



PJD60R540E / PJP60R540E / PJF60R540E

600V N-Channel Super Junction MOSFET

Voltage

600 V

Current

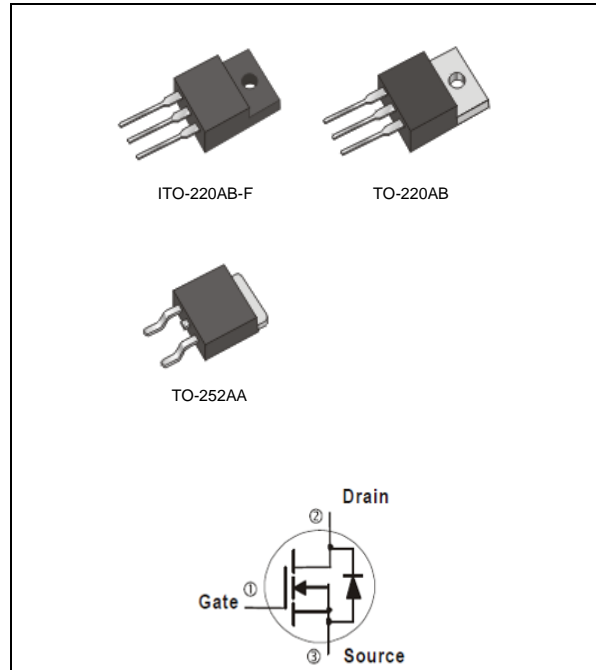
9 A

Features

- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@2.8A < 0.535\Omega$
- Fast switching speed
- Low on-resistance
- Low Noise
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

Mechanical Data

- Case : TO-252AA, TO-220AB, ITO-220AB-F
- Terminals : Solderable per MIL-STD-750, Method 2026
- TO-252AA Approx. Weight : 0.0104 ounces, 0.297grams
- TO-220AB Approx. Weight : 0.067 ounces, 1.89 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-220AB	ITO-220AB-F	TO-252AA	UNITS
Drain-Source Voltage		V_{DS}	600			V
Gate-Source Voltage		V_{GS}	±20			
Continuous Drain Current (Note 4)	$T_C=25^\circ\text{C}$	I_D	9			A
	$T_C=100^\circ\text{C}$		5			
Pulsed Drain Current (Note 1)		I_{DM}	18			
Power Dissipation (Note 3)	$T_C=25^\circ\text{C}$	P_D	94	48	94	W
	$T_C=100^\circ\text{C}$		38	19	38	
Continuous Drain Current (Note 4)	$T_A=25^\circ\text{C}$	I_D	1.3			A
	$T_A=70^\circ\text{C}$		1			
Power Dissipation	$T_A=25^\circ\text{C}$	P_D	2	1.04	2	W
	$T_A=70^\circ\text{C}$		1.3	0.9	1.3	
Single Pulse Avalanche Energy (Note 6)		E_{AS}	98			mJ
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150			$^\circ\text{C}$
Typical Thermal Resistance (Note 4,5)		$R_{\theta JC}$	1.33	2.6	1.33	$^\circ\text{C/W}$
		$R_{\theta JA}$	62.5	120	62.5	

