



## PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

### 650V N-Channel MOSFET

**Voltage**

**650 V**

**Current**

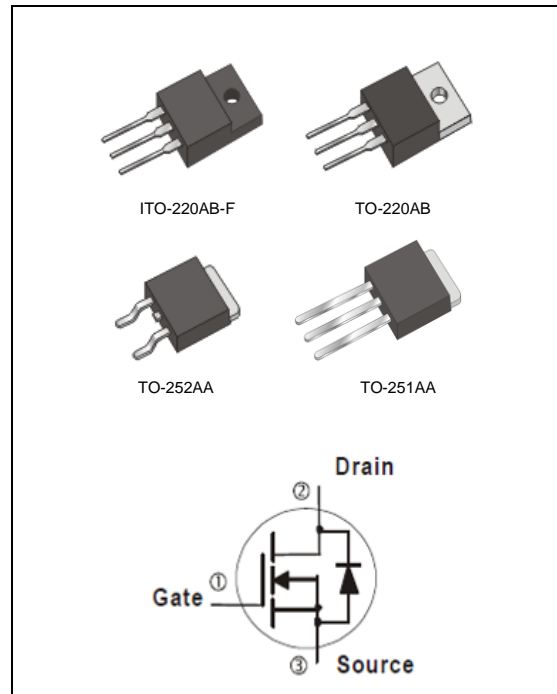
**7 A**

#### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@3.5A < 1.5\Omega$
- High switching speed
- Improved dv/dt capability
- Low Gate Charge
- 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	
		TO-251AA-1					
Drain-Source Voltage	$V_{DS}$	650				V	
Gate-Source Voltage	$V_{GS}$	$\pm 30$					
Continuous Drain Current <sup>(Note 4)</sup>	$I_D$	7				A	
Pulsed Drain Current	$I_{DM}$	28					
Single Pulse Avalanche Energy <sup>(Note 1)</sup>	$E_{AS}$	435				mJ	
Power Dissipation	$T_C=25^\circ\text{C}$	$P_D$	140	145	46	140	W
	Derate above $25^\circ\text{C}$		1.12	1.16	0.37	1.12	W/ $^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150				$^\circ\text{C}$	
Typical Thermal Resistance <sup>(Note 4)</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



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### 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	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.88	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3.5A$	-	1.35	1.5	$\Omega$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
Diode Forward Voltage	$V_{SD}$	$I_S=7A, V_{GS}=0V$	-	0.88	1.4	V
<b>Dynamic</b> (Note 5)						
Total Gate Charge	$Q_g$	$V_{DS}=520V, I_D=7A,$ $V_{GS}=10V$ (Note 2,3)	-	16.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	5	-	
Gate-Drain Charge	$Q_{gd}$		-	6	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$	-	754	-	pF
Output Capacitance	$C_{oss}$		-	97	-	
Reverse Transfer Capacitance	$C_{rss}$		-	0.8	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=325V, I_D=7A,$ $R_G=25\Omega$ (Note 2,3)	-	14	-	ns
Turn-On Rise Time	$t_r$		-	28	-	
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	
Turn-Off Fall Time	$t_f$		-	28	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$	---	-	-	7	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	---	-	-	28	A
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=7A$	-	493	-	ns
Reverse Recovery Charge	$Q_{rr}$	$di_F/dt=100A/\mu s$ (Note 2)	-	2.99	-	$\mu C$

**NOTES :**

1.  $L=30\text{mH}, I_{AS}=5.25A, V_{DD}=50V, R_G=25\text{ohm}$ , Starting  $T_J=25^\circ\text{C}$ .
2. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature typical characteristics.
4. The maximum current rating is package limited.
5. Guaranteed by design, not subject to production testing.



# PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

## TYPICAL CHARACTERISTIC CURVES

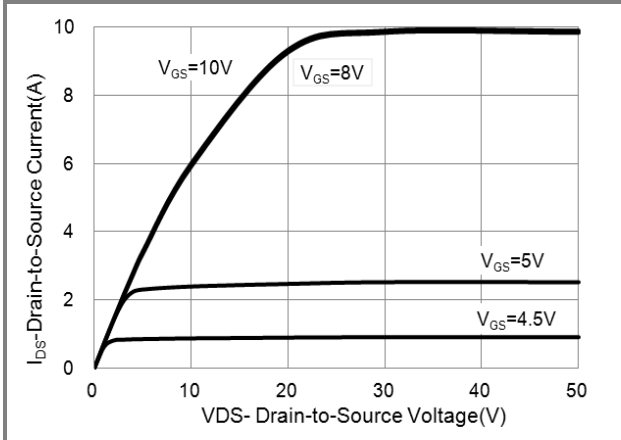


Fig.1 Output Characteristics

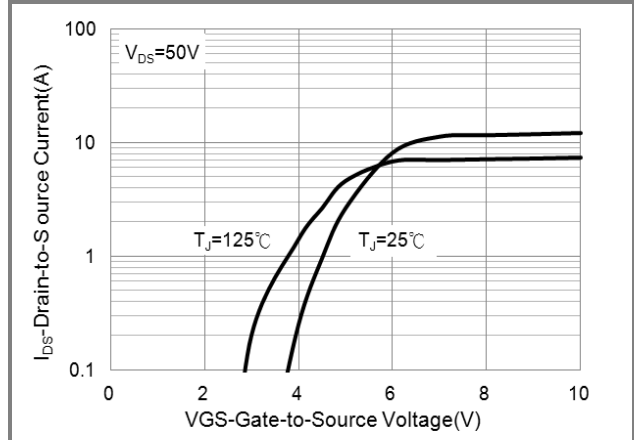


Fig.2 Transfer Characteristics

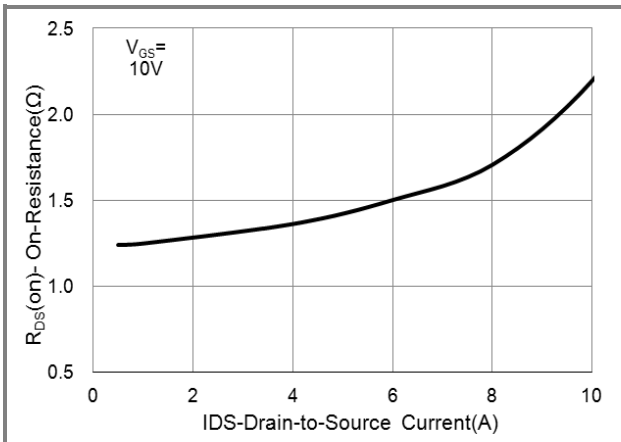


Fig.3 On-Resistance vs. Drain Current

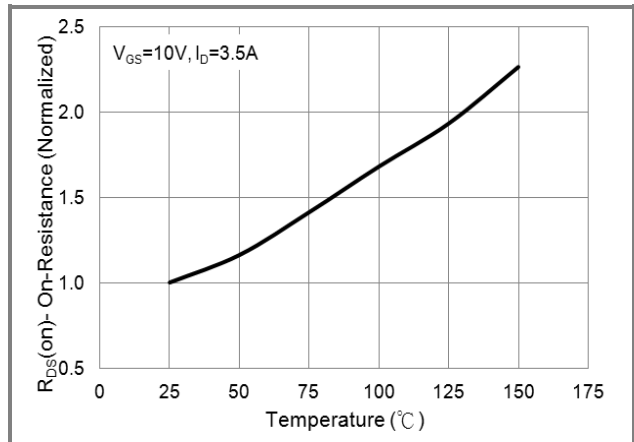


Fig.4 Resistance vs. Junction Temperature

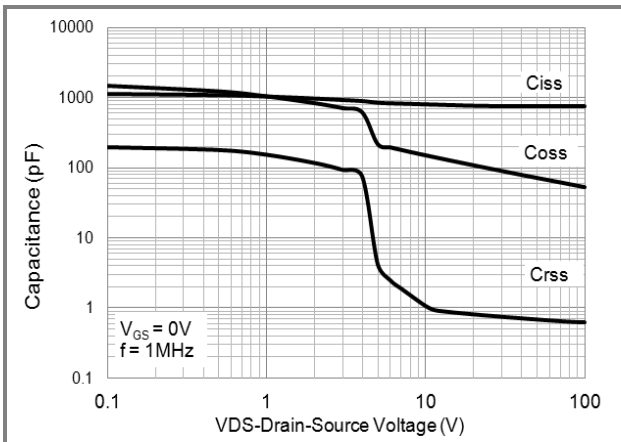


Fig.5 Capacitance vs. Drain-Source Voltage

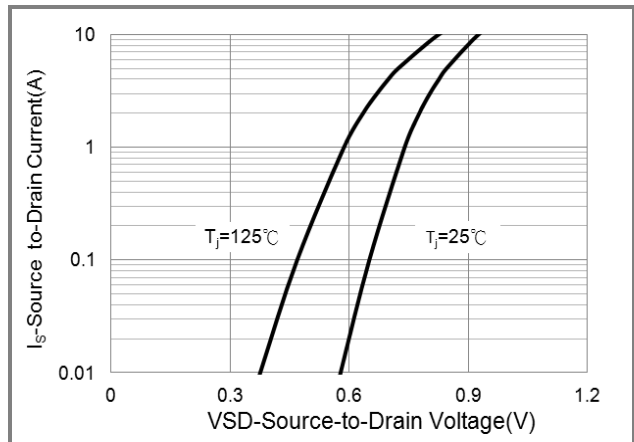


Fig.6 Source-Drain Diode Forward Voltage



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## TYPICAL CHARACTERISTIC CURVES

