

# PJD50N04V-AU

## 40V N-Channel Enhancement Mode MOSFET

<b>Voltage</b>	<b>40 V</b>	<b>Current</b>	<b>80 A</b>
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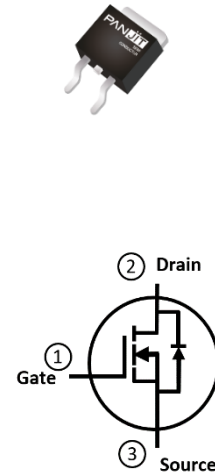
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@20A < 5.9m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@7V$ ,  $I_D@20A < 7.3m\Omega$
- Excellent FOM
- Standard Level Drive
- AEC-Q101 qualified
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case : TO-252AA Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.3217 grams

TO-252AA



### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ C$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>(Note 3)</sup>	$T_C=25^\circ C$	$I_D$	80	A
	$T_C=100^\circ C$		57	
Pulsed Drain Current <sup>(Note 1)</sup>	$T_C=25^\circ C$	$I_{DM}$	320	
Power Dissipation	$T_C=25^\circ C$	$P_D$	68	W
	$T_C=100^\circ C$		34	
Continuous Drain Current <sup>(Note 4)</sup>	$T_A=25^\circ C$	$I_D$	16.8	A
	$T_A=70^\circ C$		14	
Power Dissipation	$T_A=25^\circ C$	$P_D$	3	W
	$T_A=70^\circ C$		2.1	
Single Pulse Avalanche Energy <sup>(Note 5)</sup>		$E_{AS}$	110	mJ
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~175	$^\circ C$
Thermal Resistance <sup>(Note 4)</sup>	Junction to Case	$R_{\theta JC}$	2.2	$^\circ C/W$
	Junction to Ambient	$R_{\theta JA}$	50	

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## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	40	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =50uA	2	2.8	3.5	
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	4.7	5.9	mΩ
		V <sub>GS</sub> =7V, I <sub>D</sub> =20A	-	5.6	7.3	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	-	-	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>Dynamic</b> (Note 6)						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =32V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	23	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	5	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	6	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	1287	-	pF
Output Capacitance	C <sub>oss</sub>		-	284	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	51	-	
Gate resistance	R <sub>g</sub>	f=1MHz	-	0.8	-	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DS</sub> =32V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω (Note 2)	-	14	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	3	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	24	-	
Turn-Off Fall Time	t <sub>f</sub>		-	5	-	
<b>Drain-Source Diode</b>						
Diode Forward Current	I <sub>S</sub>	T <sub>C</sub> =25°C	-	-	80	A
Pulsed Diode Forward Current	I <sub>SM</sub>		-	-	320	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	-	0.85	1.3	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	24	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>S</sub> /dt=100A/us	-	11	-	nC

**NOTES :**

1. Pulse width ≤ 100us, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature typical characteristics.
3. Chip capability with an R<sub>θJC</sub>=2.2°C/W.
4. R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch<sup>2</sup> with 2oz.square pad of copper.
5. The test condition is L=0.5mH, I<sub>AS</sub>=21A, V<sub>DD</sub>=30V, V<sub>GS</sub>=10V, Starting T<sub>J</sub>=25°C.
6. Guaranteed by design, not subject to production testing.

