



## PJU45N06A / PJD45N06A / PJP45N06A

### 60V N-Channel Enhancement Mode MOSFET

**Voltage**

**60 V**

**Current**

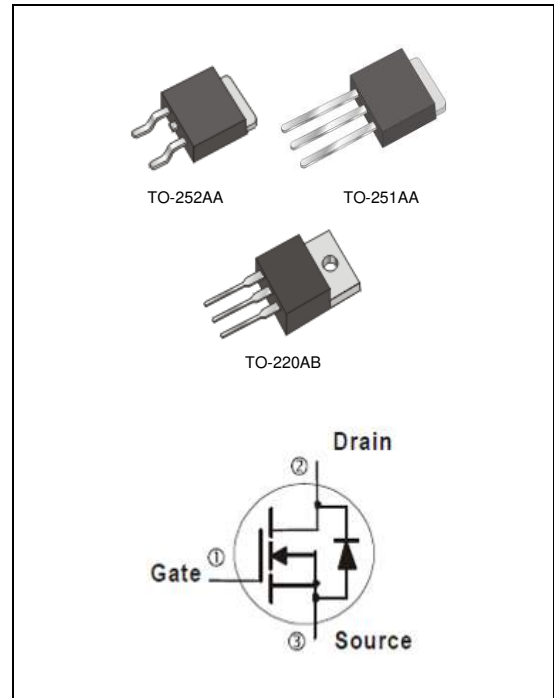
**45 A**

#### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@20A < 12m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@4.5V$ ,  $I_D@15A < 15m\Omega$
- High switching speed
- Improved dv/dt capability
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

#### Mechanical Data

- Case : TO-251AA, TO-252AA, TO-220AB Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- TO-251AA Approx. Weight : 0.0104 ounces, 0.297grams
- TO-252AA Approx. Weight : 0.0104 ounces, 0.297grams
- TO-220AB Approx. Weight : 0.067 ounces, 1.9 grams



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

PARAMETER		SYMBOL	TO-251AA	TO-220AB	TO-252AA	UNITS
Drain-Source Voltage		$V_{DS}$	60			V
Gate-Source Voltage		$V_{GS}$	±20			
Continuous Drain Current (Note 4)	$T_C=25^\circ C$	$I_D$	45	55	45	A
	$T_C=100^\circ C$		29	35	29	
Pulsed Drain Current (Note 1)	$T_C=25^\circ C$	$I_{DM}$	180	220	180	
Power Dissipation	$T_C=25^\circ C$	$P_D$	63	96	63	W
	$T_C=100^\circ C$		25	38	25	
Single Pulse Avalanche Energy (Note 6)		$E_{AS}$	61			mJ
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~150			$^\circ C$
Typical Thermal Resistance (Note 4,5)						
- Junction to Case		$R_{\theta JC}$	2.0	1.3	2.0	$^\circ C/W$
- Junction to Ambient		$R_{\theta JA}$	110	62.5	110	

- Limited only By Maximum Junction Temperature



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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	60	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	1.7	2.5	
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	10.5	12	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	-	12	15	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, 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 7)						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, I <sub>D</sub> =10A, V <sub>GS</sub> =10V (Note 2,3)	-	39	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	6.1	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	6.7	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHZ	-	2256	-	pF
Output Capacitance	C <sub>oss</sub>		-	145	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	93	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =10A, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω (Note 2,3)	-	7.5	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	36	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	49	-	
Turn-Off Fall Time	t <sub>f</sub>		-	12	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>	---	-	-	45	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V	-	0.67	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>=150°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>=35A, V<sub>DD</sub>=25V, V<sub>GS</sub>=10V
7. Guaranteed by design, not subject to production testing.