- 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}	$V_{GS}=0V, I_D=250\mu A$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.98	4	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2.8A$	-	0.45	0.535	Ω
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Diode Forward Voltage	V_{SD}	$I_S=9A, V_{GS}=0V$	-	0.98	1.5	V
Transconductance	G_{FS}	$V_{DS}=10V, I_D=4.5A$	-	4.5	-	S
Dynamic (Note 7)						
Total Gate Charge	Q_g	$V_{DS}=300V, I_D=9A,$ $V_{GS}=10V$ (Note 2,3)	-	23.7	-	nC
Gate-Source Charge	Q_{gs}		-	3.5	-	
Gate-Drain Charge	Q_{gd}		-	13.3	-	
Gate Input Resistance	R_g	$F = 1\text{MHz}$	-	10.1	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$	-	531	-	pF
Output Capacitance	C_{oss}		-	547	-	
Reverse Transfer Capacitance	C_{rss}		-	69	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=300V, I_D=4.5A,$ $R_G=10\Omega$ (Note 2,3)	-	11	-	ns
Turn-On Rise Time	t_r		-	26	-	
Turn-Off Delay Time	$t_{d(off)}$		-	69	-	
Turn-Off Fall Time	t_f		-	26	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	-	-	9	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	-	-	18	
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=9A$	-	354	-	ns
Reverse Recovery Charge	Q_{rr}	$di_f/dt=100A/\mu s$ (Note 2)	-	4.3	-	μC

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. TO-252AA mounted on a 1 inch² with 2oz. square pad of copper.
6. $L=100\text{mH}, I_{AS}=1.4A, V_{DD}=50V, R_G=25\text{ohm}$, Starting $T_J=25^\circ\text{C}$.
7. Guaranteed by design, not subject to production testing.



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TYPICAL CHARACTERISTIC CURVES

