



# PJD100P04-AU

## 40V P-Channel Enhancement Mode Mosfet

**Voltage** -40 V **Current** -90 A

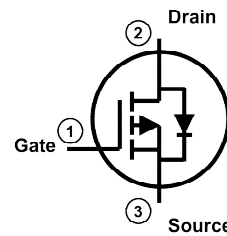
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@-10V$ ,  $I_D@-20A < 6.5m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V$ ,  $I_D@-10A < 9m\Omega$
- High switching speed
- Improved dv/dt capability
- Low gate charge
- 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 : 0.0105 ounces, 0.297grams

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 4)</sup>	$T_C=25^\circ C$	$I_D$	-90	A
	$T_C=100^\circ C$		-63	
Pulsed Drain Current <sup>(Note 1)</sup>	$T_C=25^\circ C$	$I_{DM}$	-300	
Power Dissipation	$T_C=25^\circ C$	$P_D$	83	W
	$T_C=100^\circ C$		41	
Continuous Drain Current <sup>(Note 4)</sup>	$T_A=25^\circ C$	$I_D$	-15	A
	$T_A=70^\circ C$		-13	
Power Dissipation	$T_A=25^\circ C$	$P_D$	2.4	W
	$T_A=70^\circ C$		1.7	
Single Pulse Avalanche Energy <sup>(Note 6)</sup>		$E_{AS}$	245	mJ
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~175	$^\circ C$
Typical Thermal Resistance <sup>(Note 4,5)</sup>	Junction to Case	$R_{\theta JC}$	1.8	$^\circ C/W$
	Junction to Ambient	$R_{\theta JA}$	62.5	



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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> =-250uA	-1	-1.4	-2.5	
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	-	5.1	6.5	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A	-	6.5	9	
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> =-10A, V <sub>GS</sub> =-10V (Note 2,3)	-	128	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	14.4	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	28.9	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHZ	-	6324	-	pF
Output Capacitance	C <sub>oss</sub>		-	548	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	292	-	
Gate resistance	R <sub>g</sub>	f=1MHZ	-	3.7	-	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DS</sub> =-32V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω (Note 2,3)	-	12	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	18.6	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	241	-	
Turn-Off Fall Time	t <sub>f</sub>		-	91	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>s</sub>	---	-	-	-90	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>s</sub> =-1A, V <sub>GS</sub> =0V	-	-0.66	-1	V

**NOTES :**

1. Pulse width ≤ 300us, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=175°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub> = 25°C.
4. The maximum current rating is package limited.
5. 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.
6. The test condition is L=0.1mH, I<sub>AS</sub>=-70A, V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, Starting T<sub>J</sub>=25°C.
7. Guaranteed by design, not subject to production testing.



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## TYPICAL CHARACTERISTIC CURVES