# PJD50N04V-AU

## TYPICAL CHARACTERISTIC CURVES

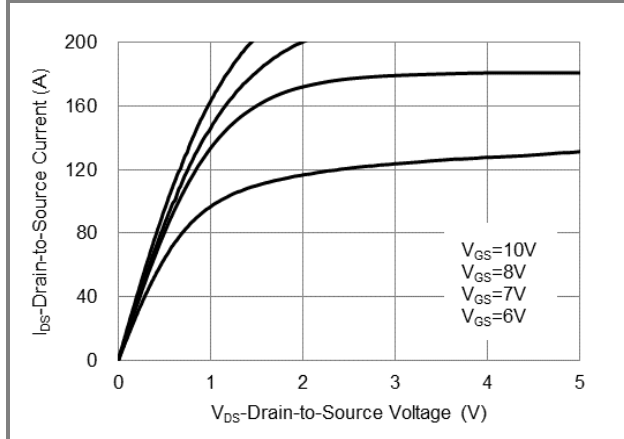


Fig.1 On-Region Characteristics

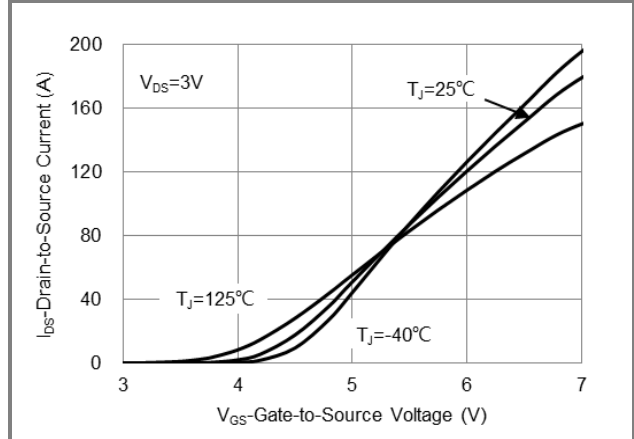


Fig.2 Transfer Characteristics

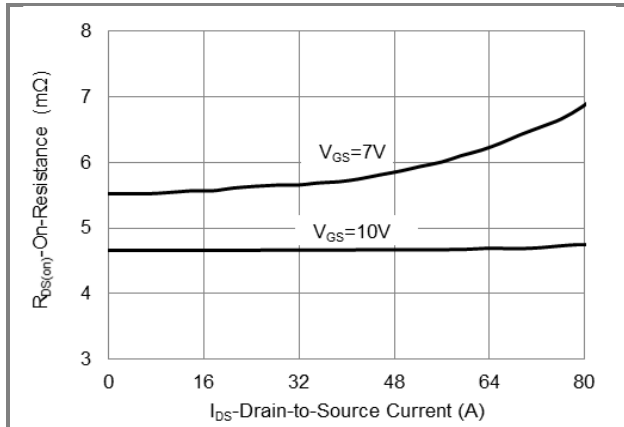


Fig.3 On-Resistance vs. Drain Current

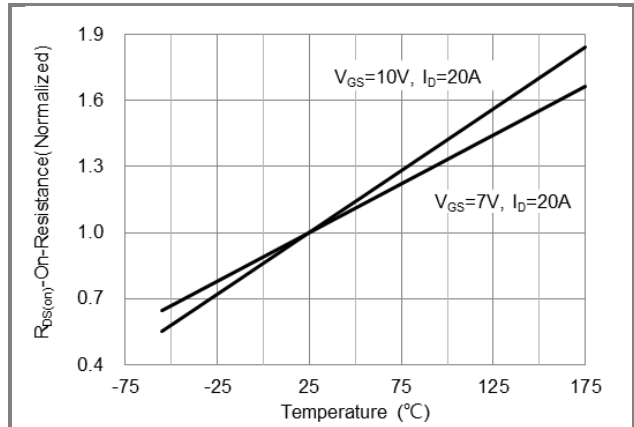


Fig.4 On-Resistance vs. Junction temperature

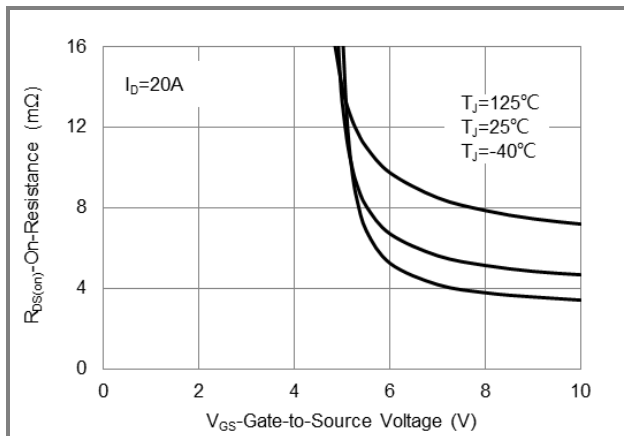


Fig.5 On-Resistance Variation with  $V_{GS}$

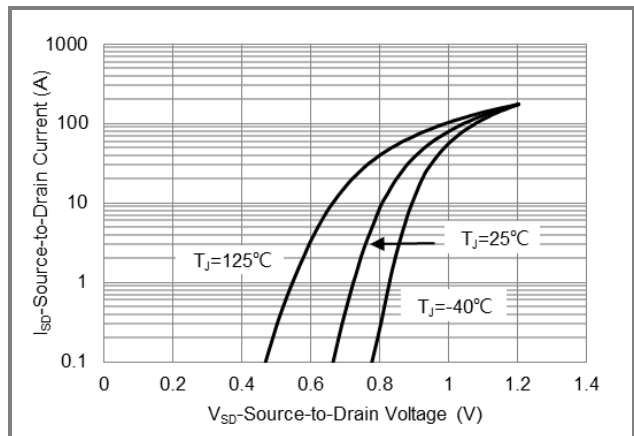


Fig.6 Source-Drain Diode Forward Voltage

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## TYPICAL CHARACTERISTIC CURVES