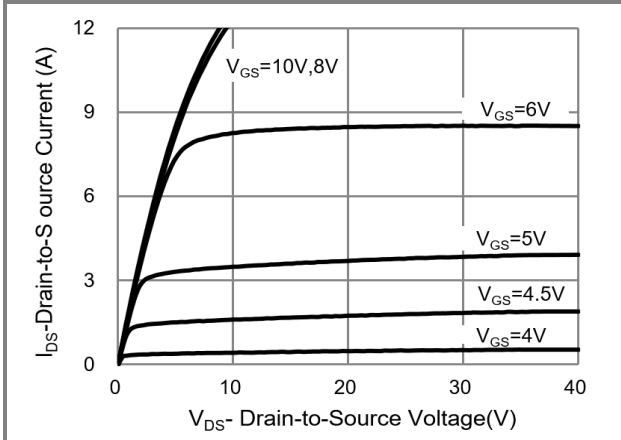


Fig.1 Output Characteristics

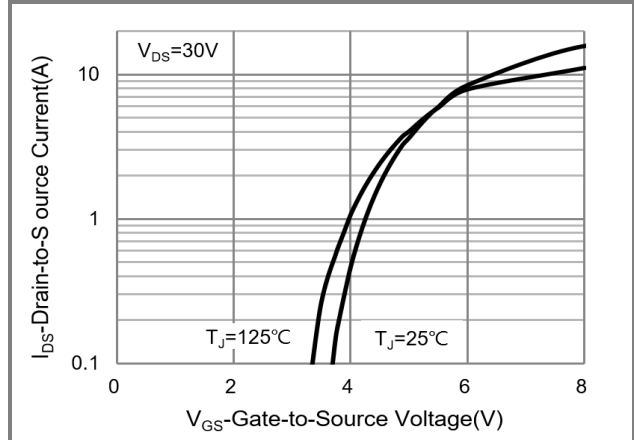


Fig.2 Transfer Characteristics

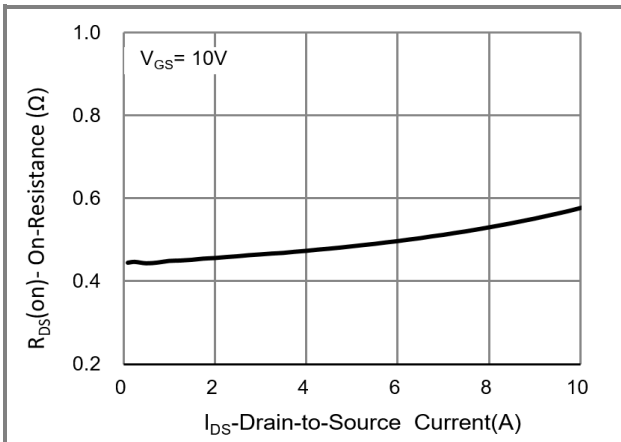


Fig.3 On-Resistance vs. Drain Current

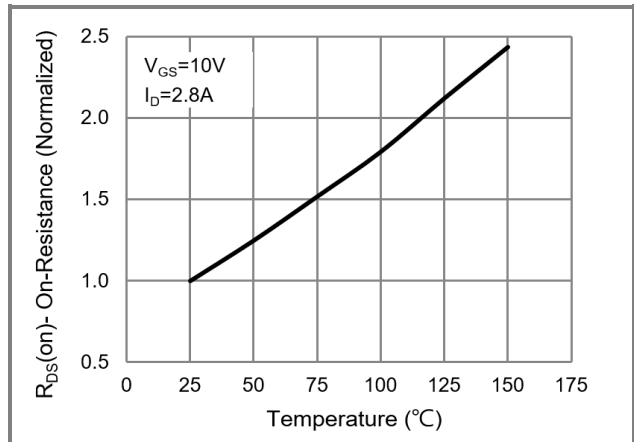


Fig.4 On-Resistance vs. Junction Temperature

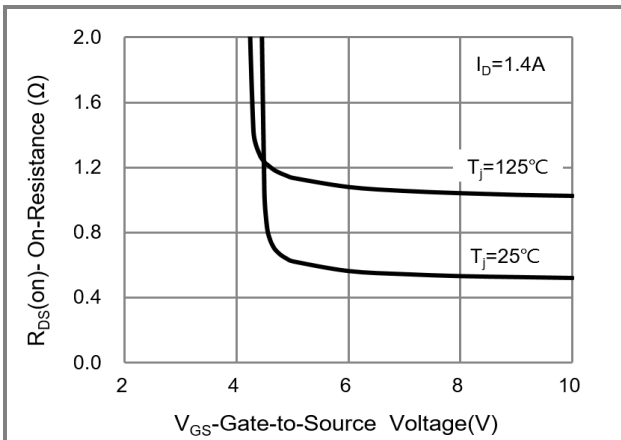


Fig.5 On-Resistance Variation with V_{GS}

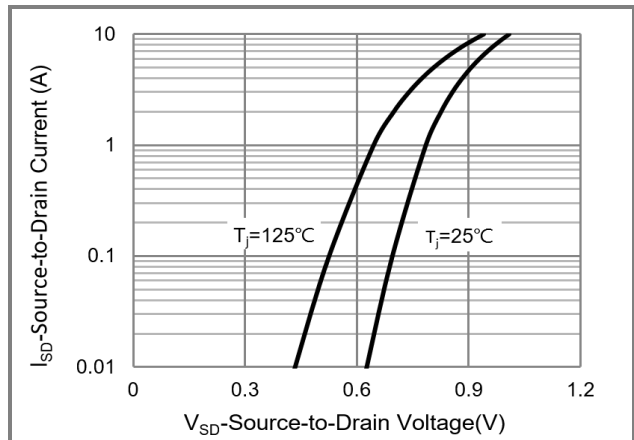


Fig.6 Source-Drain Diode Forward Voltage



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TYPICAL CHARACTERISTIC CURVES