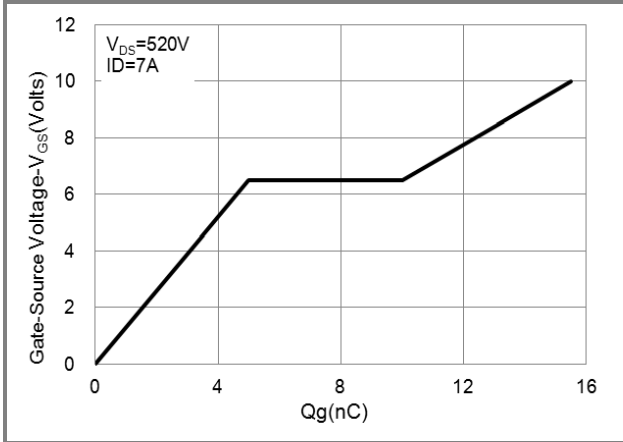


Fig.7 Gate Charge

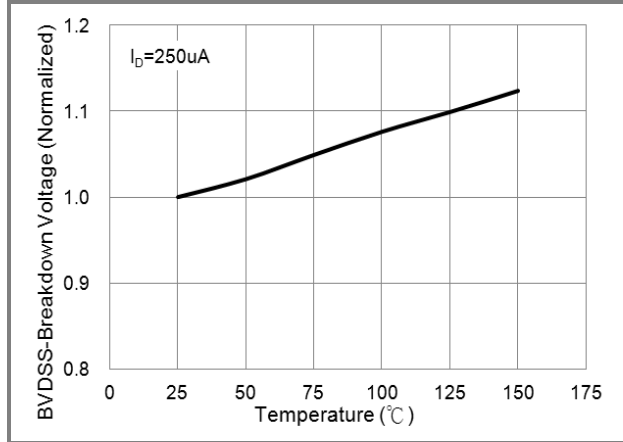


Fig.8 BV<sub>DSS</sub> vs. Junction Temperature On-

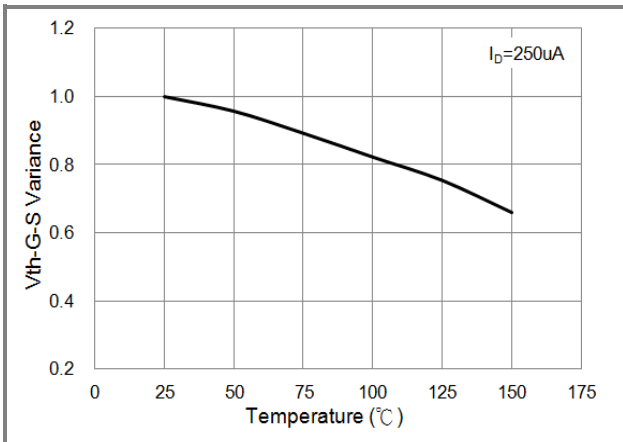


Fig.9 Threshold Voltage Variation with Temperature

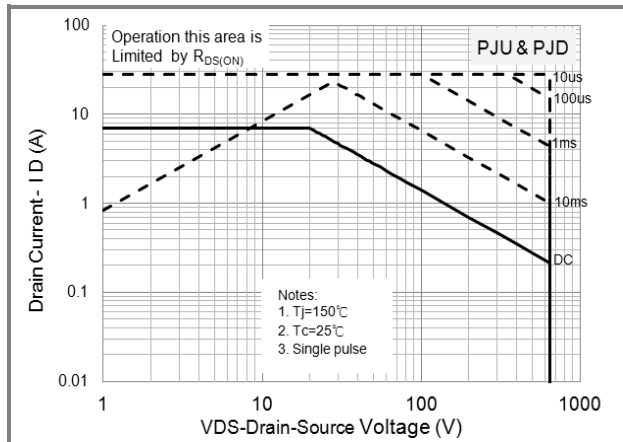


