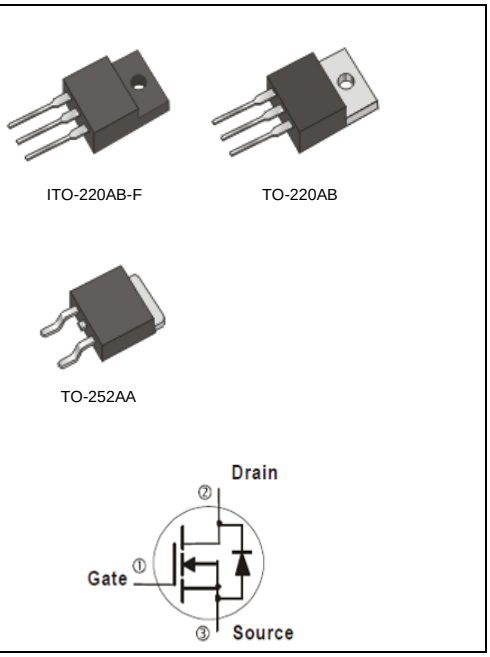
PJD60R390E / PJP60R390E / PJF60R390E

600V N-Channel Super Junction MOSFET

Voltage	600 V	Current	11 A



Features

- $R_{DS(ON)}$, V_{GS}@10V, I_D@3.8A<0.39Ω
- 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°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			V
Continuous Drain Current (Note 4)	T_C=25°C	I_D	11			A
	T_C=100°C		7.5			A
Pulsed Drain Current (Note 1)		I_{DM}	22			A
Power Dissipation (Note 3)	T_C=25°C	P_D	124	53	124	W
	T_C=100°C		0.99	0.424	0.99	W
Continuous Drain Current (Note 4)	T_A=25°C	I_D	1.5			A
	T_A=70°C		1.2			A
Power Dissipation	T_A=25°C	P_D	2	1.04	2	W
	T_A=70°C		1.3	0.9	1.3	W
Single Pulse Avalanche Energy (Note 5)		E_{AS}	162			mJ
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55~150			°C
Typical Thermal Resistance (Note 4,5)		$R_{\theta JC}$	1	2.36	1	°C/W
		$R_{\theta JA}$	62.5	120	62.5	°C/W

- Limited only By Maximum Junction Temperature

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Electrical Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2	3.1	4	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=3.8A	-	0.35	0.39	Ω
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Diode Forward Voltage	V_{SD}	I_S=11A, V_{GS}=0V	-	0.95	1.5	V
Transconductance	G_{FS}	V_{DS}=10V, I_D=5.5A	-	6	-	S
Dynamic (Note 7)						
Total Gate Charge	Q_g	V_{DS}=300V, I_D=11A, V_{GS}=10V (Note 2,3)	-	32	-	nC
Gate-Source Charge	Q_{gs}		-	4.6	-	
Gate-Drain Charge	Q_{gd}		-	17	-	
Gate Input Resistance	R_g	F = 1MHz	-	7.7	-	Ω
Input Capacitance	Ciss	V_{DS}=25V, V_{GS}=0V, f=1MHZ	-	531	-	pF
Output Capacitance	Coss		-	547	-	
Reverse Transfer Capacitance	Crss		-	69	-	
Turn-On Delay Time	$td_{(on)}$	V_{DD}=300V, I_D=5.5A, R_G=10Ω (Note 2,3)	-	12	-	ns
Turn-On Rise Time	t_r		-	27	-	
Turn-Off Delay Time	$td_{(off)}$		-	86	-	
Turn-Off Fall Time	t_f		-	27	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	-	-	11	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	-	-	22	
Reverse Recovery Time	trr	V_{GS}=0V, I_S=11A	-	389	-	ns
Reverse Recovery Charge	Qrr	dI_F/ dt=100A/us (Note 2)	-	5.43	-	uC

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 $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J =25°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=100mH, I_{AS}=1.8A, V_{DD}=50V, R_G=25 ohm, Starting T_J=25°C.
7. Guaranteed by design, not subject to production testing.

