



PJU45N06A / PJD45N06A / PJP45N06A

60V N-Channel Enhancement Mode MOSFET

Voltage

60 V

Current

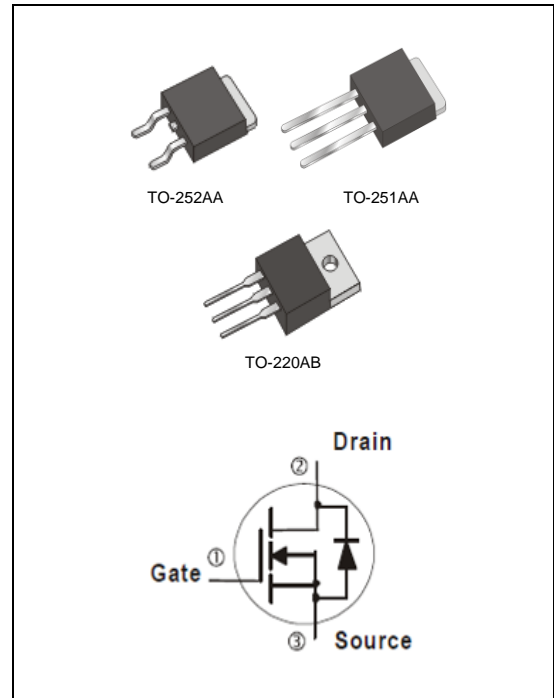
45 A

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 ($T_A=25^\circ\text{C}$ 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)	$T_C=25^\circ\text{C}$	I_D	45	55	45	A
	$T_C=100^\circ\text{C}$		29	35	29	
Pulsed Drain Current (Note 1)	$T_C=25^\circ\text{C}$	I_{DM}	180	220	180	
Power Dissipation	$T_C=25^\circ\text{C}$	P_D	63	96	63	W
	$T_C=100^\circ\text{C}$		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			$^\circ\text{C}$
Typical Thermal Resistance (Note 4,5)						
-	Junction to Case	$R_{\theta JC}$	2.0	1.3	2.0	$^\circ\text{C/W}$
-	Junction to Ambient	$R_{\theta JA}$	110	62.5	110	

- Limited only By Maximum Junction Temperature



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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.5	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	10.5	12	m Ω
		$V_{GS}=4.5V, I_D=15A$	-	12	15	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Dynamic (Note 7)						
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=10A,$ $V_{GS}=10V$ (Note 2,3)	-	39	-	nC
Gate-Source Charge	Q_{gs}		-	6.1	-	
Gate-Drain Charge	Q_{gd}		-	6.7	-	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	2256	-	pF
Output Capacitance	C_{oss}		-	145	-	
Reverse Transfer Capacitance	C_{rss}		-	93	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=10A,$ $V_{GS}=10V, R_G=6\Omega$ (Note 2,3)	-	7.5	-	ns
Turn-On Rise Time	t_r		-	36	-	
Turn-Off Delay Time	$t_{d(off)}$		-	49	-	
Turn-Off Fall Time	t_f		-	12	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	-	-	45	A
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$	-	0.67	1	V

NOTES :

- Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
- Essentially independent of operating temperature typical characteristics.
- 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 $T_J=25^{\circ}\text{C}$.
- The maximum current rating is package limited.
- $R_{\theta JA}$ 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 inch² with 2oz. square pad of copper.
- The test condition is $L=0.1\text{mH}, I_{AS}=35A, V_{DD}=25V, V_{GS}=10V$
- Guaranteed by design, not subject to production testing.



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TYPICAL CHARACTERISTIC CURVES

