



## PJU55N10A / PJD55N10A / PJP55N10A / PJF55N10A

### 100V N-Channel Enhancement Mode MOSFET

**Voltage**

**100 V**

**Current**

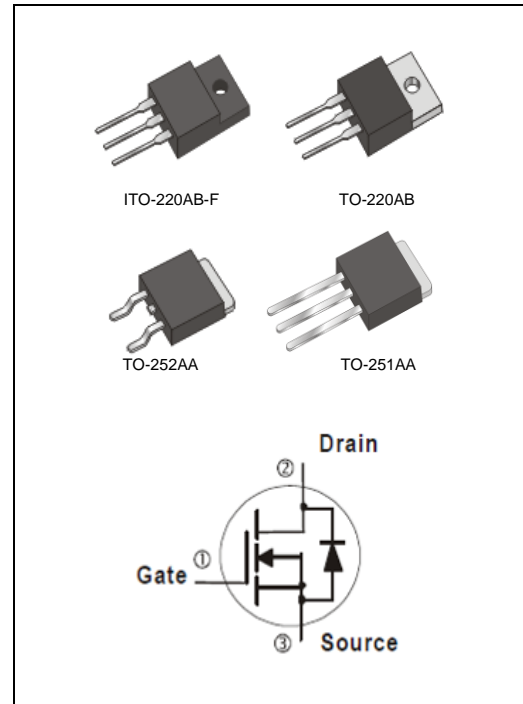
**55 A**

#### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@20A < 18m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@4.5V$ ,  $I_D@15A < 20m\Omega$
- 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, ITO-220AB-F 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
- ITO-220AB-F Approx. Weight : 0.068 ounces, 2 grams



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

PARAMETER	SYMBOL	TO-251AA	TO-220AB	ITO-220AB-F	TO-252AA	UNITS	
Drain-Source Voltage	$V_{DS}$	100				V	
Gate-Source Voltage	$V_{GS}$	±20					
Continuous Drain Current <sup>(Note 4)</sup>	$I_D$	$T_C=25^\circ\text{C}$	55			A	
		$T_C=100^\circ\text{C}$	35				
Pulsed Drain Current <sup>(Note 1)</sup>	$I_{DM}$	220				A	
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	140	142	46	140	W
		$T_C=100^\circ\text{C}$	56	57	18	56	
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	7.2			A	
		$T_A=70^\circ\text{C}$	5.7				
Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	1.1	2	1	1.1	W
		$T_A=70^\circ\text{C}$	0.7	1.3	0.7	0.7	
Single Pulse Avalanche Energy <sup>(Note 6)</sup>	$E_{AS}$	156				mJ	
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150				$^\circ\text{C}$	
Typical Thermal Resistance <sup>(Note 4,5)</sup>							
- Junction to Case	$R_{\theta JC}$	0.89	0.88	2.72	0.89	$^\circ\text{C/W}$	
- Junction to Ambient	$R_{\theta JA}$	110	62.5	120	110		

Limited only By Maximum Junction Temperature



## PJU55N10A / PJD55N10A / PJP55N10A / PJF55N10A

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.5	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	15	18	m $\Omega$
		$V_{GS}=4.5V, I_D=15A$	-	15.5	20	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>Dynamic</b> (Note 7)						
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=30A,$ $V_{GS}=10V$ (Note 1,2)	-	95	-	nC
Gate-Source Charge	$Q_{gs}$		-	11	-	
Gate-Drain Charge	$Q_{gd}$		-	18	-	
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V,$ $f=1MHz$	-	5173	-	pF
Output Capacitance	$C_{oss}$		-	226	-	
Reverse Transfer Capacitance	$C_{rss}$		-	66	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=50V, I_D=30A,$ $V_{GS}=10V, R_G=3\Omega$ (Note 1,2)	-	29	-	ns
Turn-On Rise Time	$t_r$		-	61	-	
Turn-Off Delay Time	$t_{d(off)}$		-	154	-	
Turn-Off Fall Time	$t_f$		-	84	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$	---	-	-	55	A
Diode Forward Voltage	$V_{SD}$	$I_S=20A, V_{GS}=0V$	-	0.8	1.3	V