PJD60R390E / PJP60R390E / PJF60R390E

TYPICAL CHARACTERISTIC CURVES

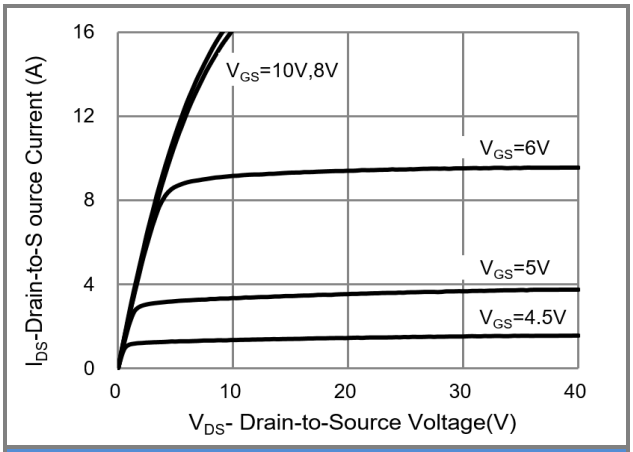


Fig.1 Output Characteristics

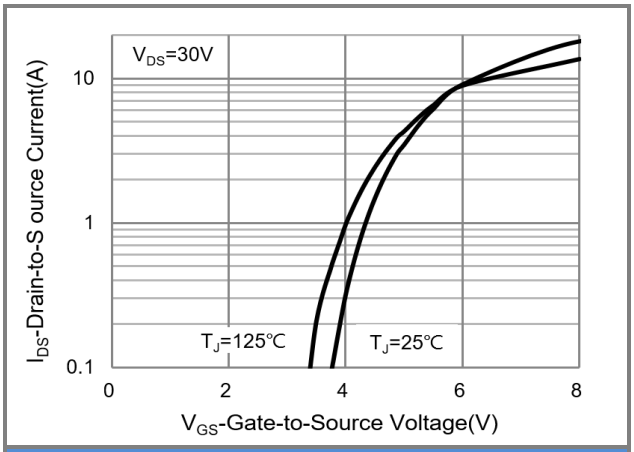


Fig.2 Transfer Characteristics

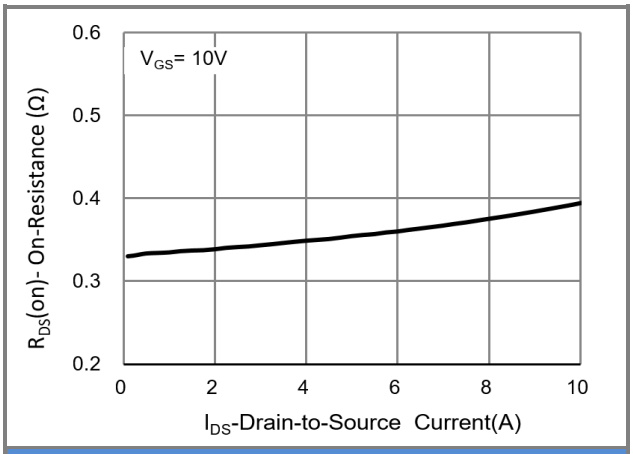


Fig.3 On-Resistance vs. Drain Current

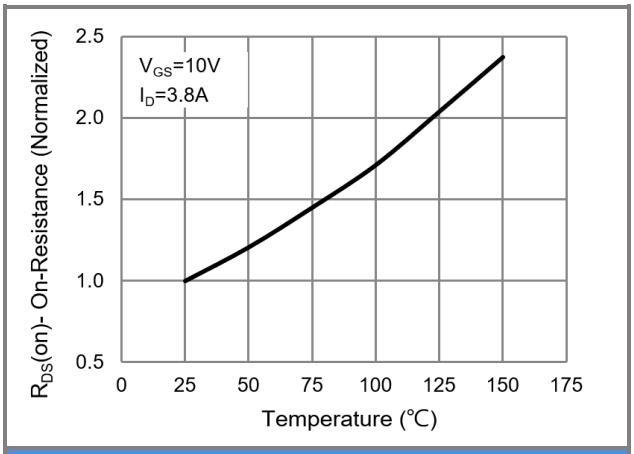


Fig.4 On-Resistance vs. Junction Temperature

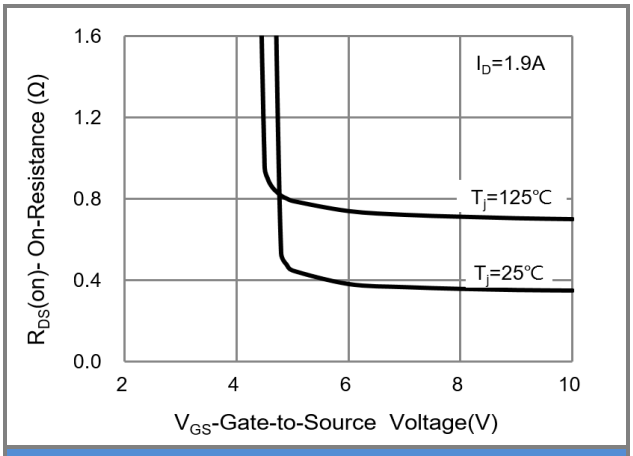


Fig.5 On-Resistance Variation with V_{GS}