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## TYPICAL CHARACTERISTIC CURVES

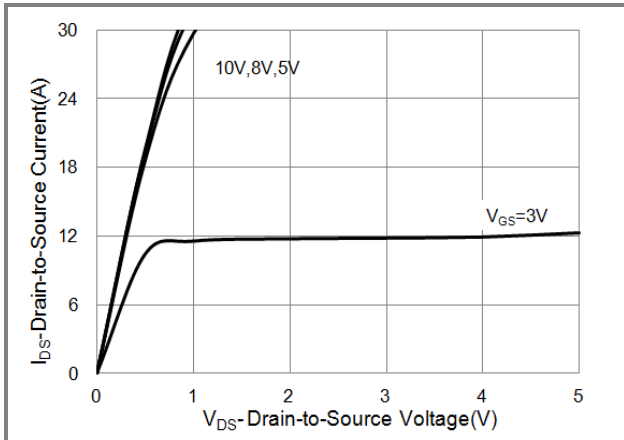


Fig.1 Output Characteristics

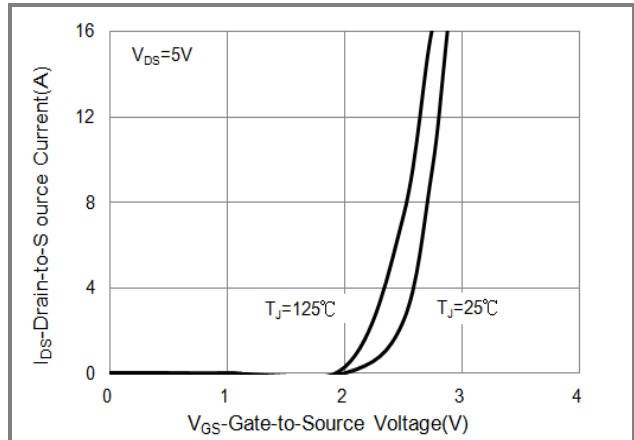


Fig.2 Transfer Characteristics

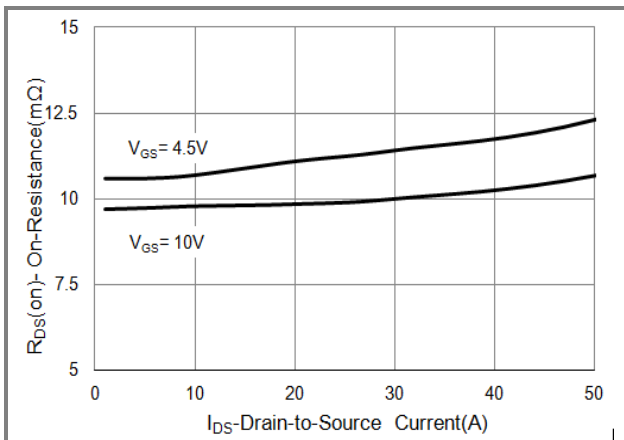


Fig.3 On-Resistance vs. Drain Current

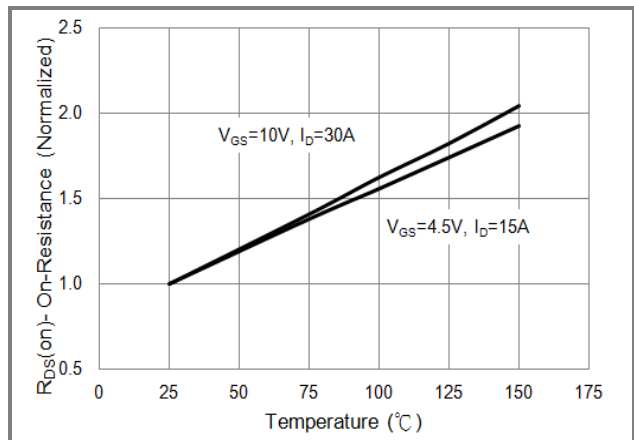


Fig.4 On-Resistance vs. Junction temperature

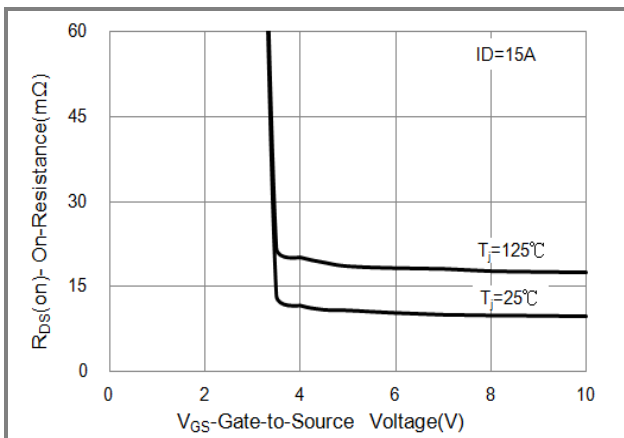


Fig.5 On-Resistance Variation with  $V_{GS}$

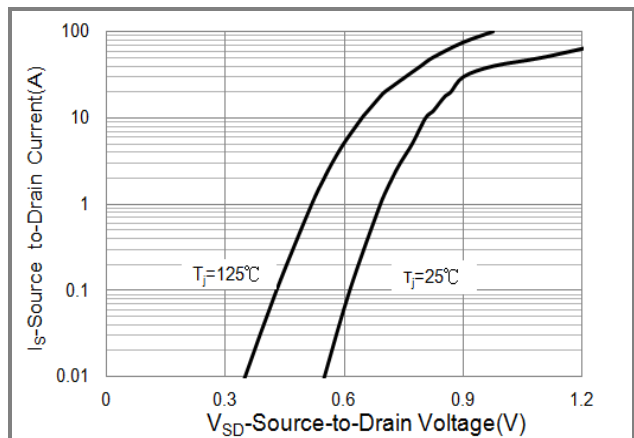


Fig.6 Source-Drain Diode Forward Voltage



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## TYPICAL CHARACTERISTIC CURVES