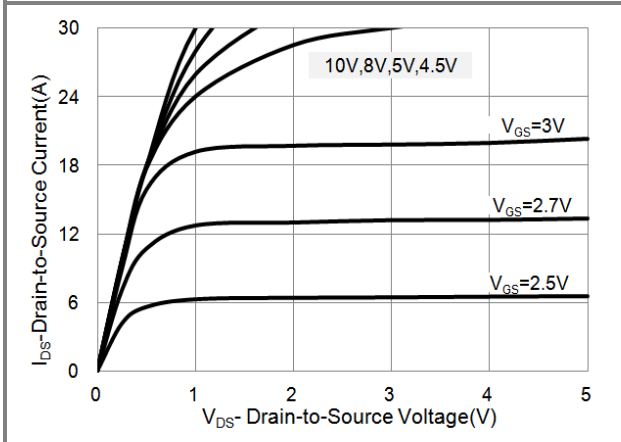
**NOTES :**

1. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .
4. The maximum current rating is package limited.
5.  $R_{\theta JA}$  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  $L=0.5mH, I_{AS}=25A, V_{DD}=25V, V_{GS}=10V, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
7. Guaranteed by design, not subject to production testing.

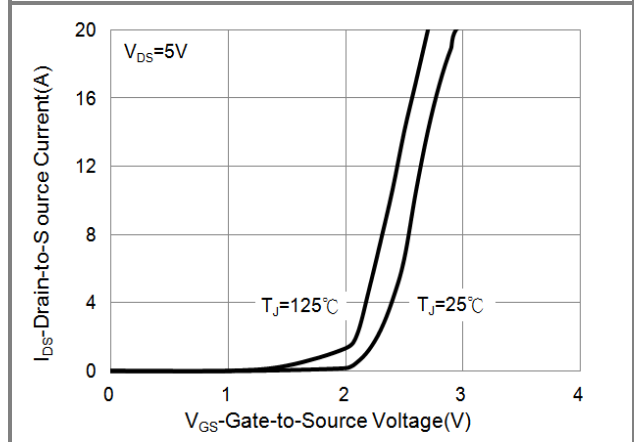


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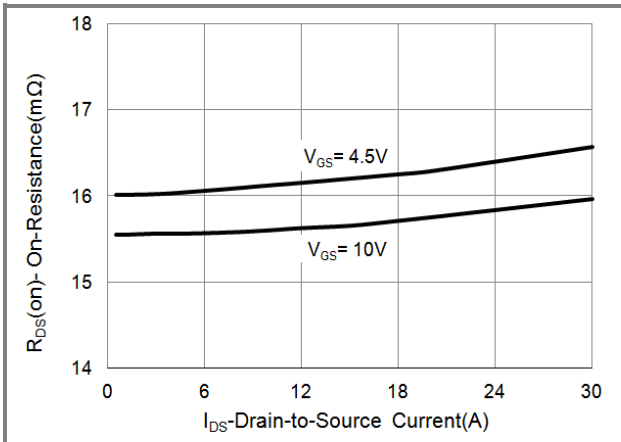
**TYPICAL CHARACTERISTIC CURVES**