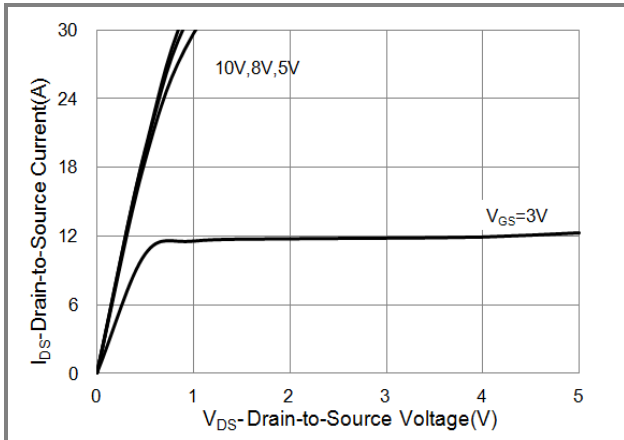


Fig.1 Output Characteristics

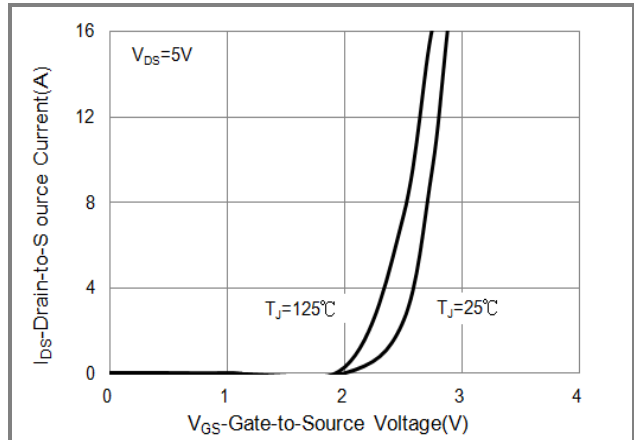


Fig.2 Transfer Characteristics

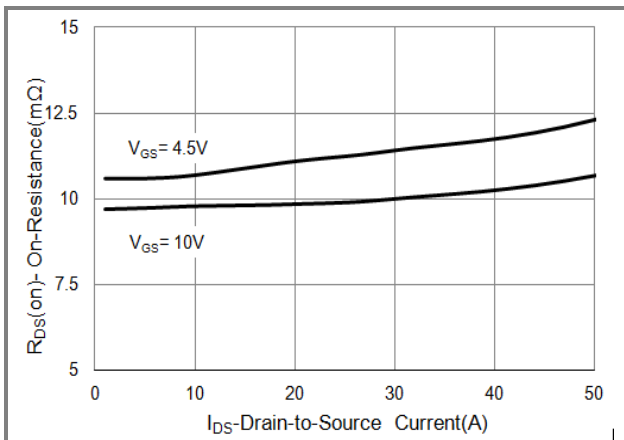


Fig.3 On-Resistance vs. Drain Current

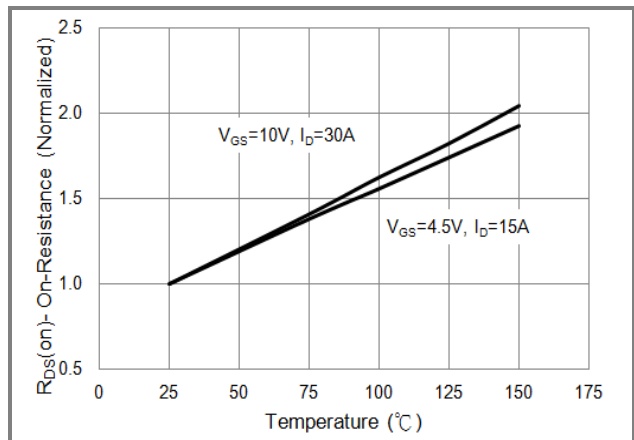


Fig.4 On-Resistance vs. Junction temperature

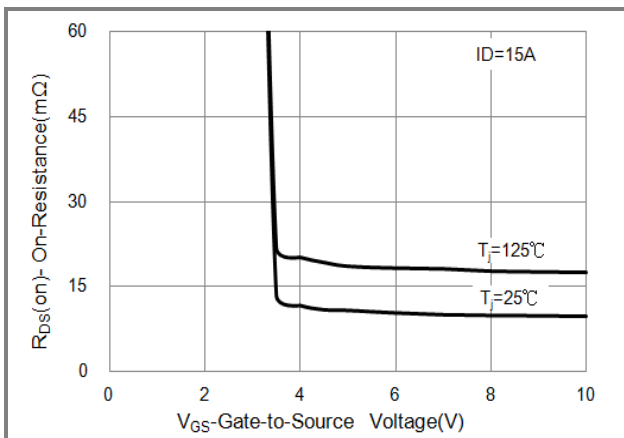


Fig.5 On-Resistance Variation with V_{GS}

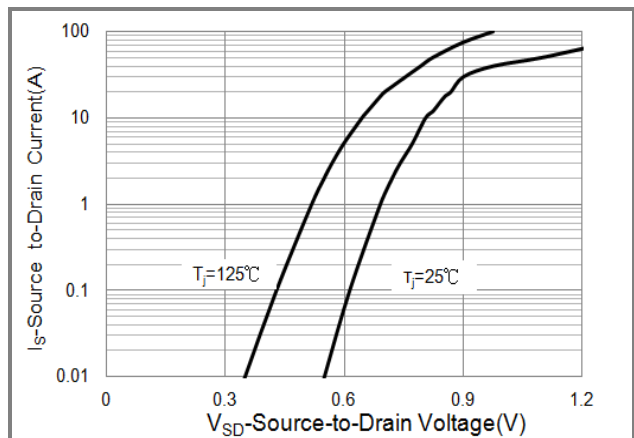


Fig.6 Source-Drain Diode Forward Voltage



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TYPICAL CHARACTERISTIC CURVES