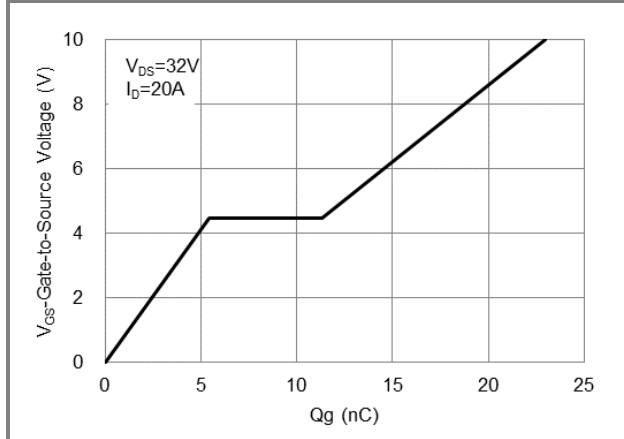


Fig.7 Gate-Charge Characteristics

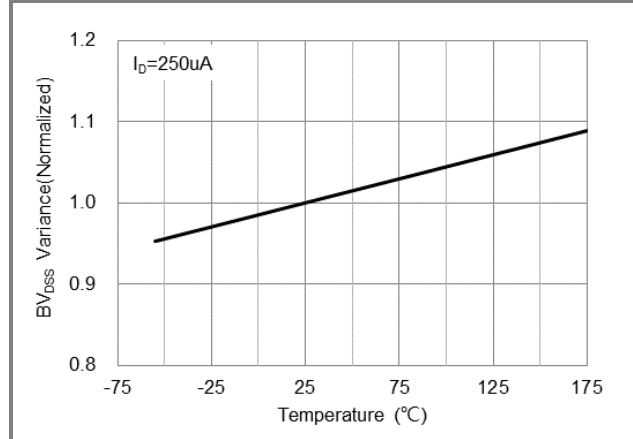


Fig.8 Breakdown Voltage Variation vs. Temperature

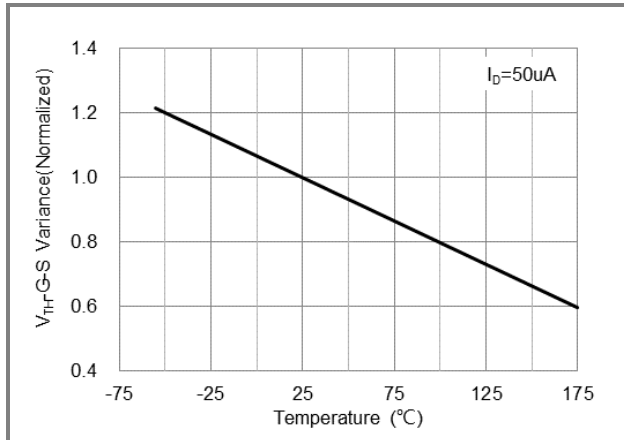


Fig.9 Threshold Voltage Variation with Temperature

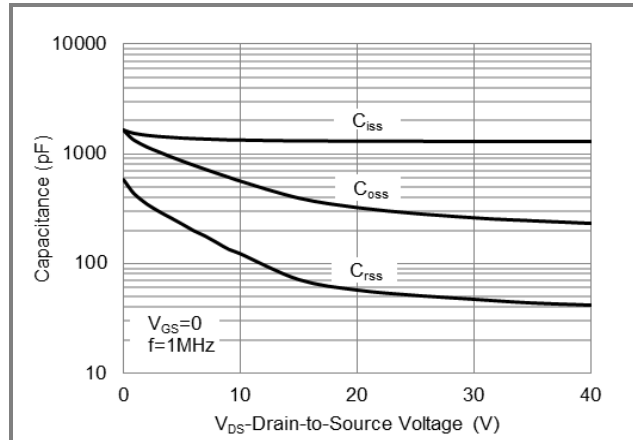


Fig.10 Capacitance vs. Drain-Source Voltage

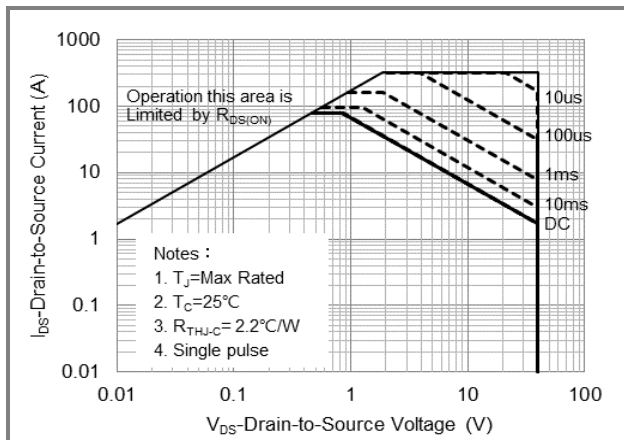


Fig.11 Maximum Safe Operating Area

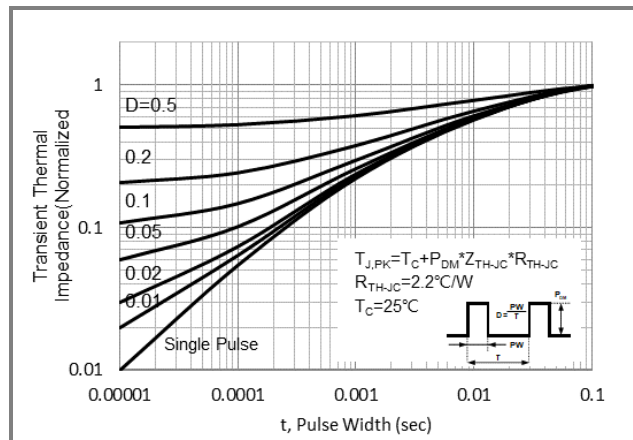


Fig.12 Normalized Transient Thermal Impedance



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