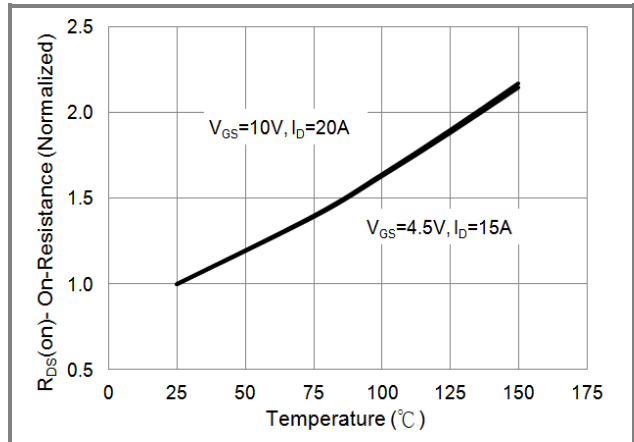
**Fig.1 Output Characteristics**



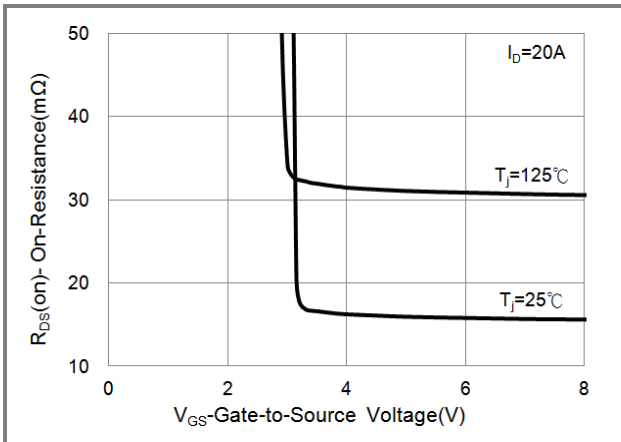
**Fig.2 Transfer Characteristics**



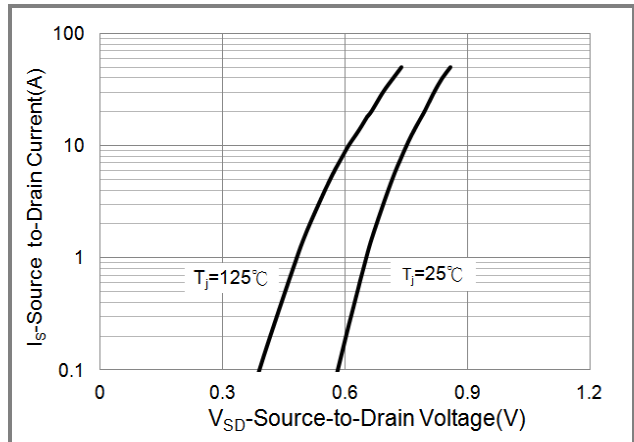
**Fig.3 On-Resistance vs. Drain Current**