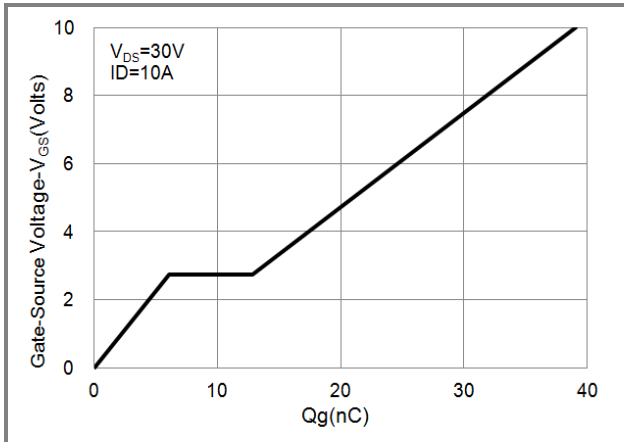


Fig.7 Gate-Charge Characteristics

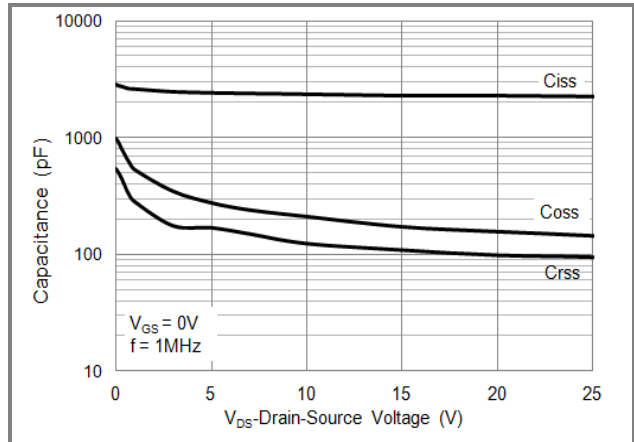


Fig.8 Capacitance vs. Drain-Source Voltage

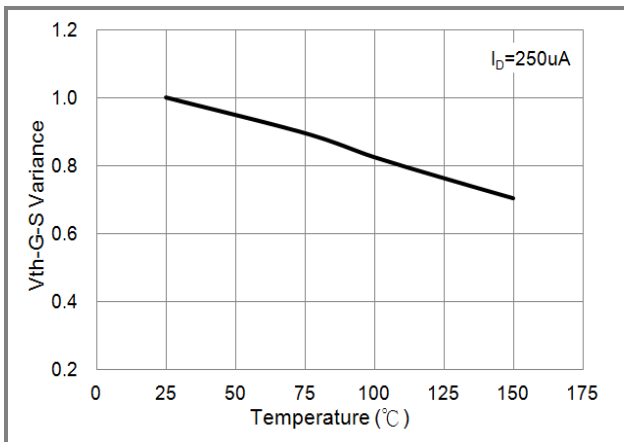


Fig.9 Threshold Voltage Variation with Temperature

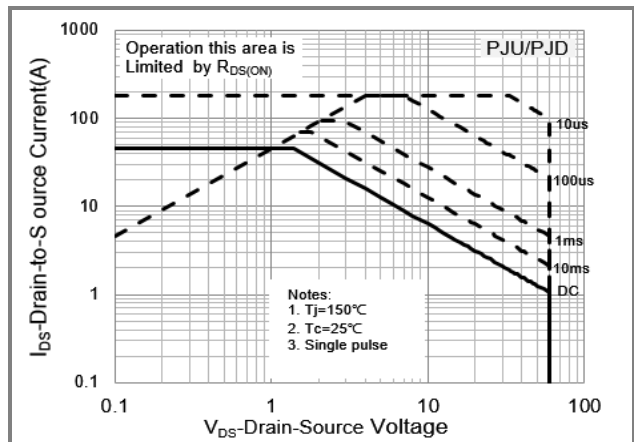


Fig.10 Maximum Safe Operating Area

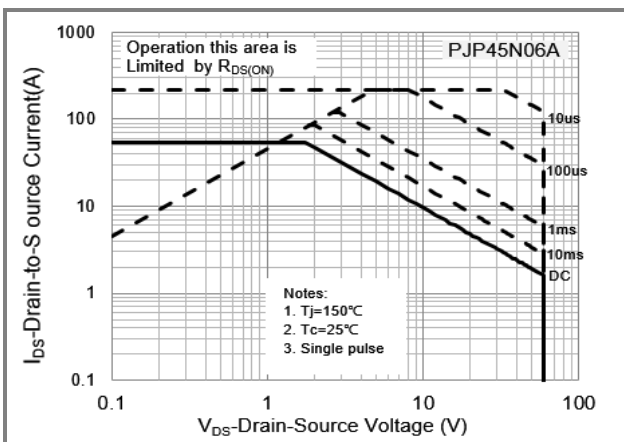


Fig.11 Maximum Safe Operating Area



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TYPICAL CHARACTERISTIC CURVES