Fig.10 Maximum Safe Operating Area

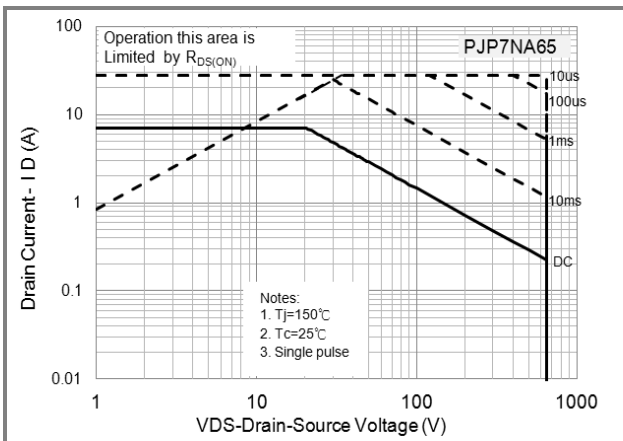


Fig.11 Maximum Safe Operating Area

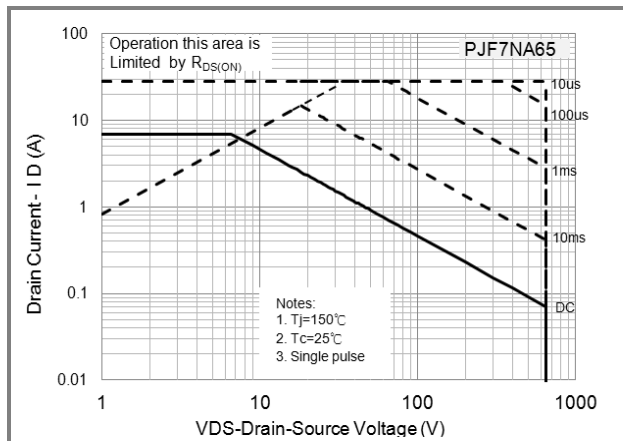


Fig.12 Maximum Safe Operating Area



# PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

## TYPICAL