**Fig.4 On-Resistance vs. Junction temperature**



**Fig.5 On-Resistance Variation with VGS**

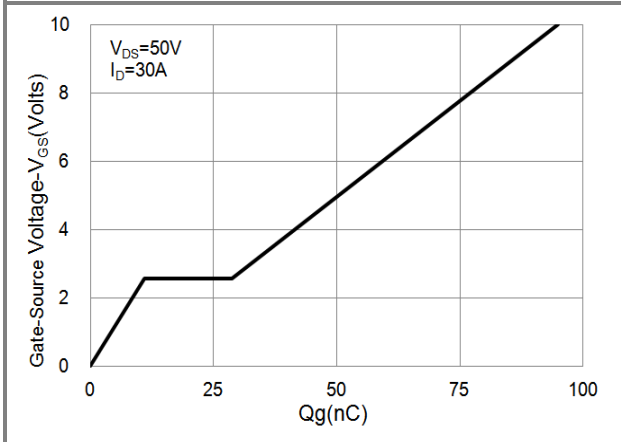


**Fig.6 Source-Drain Diode Forward Voltage**

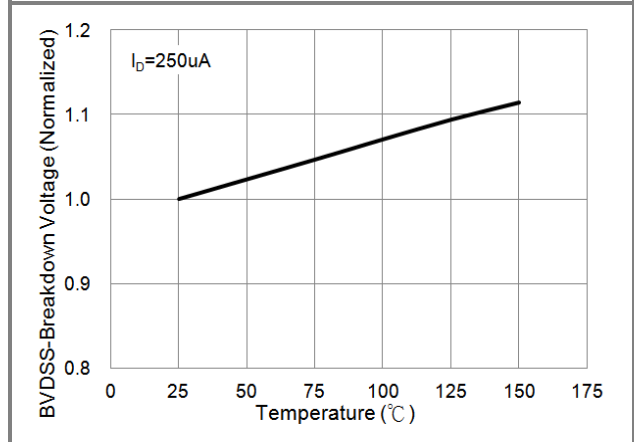


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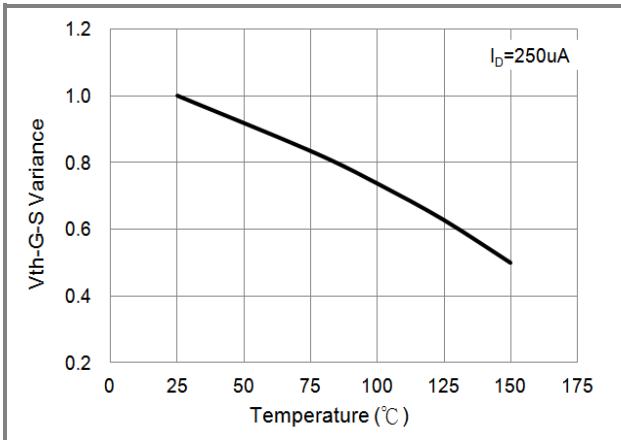
**TYPICAL CHARACTERISTIC CURVES**



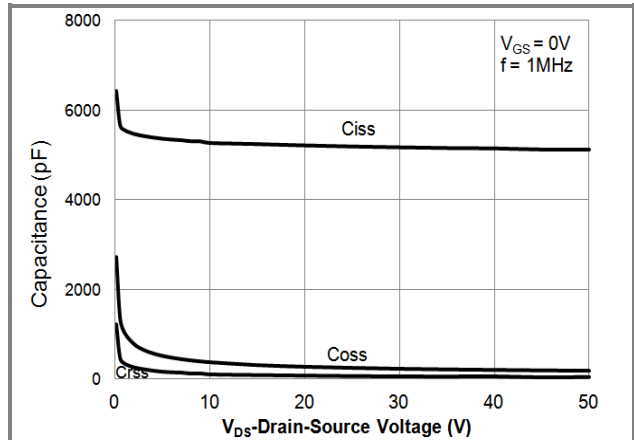
**Fig.7 Gate-Charge Characteristics**



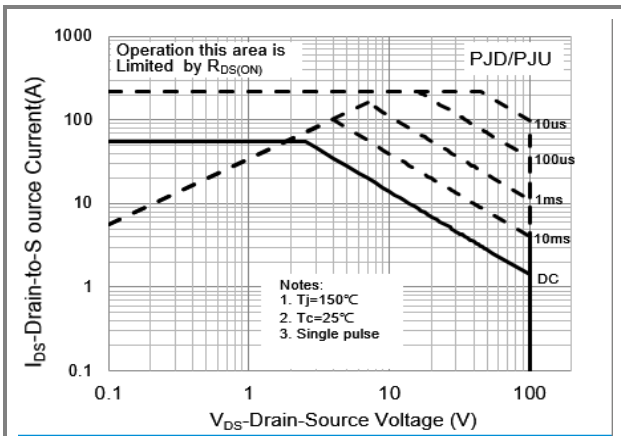
**Fig.8 Breakdown Voltage Variation vs. Temperature**



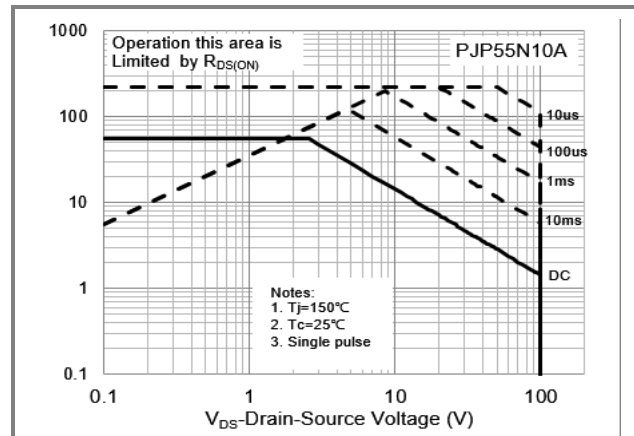
**Fig.9 Threshold Voltage Variation with Temperature**