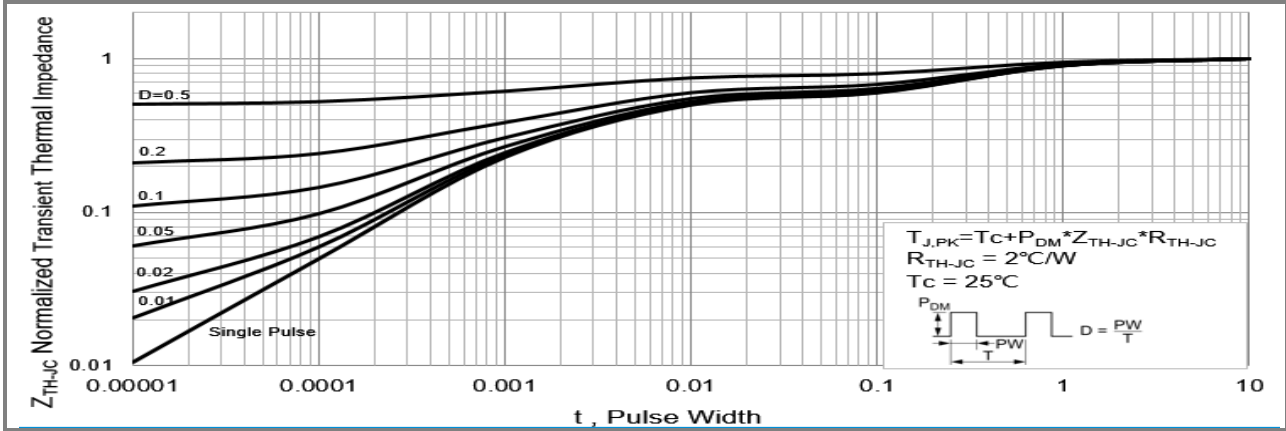


Fig.12 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

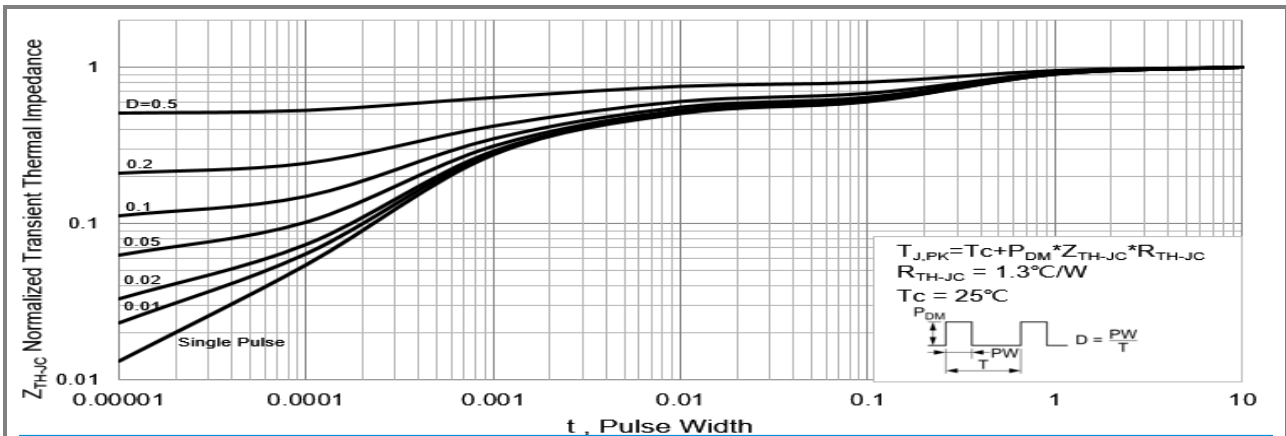