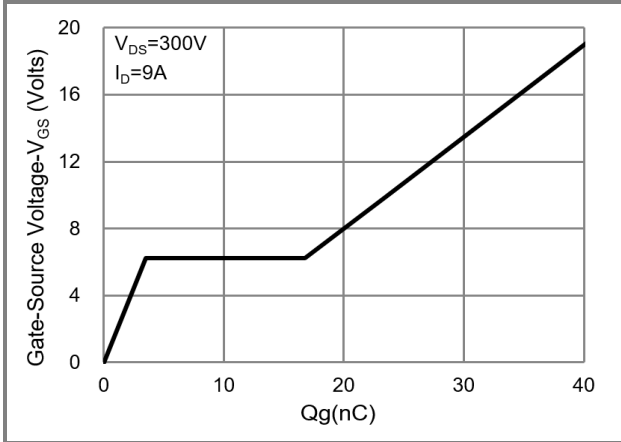


Fig.7 Gate-Charge Characteristics

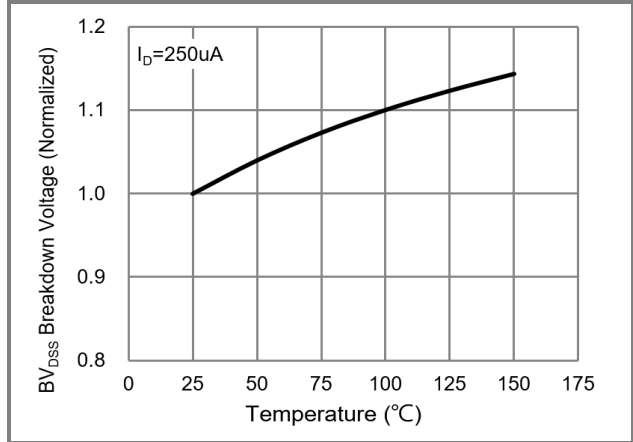


Fig.8 Breakdown Voltage Variation vs. Temperature

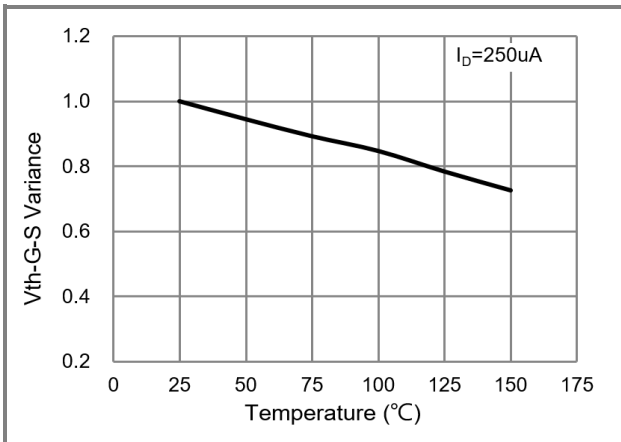


Fig.9 Threshold Voltage Variation with Temperature

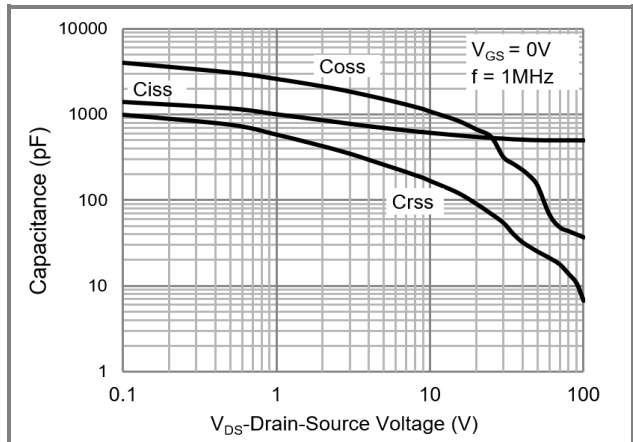


Fig.10 Capacitance vs. Drain-Source Voltage

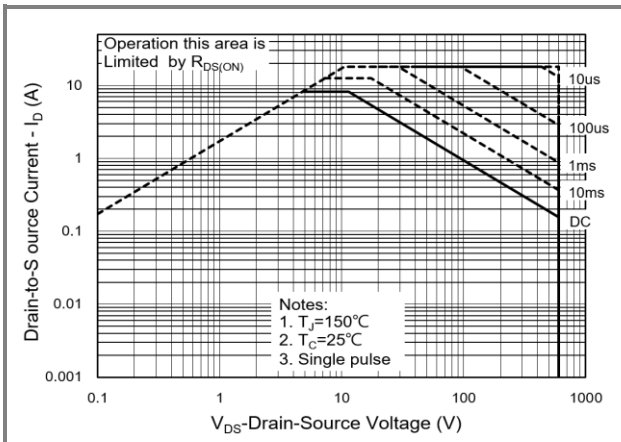


Fig.11 PJD Maximum Safe Operating Area

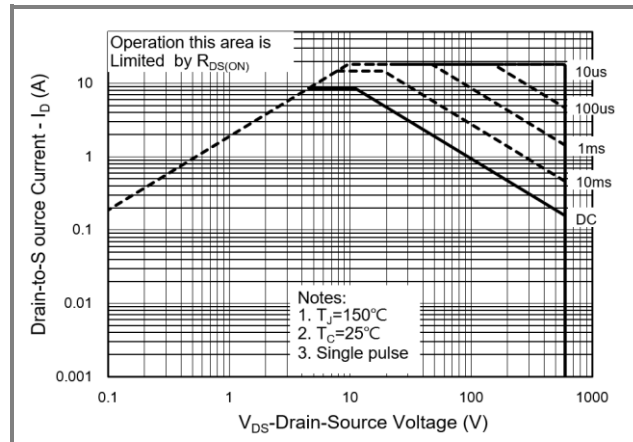


Fig.12 PJP Maximum Safe Operating Area



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TYPICAL CHARACTERISTIC CURVES