**Fig.10 Capacitance vs. Drain-Source Voltage**



**Fig.11 Maximum Safe Operating Area**

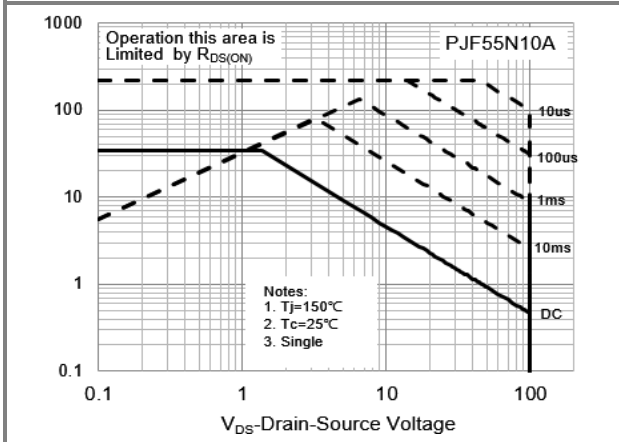


**Fig.12 Maximum Safe Operating Area**

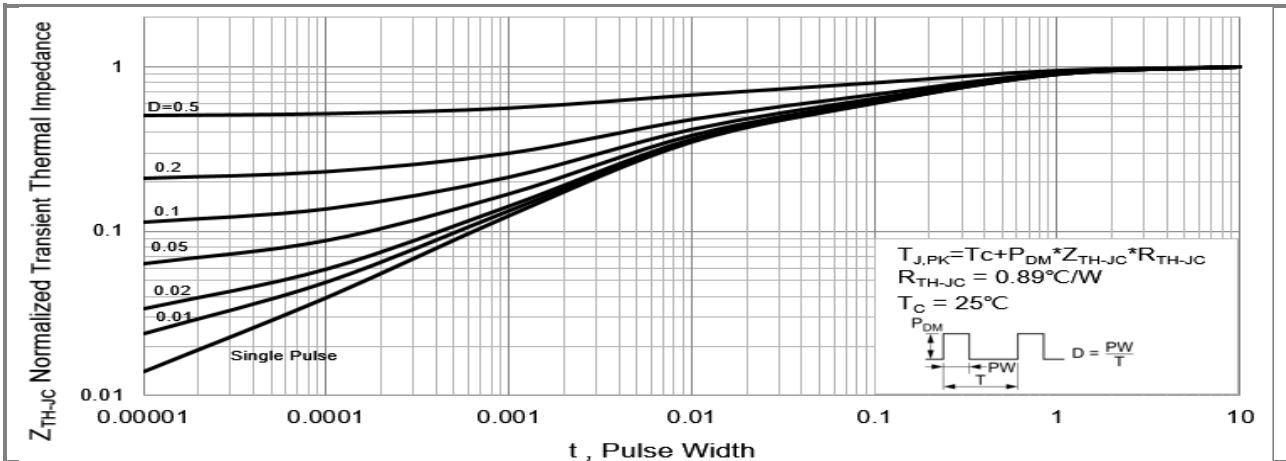


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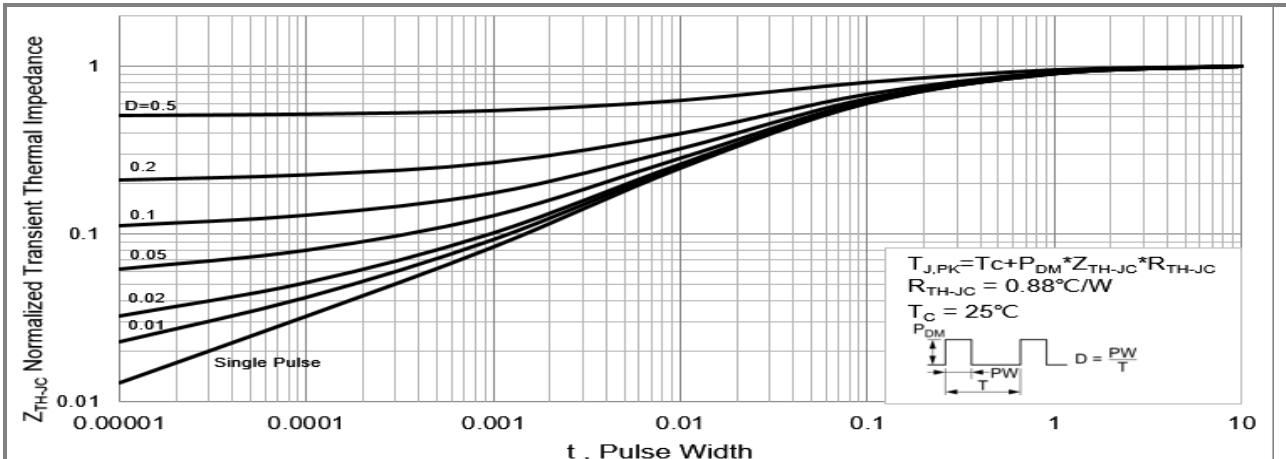
**TYPICAL CHARACTERISTIC CURVES**