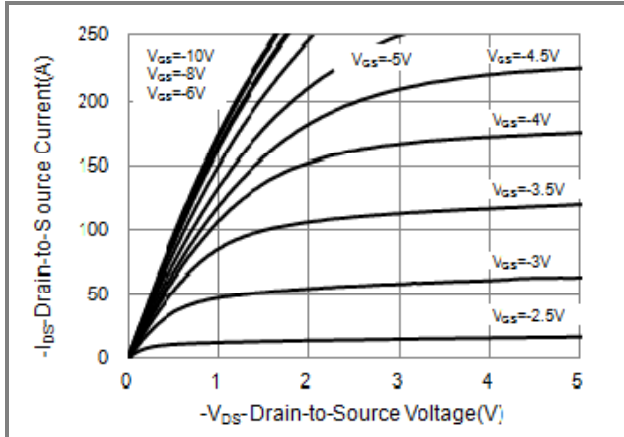


Fig.1 Output Characteristics

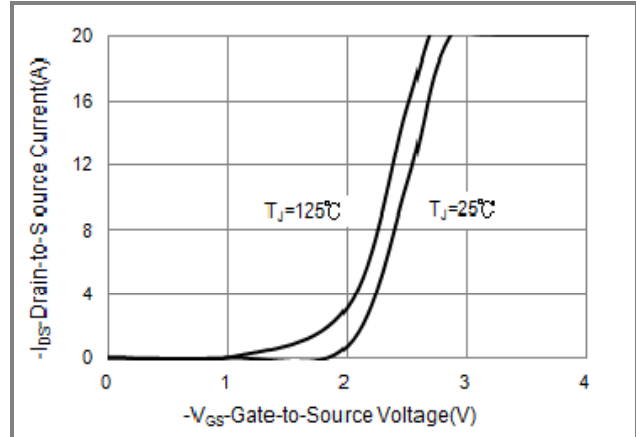


Fig.2 Transfer Characteristics

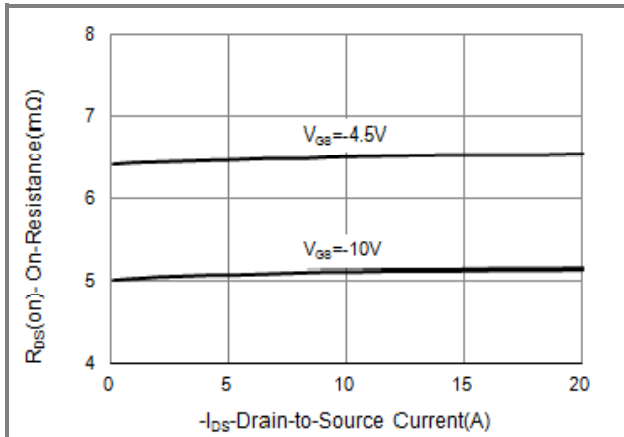


Fig.3 On-Resistance vs. Drain Current

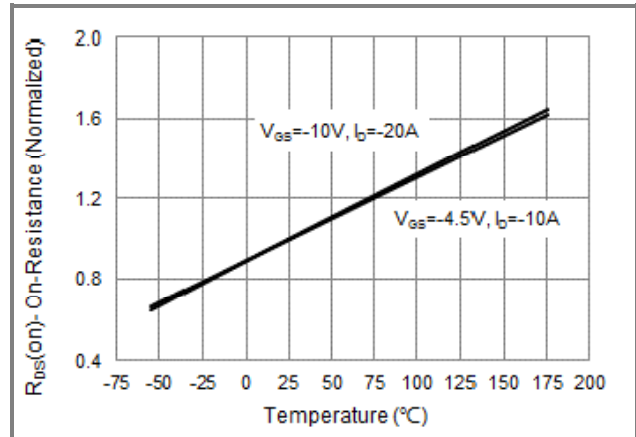


Fig.4 On-Resistance vs. Junction temperature

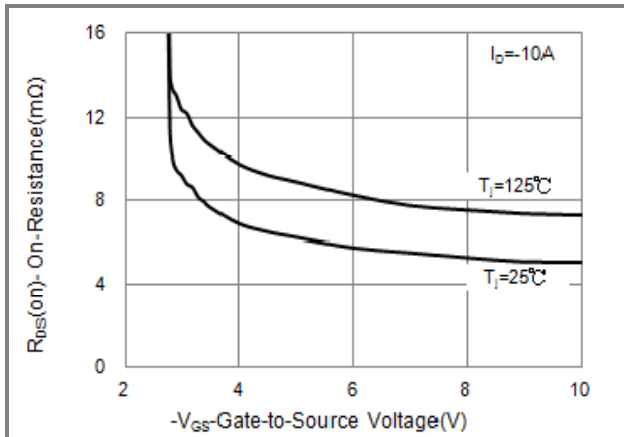


Fig.5 On-Resistance Variation with  $V_{GS}$

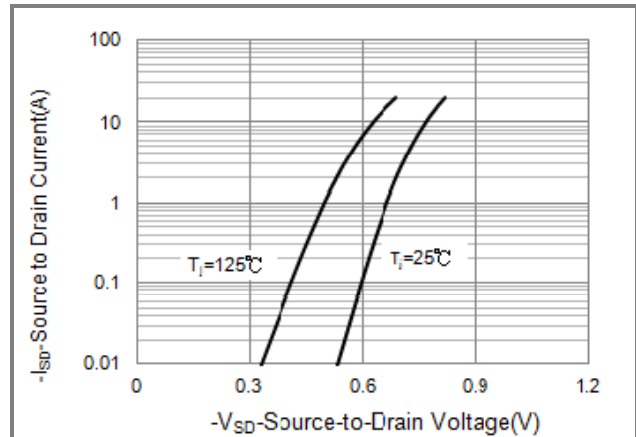


Fig.6 Source-Drain Diode Forward Voltage



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## TYPICAL CHARACTERISTIC CURVES