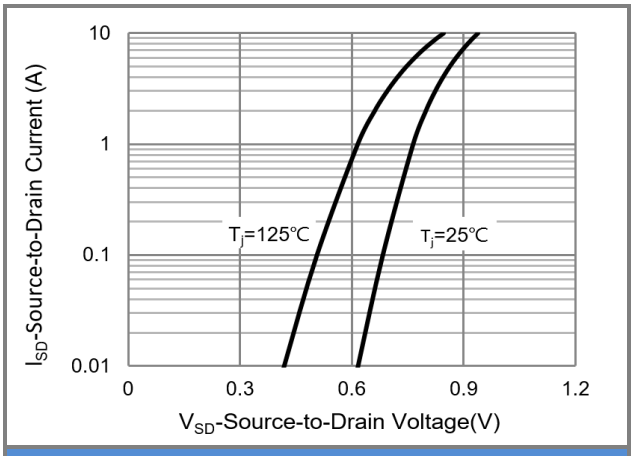


Fig.6 Source-Drain Diode Forward Voltage

PJD60R390E / PJP60R390E / PJF60R390E

TYPICAL CHARACTERISTIC CURVES

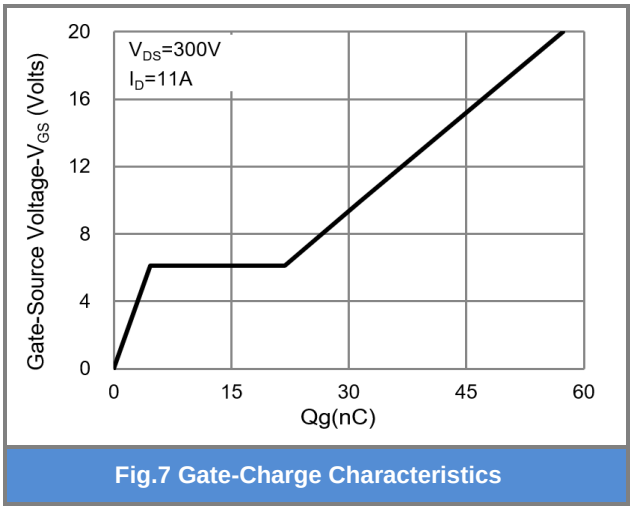


Fig.7 Gate-Charge Characteristics

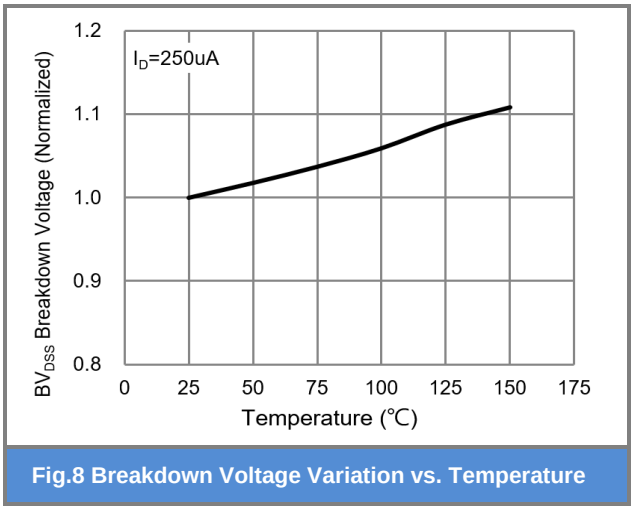


Fig.8 Breakdown Voltage Variation vs. Temperature

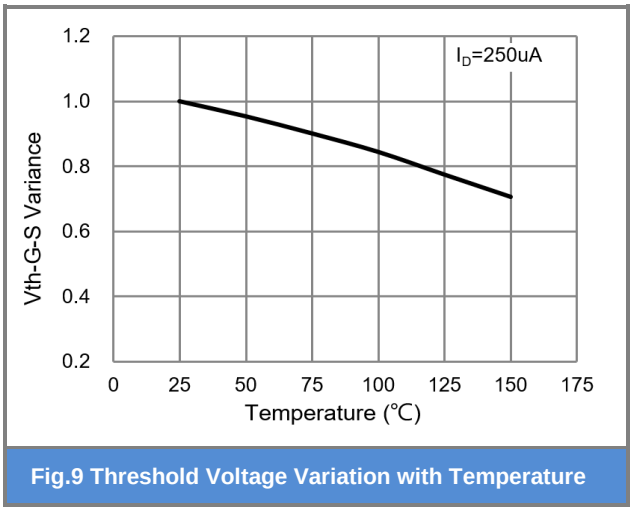


Fig.9 Threshold Voltage Variation with Temperature

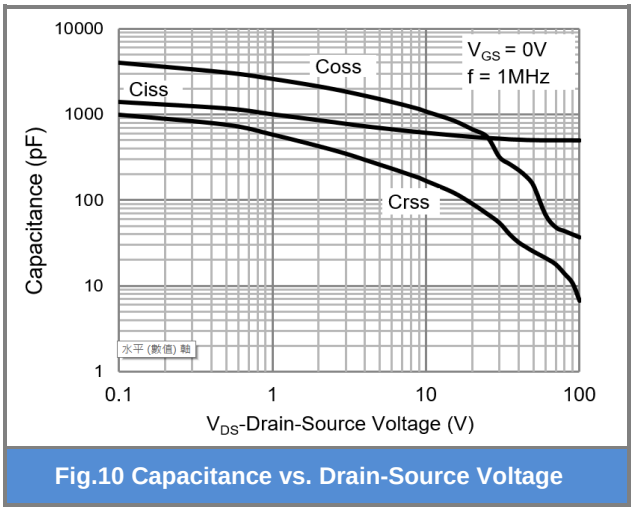