CHARACTERISTIC CURVES

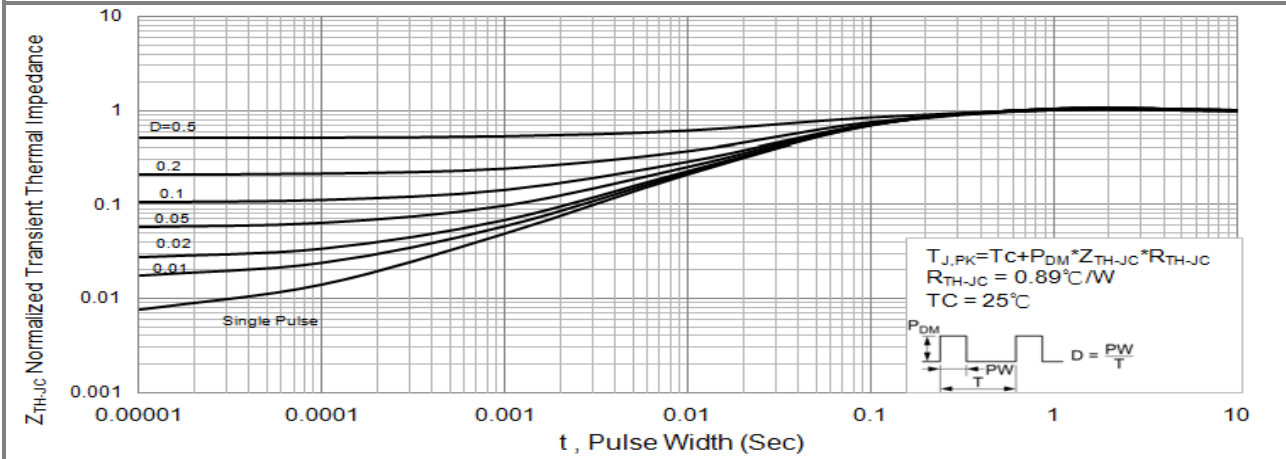


Fig.13 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

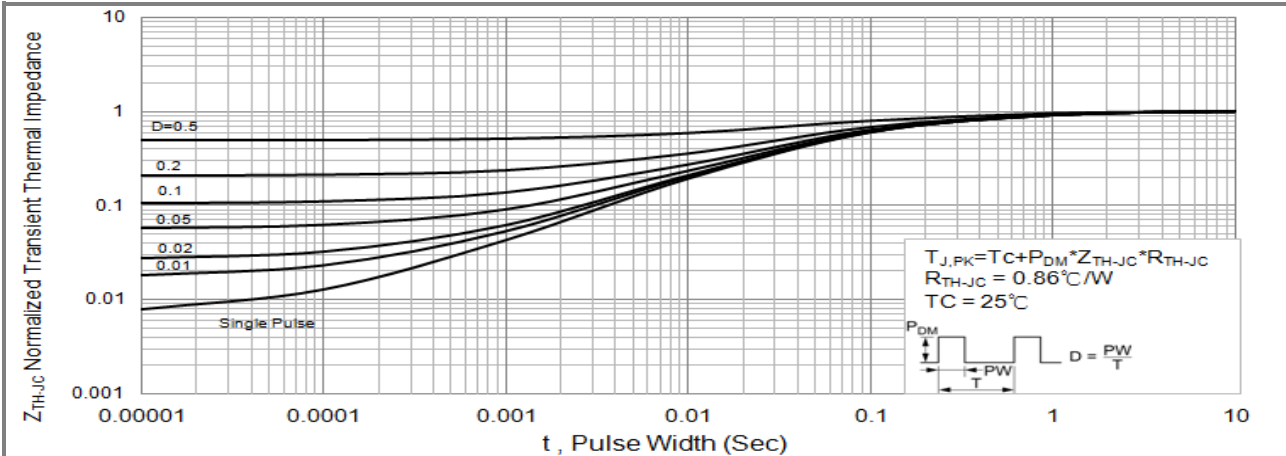


Fig.14 PJP7NA65 Normalized Transient Thermal Impedance vs. Pulse Width

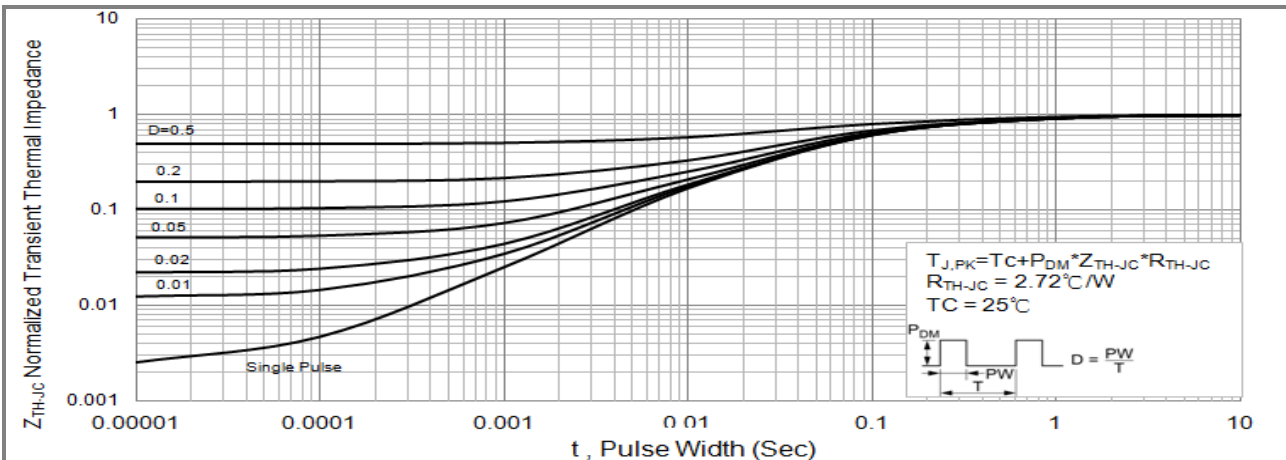