**Fig.13 Maximum Safe Operating Area**



**Fig.14 PJD/PJU Normalized Transient Thermal Impedance vs. Pulse Width**



**Fig.15 PJP55N10A Normalized Transient Thermal Impedance vs. Pulse Width**



PJU55N10A / PJD55N10A / PJP55N10A / PJF55N10A

TYPICAL CHARACTERISTIC CURVES

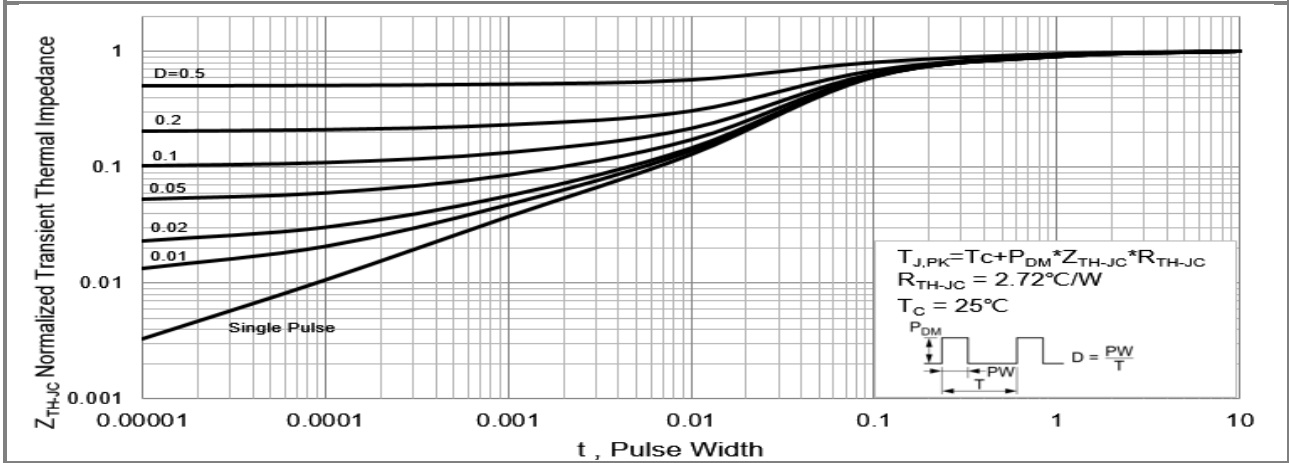
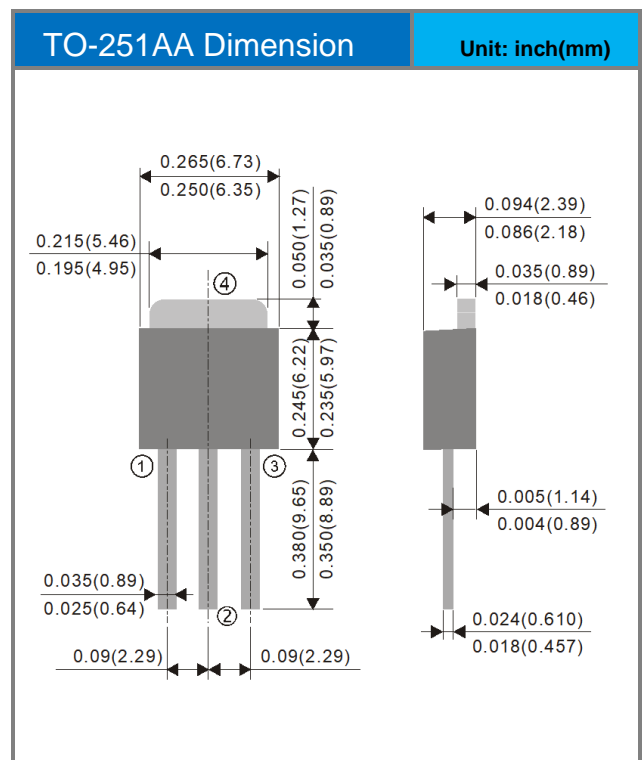
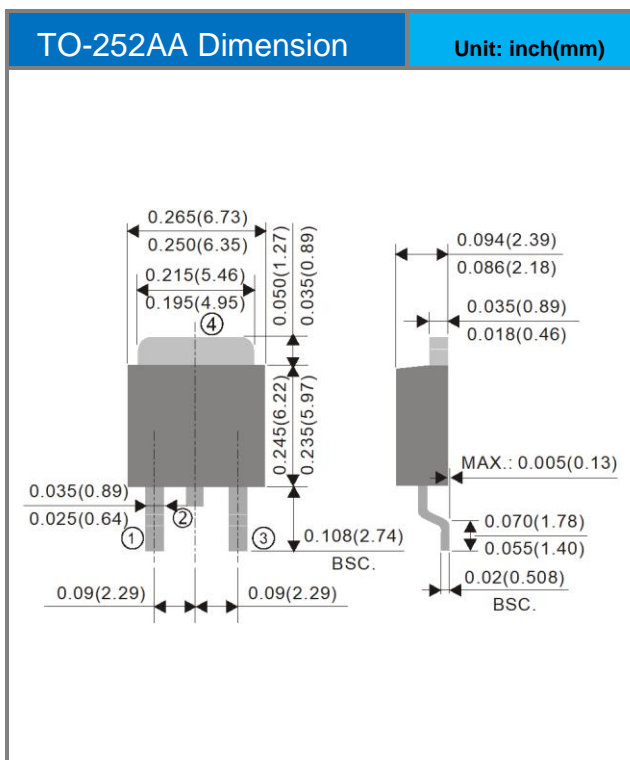
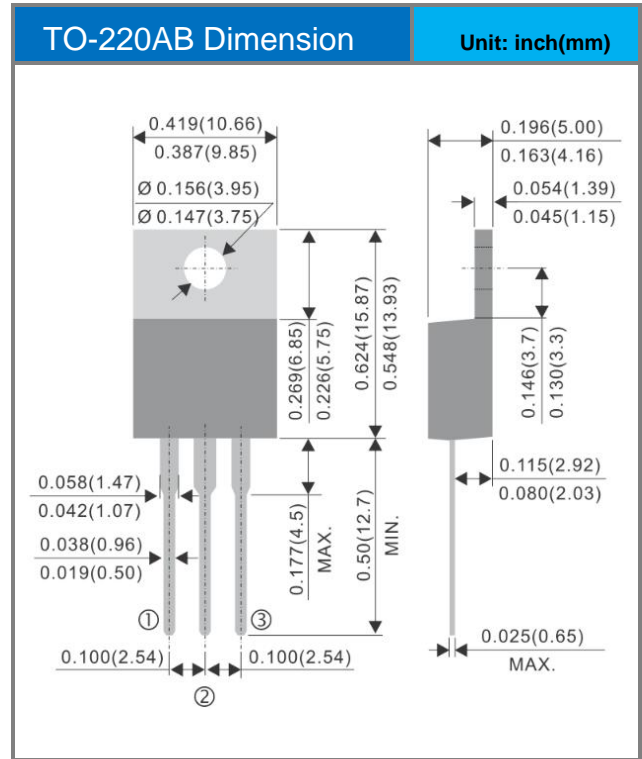
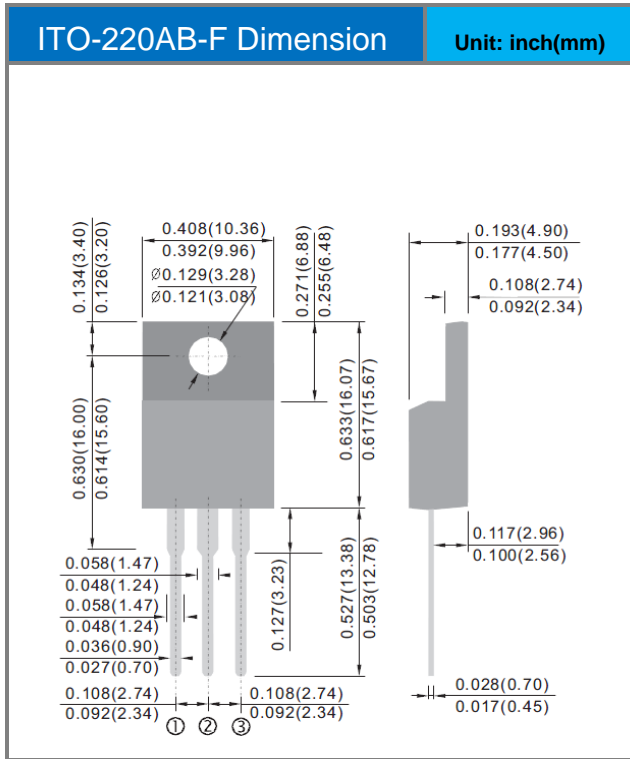