Fig.10 Capacitance vs. Drain-Source Voltage

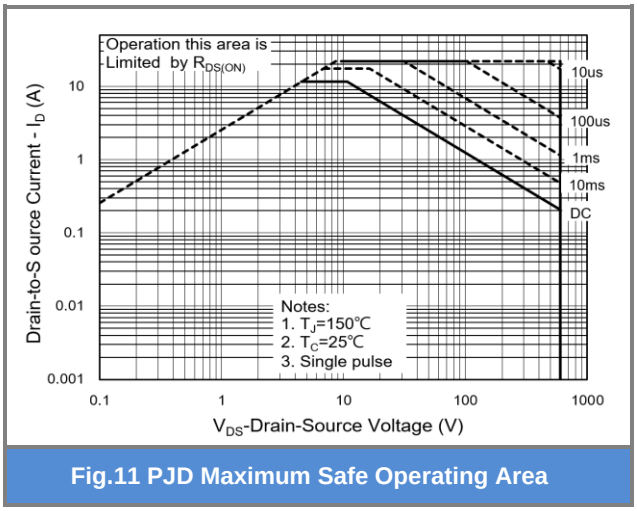


Fig.11 PJD Maximum Safe Operating Area

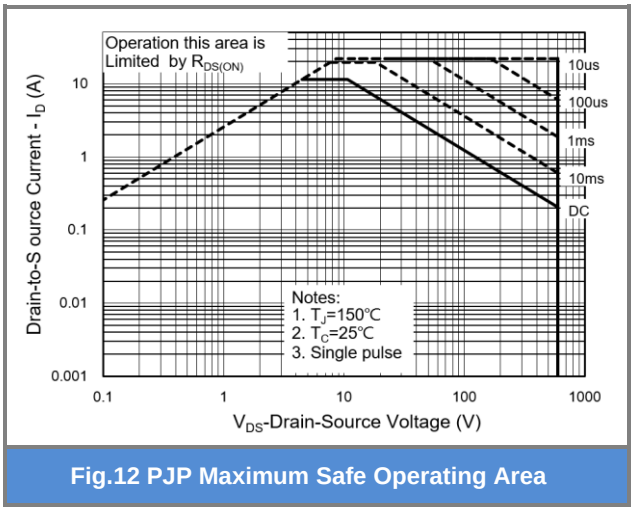


Fig.12 PJP Maximum Safe Operating Area

PJD60R390E / PJP60R390E / PJF60R390E

TYPICAL CHARACTERISTIC CURVES

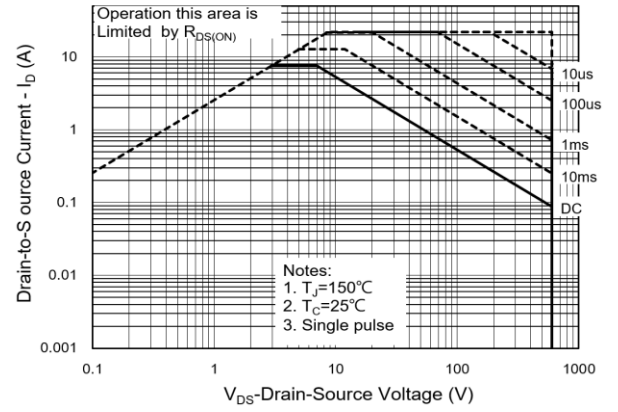


Fig.13 PJF Maximum Safe Operating Area

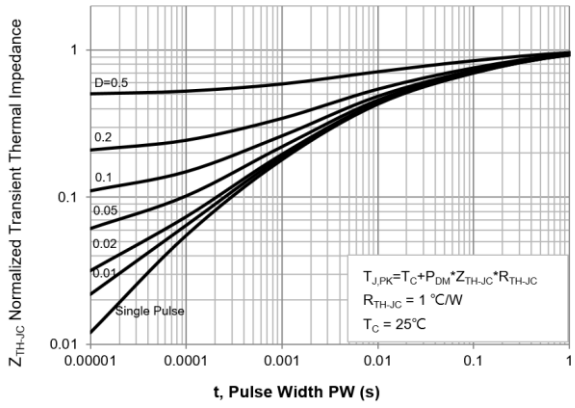


Fig.14 PJD Normalized Transient Thermal Impedance

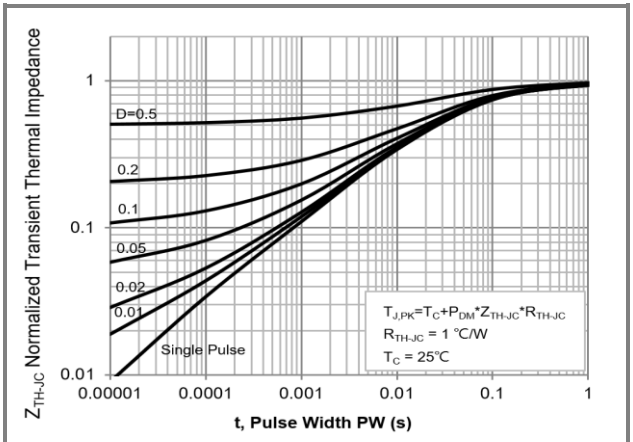