Fig.15 PJF7NA65 Normalized Transient Thermal Impedance vs. Pulse Width

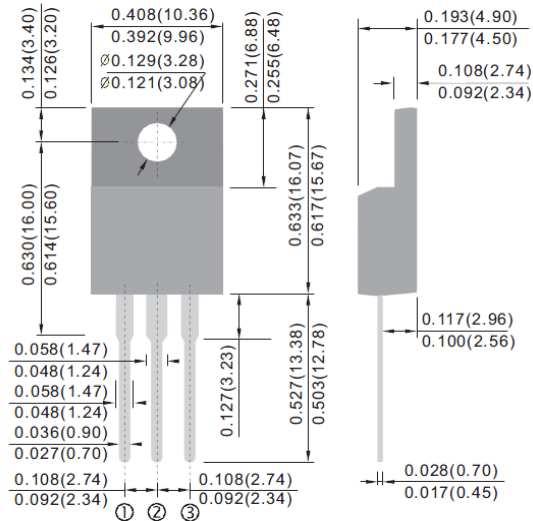


# PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

## Packaging Information

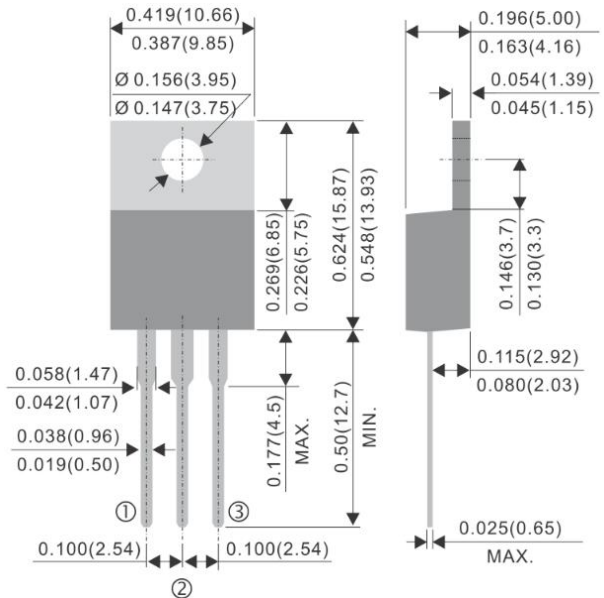
**ITO-220AB-F Dimension**

Unit: inch(mm)