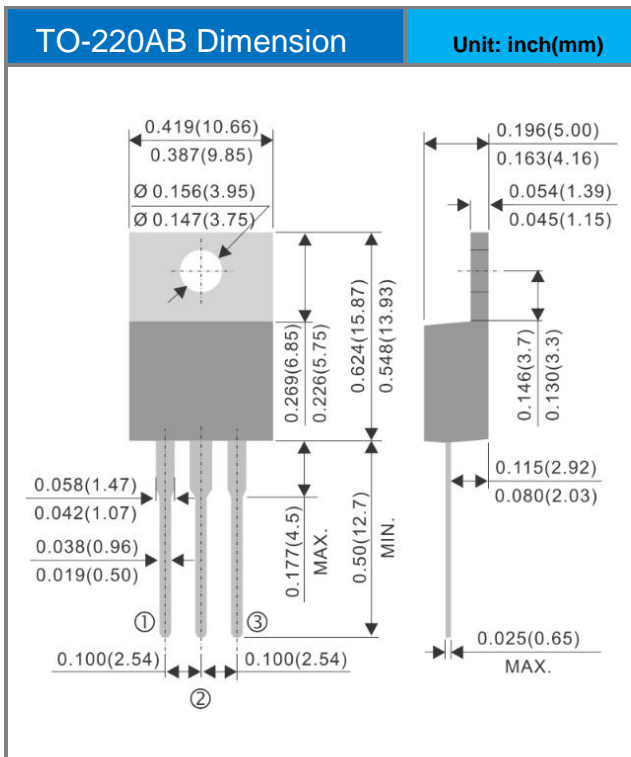
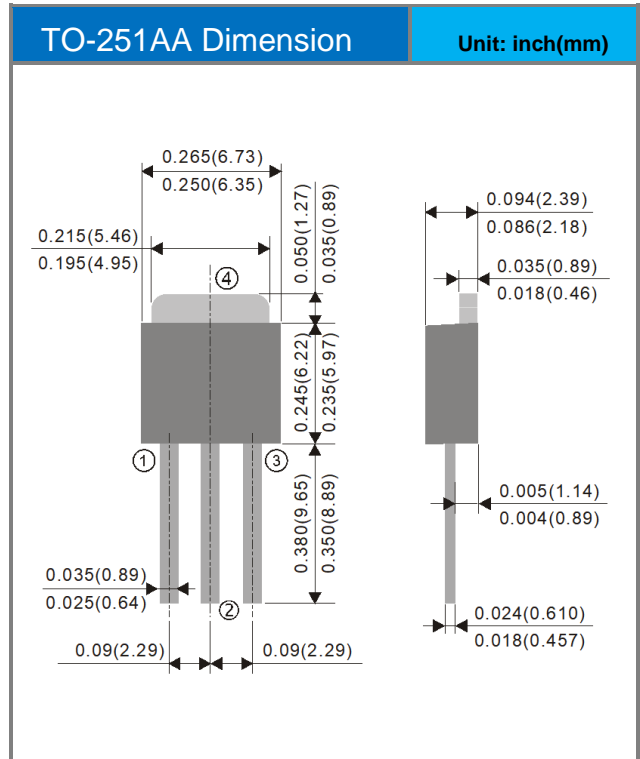
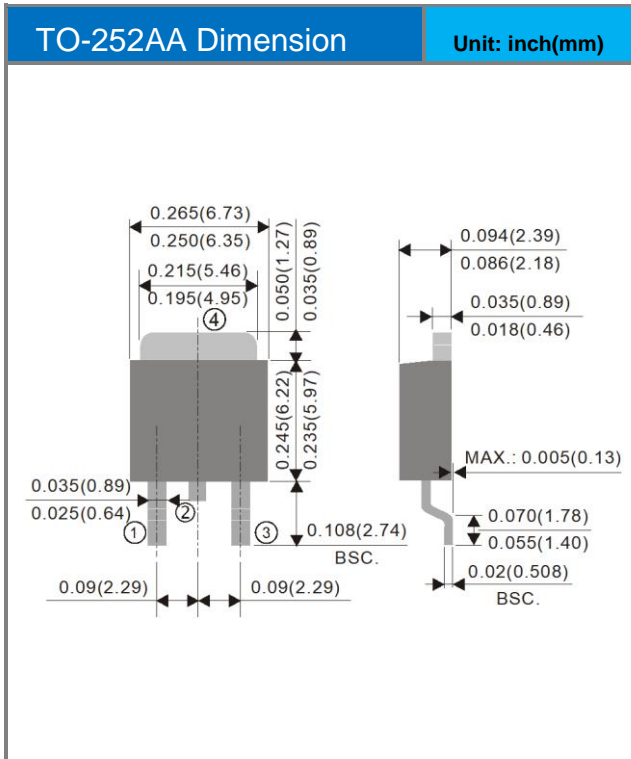