Fig.16 PJF55N10A Normalized Transient Thermal Impedance vs. Pulse Width



**PJU55N10A / PJD55N10A / PJP55N10A / PJF55N10A**

**Packaging Information**



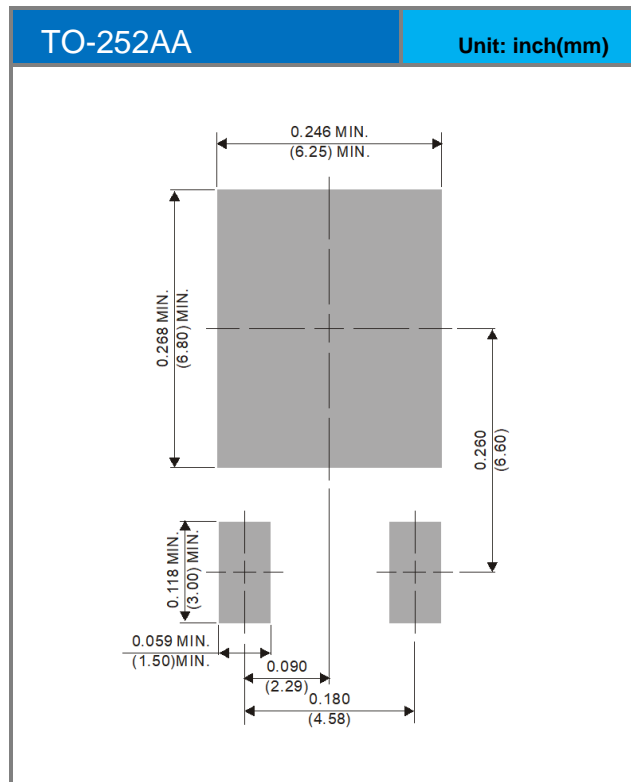


**PJU55N10A / PJD55N10A / PJP55N10A / PJF55N10A**

**Part No Packing Code Version**

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJU55N10A_TO_00001	TO-251AA	80pcs / Tube	U55N10A	Halogen free
PJD55N10A_L2_00001	TO-252AA	3,000pcs / 13" reel	D55N10A	Halogen free
PJP55N10A_TO_00001	TO-220AB	50pcs / Tube	P55N10A	Halogen free
PJF55N10A_TO_00001	ITO-220AB-F	50pcs / Tube	F55N10A	Halogen free

**Mounting Pad Layout**







## **PJU55N10A / PJD55N10A / PJP55N10A / PJF55N10A**

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