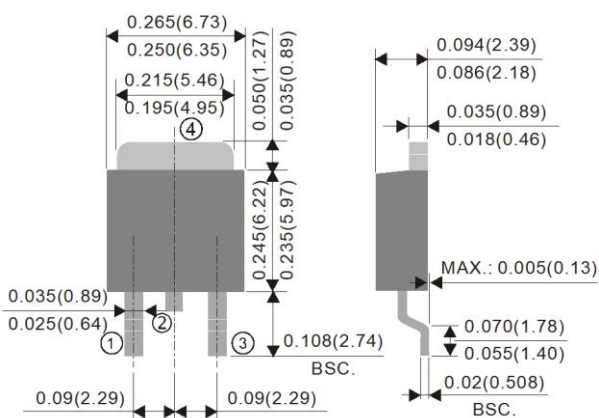
**TO-220AB Dimension**

Unit: inch(mm)



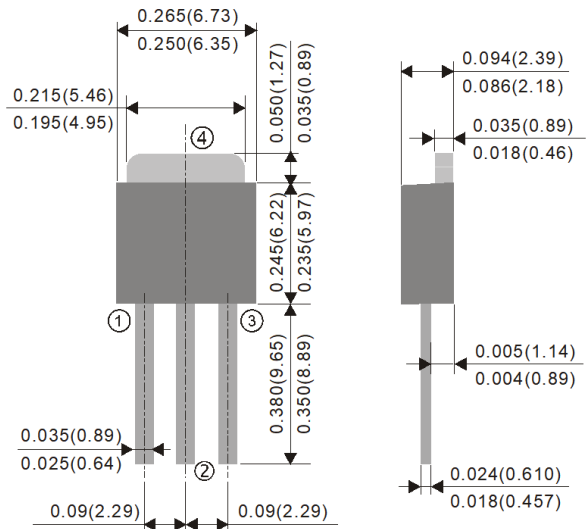
**TO-252AA Dimension**

Unit: inch(mm)



**TO-251AA Dimension**

Unit: inch(mm)



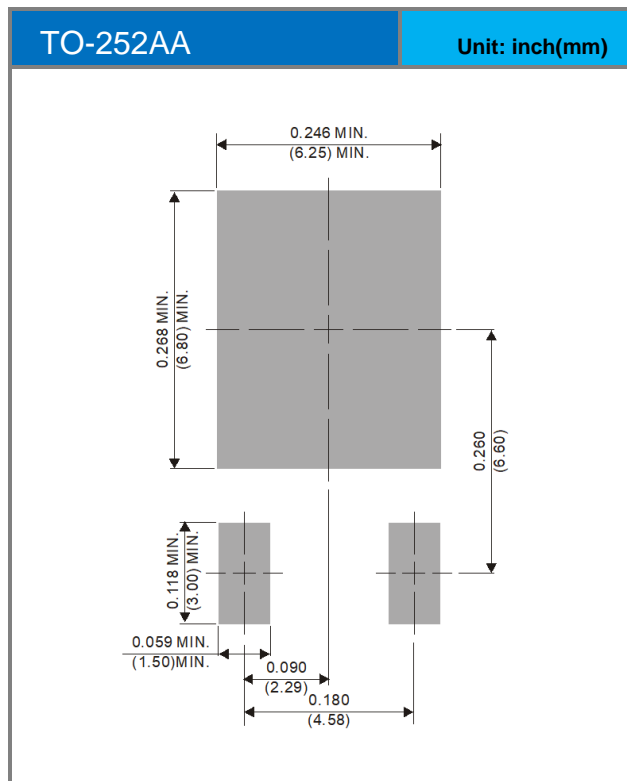


## PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

### Part No Packing Code Version

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJU7NA65_T0_00001	TO-251AA	80pcs / Tube	U7NA65	Halogen free
PJD7NA65_L2_00001	TO-252AA	3,000pcs / 13" reel	D7NA65	Halogen free
PJP7NA65_T0_00001	TO-220AB	50pcs / Tube	P7NA65	Halogen free
PJF7NA65_T0_00001	ITO-220AB-F	50pcs / Tube	F7NA65	Halogen free

### Mounting Pad Layout





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