Fig.13 Normalized Transient Thermal Impedance vs. Pulse Width



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Packaging Information



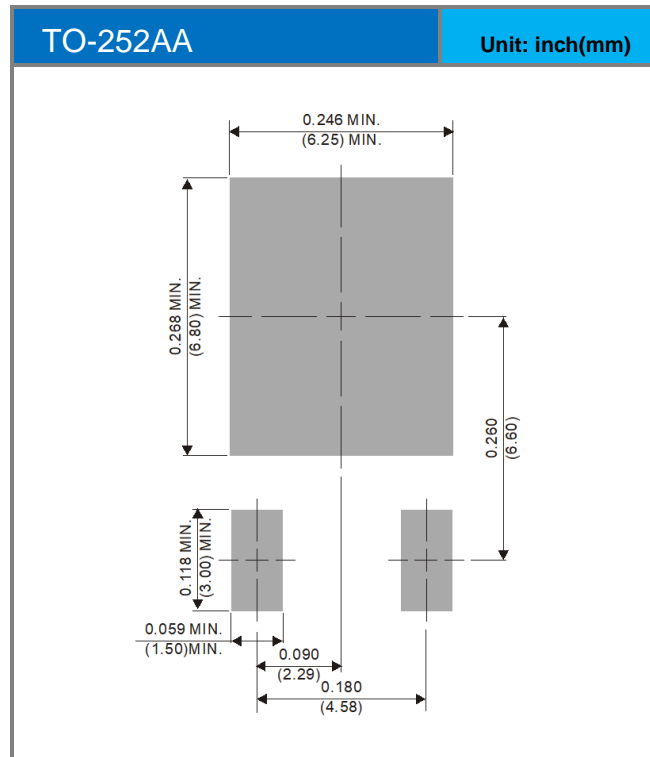


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Part No Packing Code Version

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





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