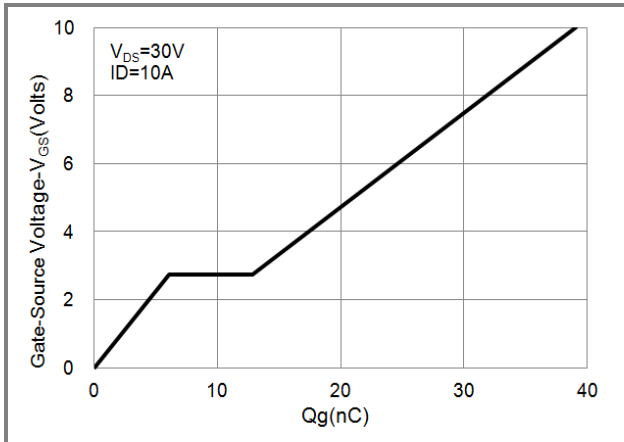


Fig.7 Gate-Charge Characteristics

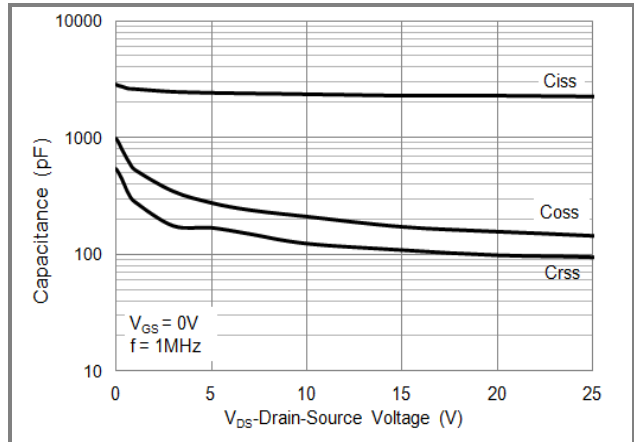


Fig.8 Capacitance vs. Drain-Source Voltage

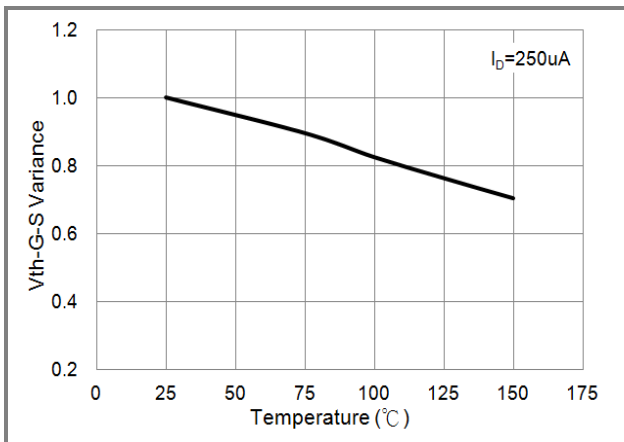


Fig.9 Threshold Voltage Variation with Temperature

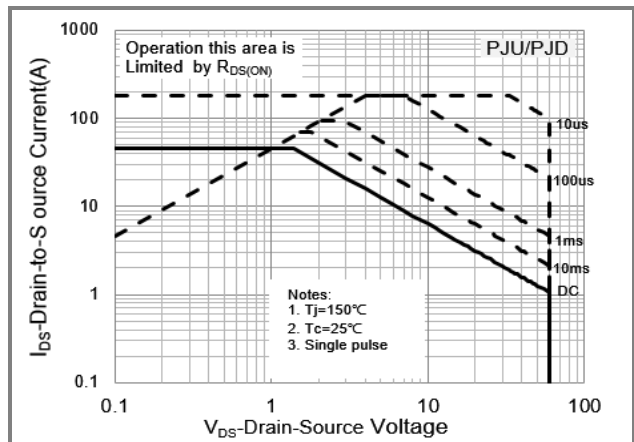


Fig.10 Maximum Safe Operating Area

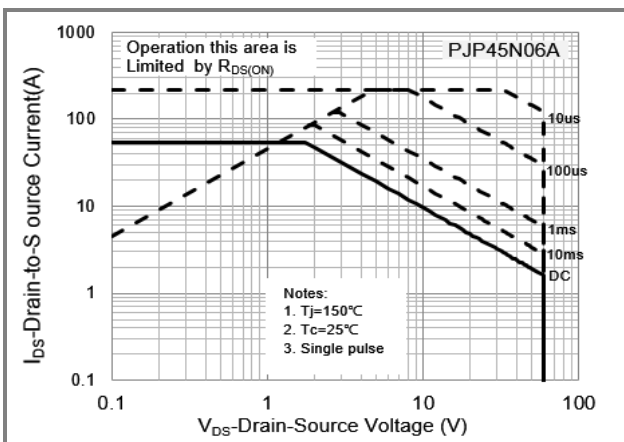


Fig.11 Maximum Safe Operating Area



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## TYPICAL CHARACTERISTIC CURVES