Fig.15 PJP Normalized Transient Thermal Impedance

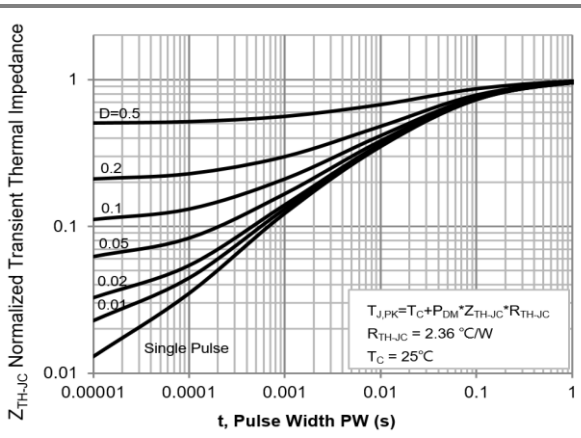


Fig.16 PJF Normalized Transient Thermal Impedance

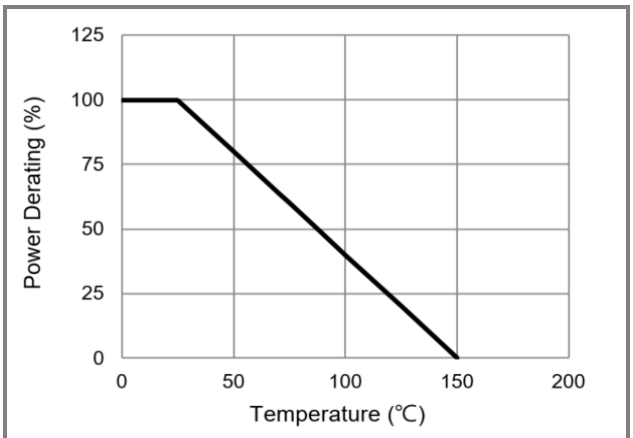


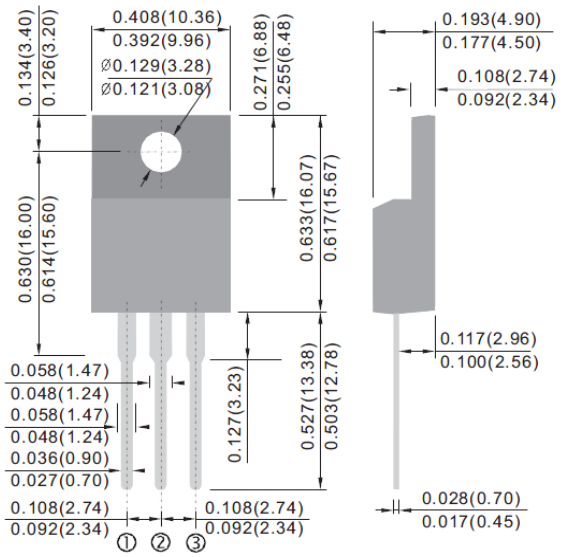
Fig.17 Total Power Dissipation

PJD60R390E / PJP60R390E / PJF60R390E

Packaging Information

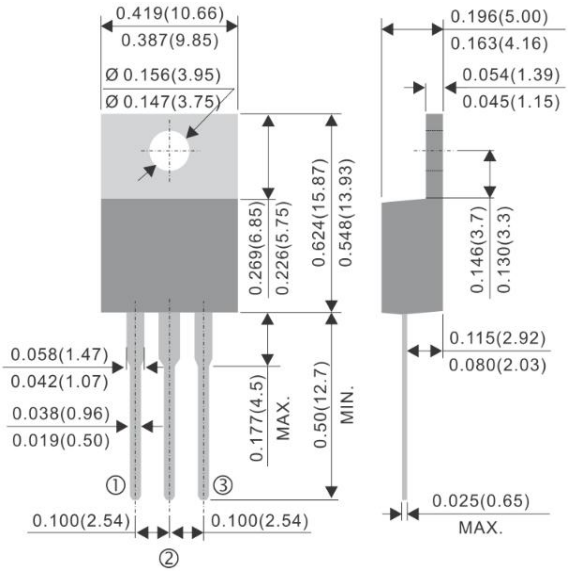
ITO-220AB-F Dimension

Unit: inch(mm)



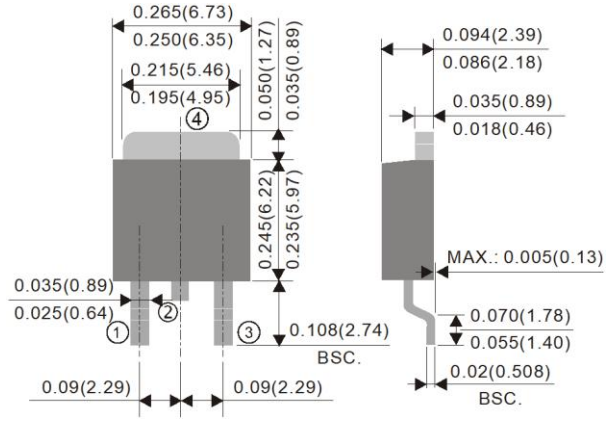
TO-220AB Dimension

Unit: inch(mm)



TO-252AA Dimension

Unit: inch(mm)



PJD60R390E / PJP60R390E / PJF60R390E

Part No Packing Code Version

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJD60R390E_L2_00001	TO-252AA	3,000pcs / 13” reel	60R390E	Halogen free
PJP60R390E_T0_00001	TO-220AB	50pcs / Tube	60R390E	Halogen free
PJF60R390E_T0_00001	ITO-220AB-F	50pcs / Tube	60R390E	Halogen free

PJD60R390E / PJP60R390E / PJF60R390E

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