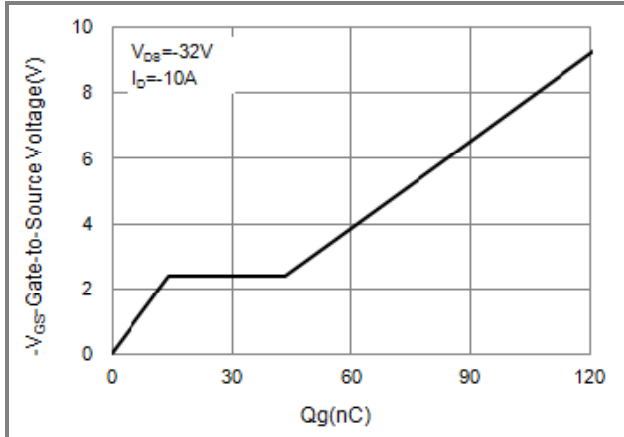


Fig.7 Gate-Charge Characteristics

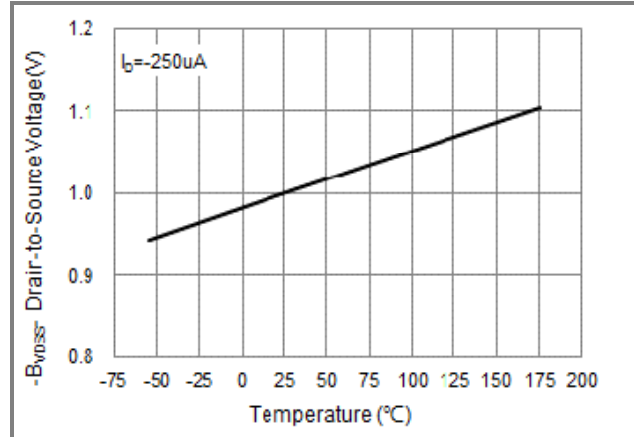


Fig.8 Breakdown Voltage Variation vs. Temperature

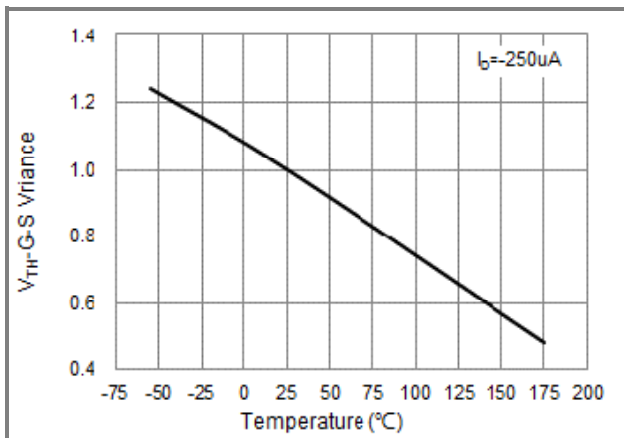


Fig.9 Threshold Voltage Variation with Temperature

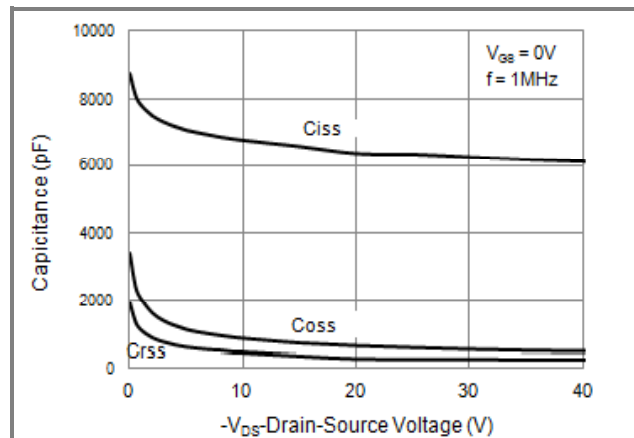


Fig.10 Capacitance vs. Drain-Source Voltage

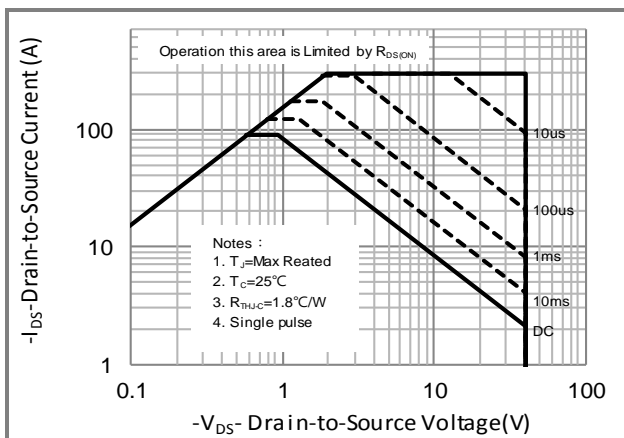


Fig.11 Maximum Safe Operating Area

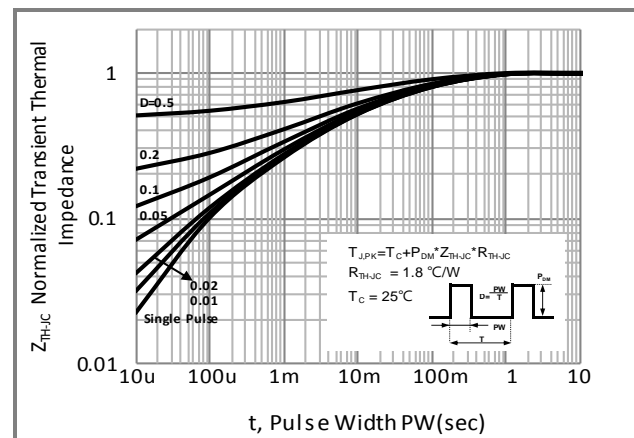


Fig.12 Normalized Transient Thermal Impedance





## **PJD100P04-AU**

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