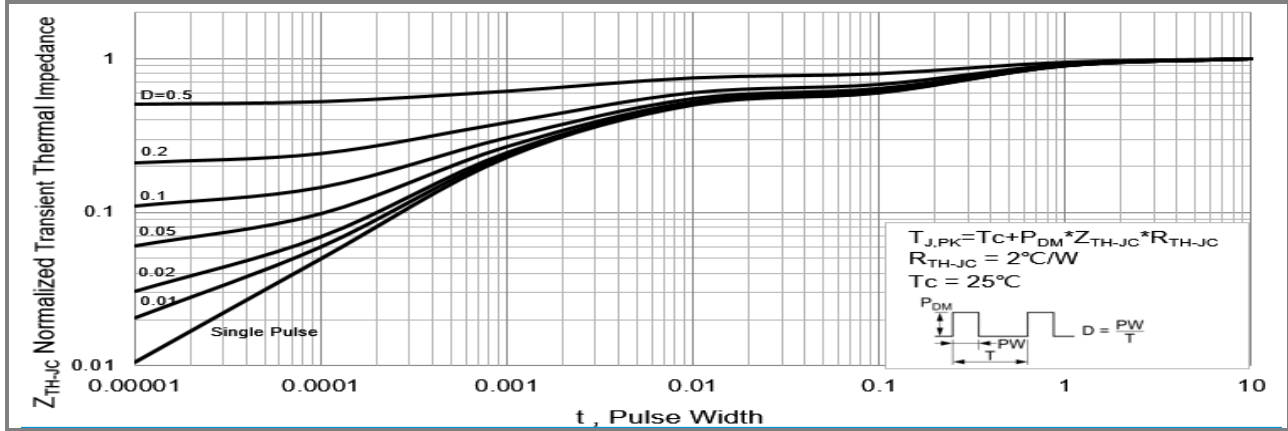


Fig.12 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

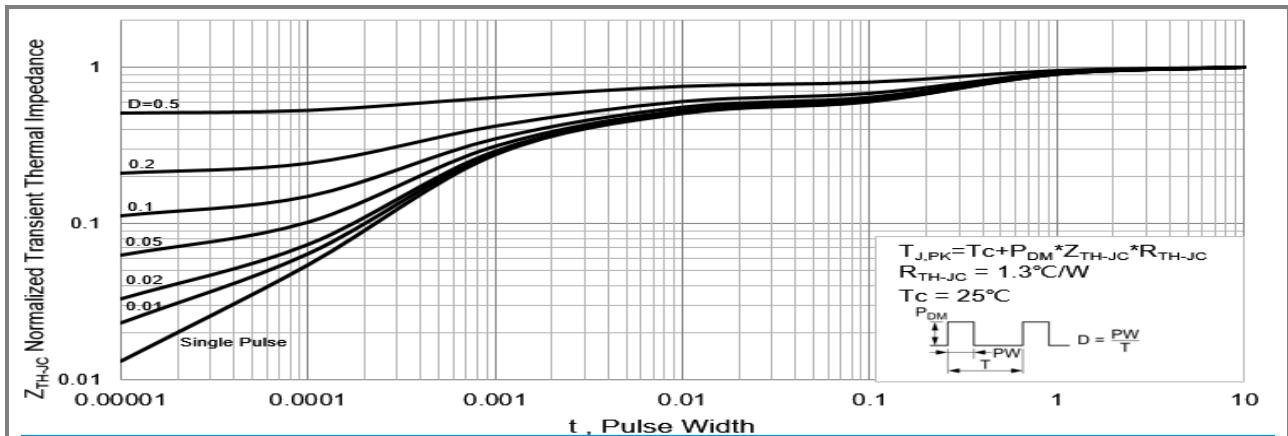


Fig.13 Normalized Transient Thermal Impedance vs. Pulse Width



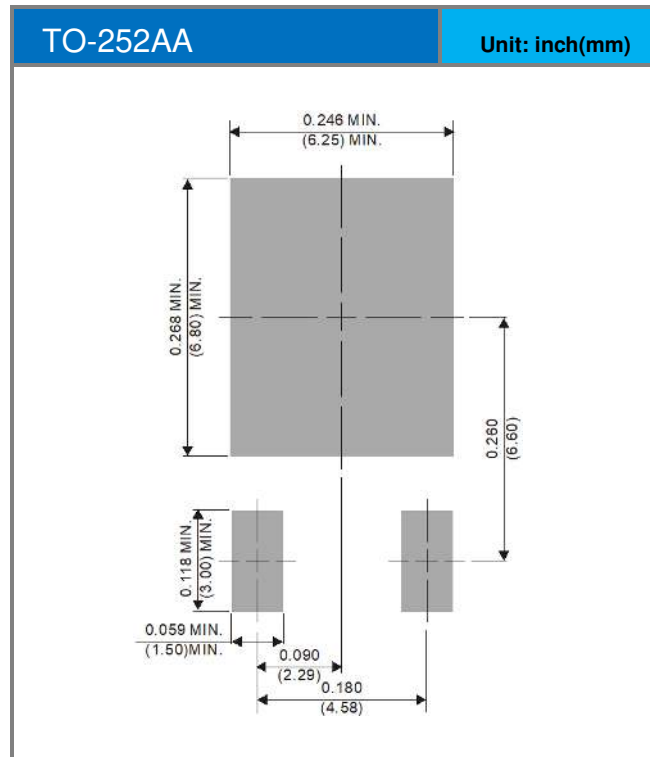


## PJU45N06A / PJD45N06A / PJP45N06A

### Part No Packing Code Version

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJU45N06A_T0_00001	TO-251AA	80pcs / Tube	U45N06A	Halogen free
PJD45N06A_L2_00001	TO-252AA	3,000pcs / 13" reel	D45N06A	Halogen free
PJP45N06A_T0_00001	TO-220AB	50pcs / Tube	P45N06A	Halogen free

### Mounting Pad Layout





## **PJU45N06A / PJD45N06A / PJP45N06A**

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