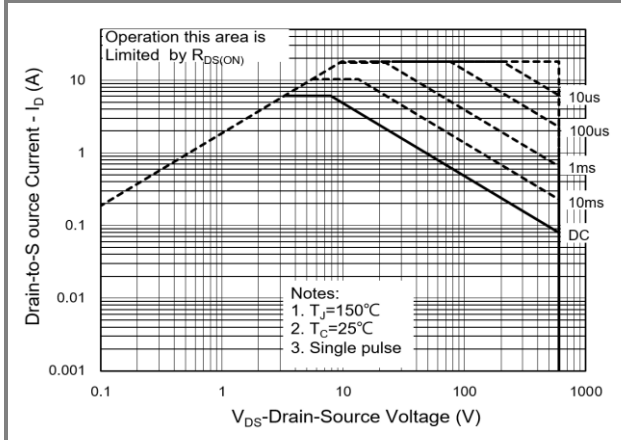


Fig.13 PJD Maximum Safe Operating Area

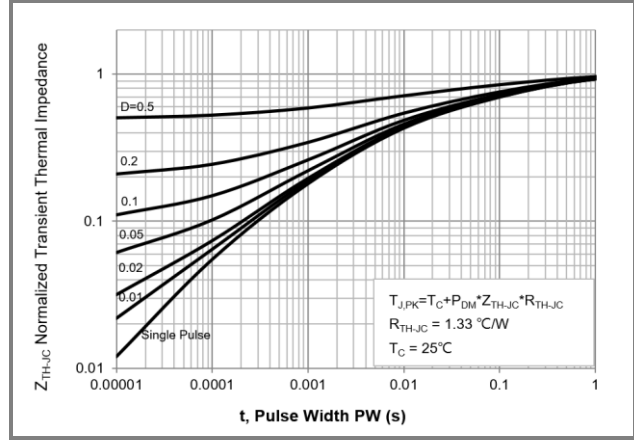


Fig.14 PJD Normalized Transient Thermal Impedance

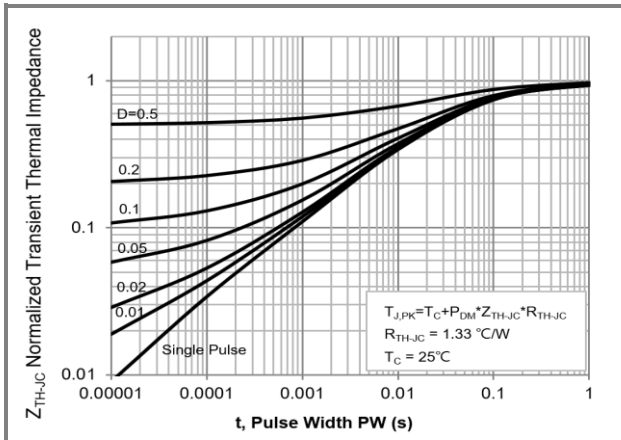


Fig.15 PJP Normalized Transient Thermal Impedance

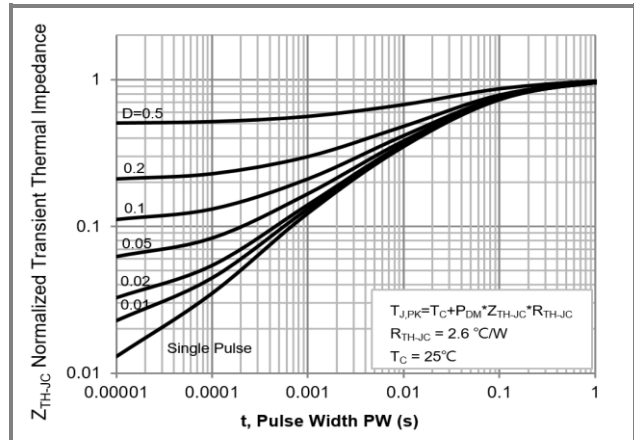


Fig.16 PJF Normalized Transient Thermal Impedance

