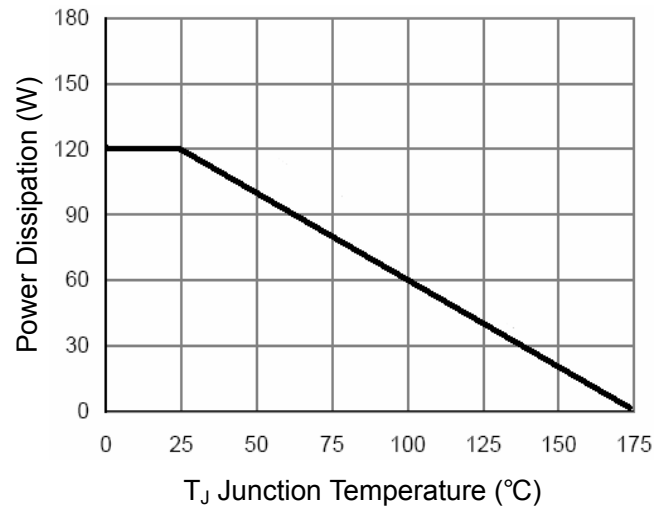
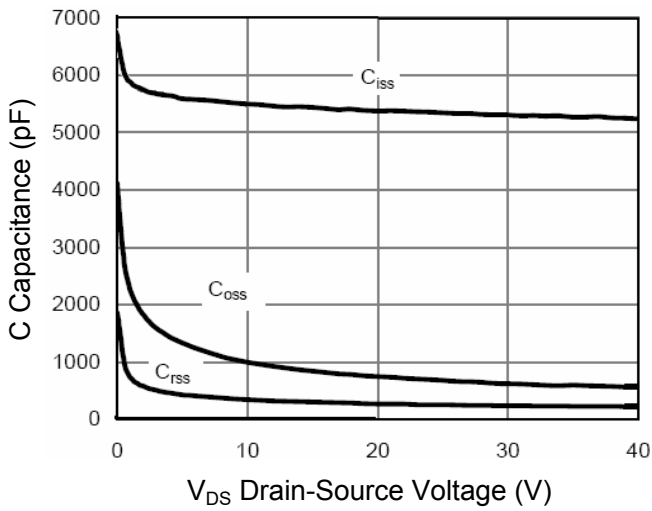
### Typical Characteristic Curves





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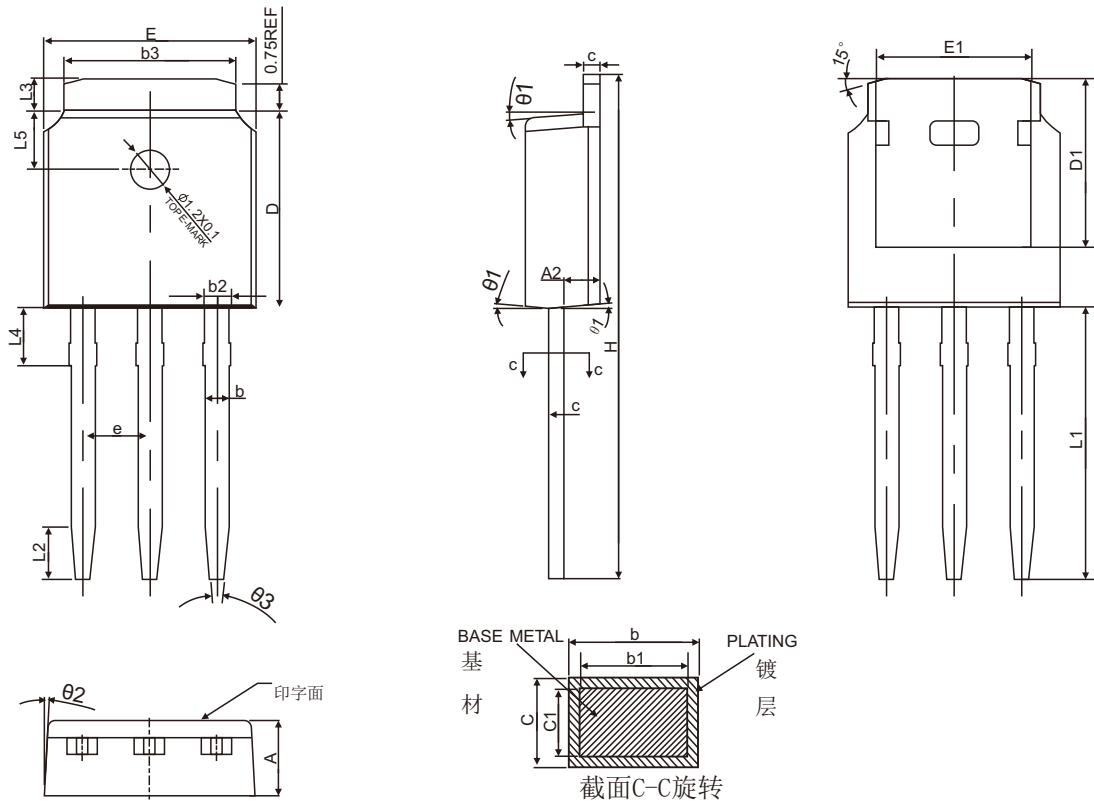
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### Package Outline

TO-251

Dimensions in mm



Symbol	mm		
	Min	Nom	Max
*A	2.20	2.30	2.38
*A2	0.97	1.07	1.17
*b	0.72	0.78	0.85
b1	0.71	0.76	0.81
*b2	0.72	0.88	0.95
*b3	5.23	5.33	5.46
*c	0.47	0.53	0.58
c1	0.46	0.51	0.56
*D	6.00	6.10	6.20
D1	5.30REF		
*E	6.50	6.60	6.70
E1	4.70	4.83	4.92
*e	2.286BSC		
*H	16.10	16.40	16.60
*L1	9.20	9.40	9.60
L2	1.25	1.35	1.45
*L3	0.90	1.02	1.22
L4	0.95	1.05	1.15
L5	1.70	1.80	1.90
theta1	5°	7°	9°
theta2	5°	7°	9°
theta3	11°	13°	15°