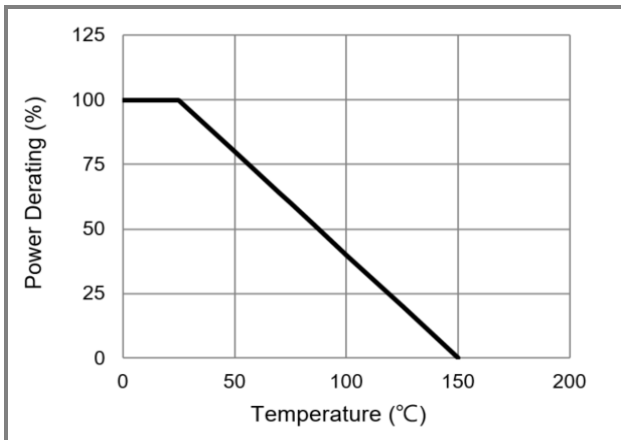
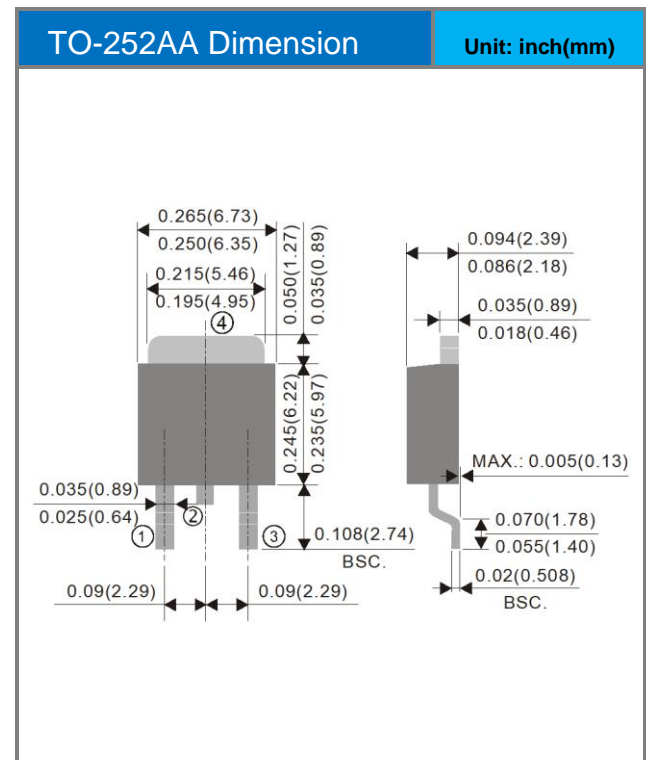
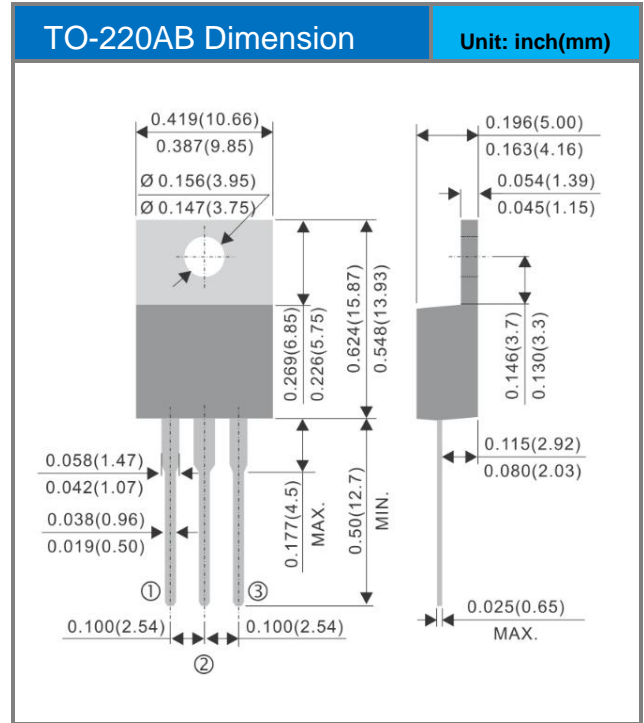
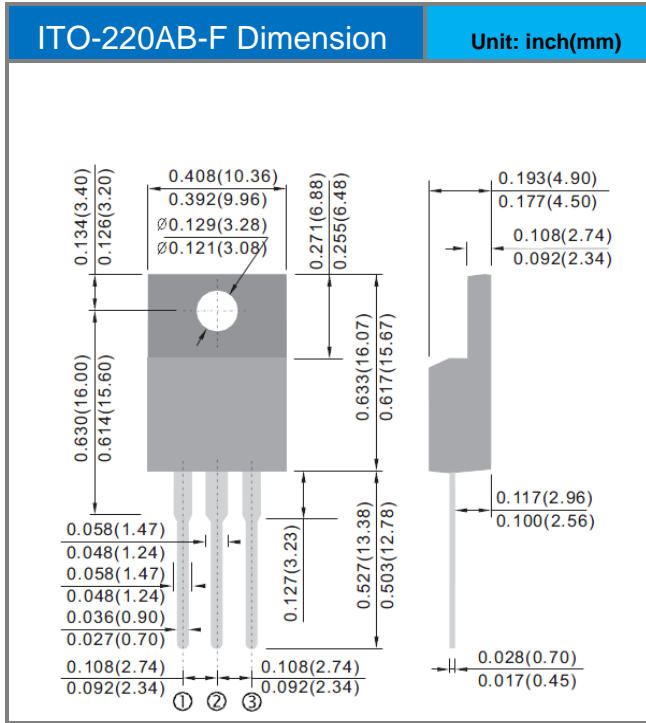


Fig.17 Total Power Dissipation



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Packaging Information





PJD60R540E / PJP60R540E / PJF60R540E

Part No Packing Code Version

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJD60R540E_L2_00001	TO-252AA	3,000pcs / 13" reel	60R540E	Halogen free
PJP60R540E_T0_00001	TO-220AB	50pcs / Tube	60R540E	Halogen free
PJF60R540E_T0_00001	ITO-220AB-F	50pcs / Tube	60R540E	Halogen free



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