



## PJU8NA65A / PJD8NA65A / PJP8NA65A / PJF8NA65A

### 650V N-Channel MOSFET

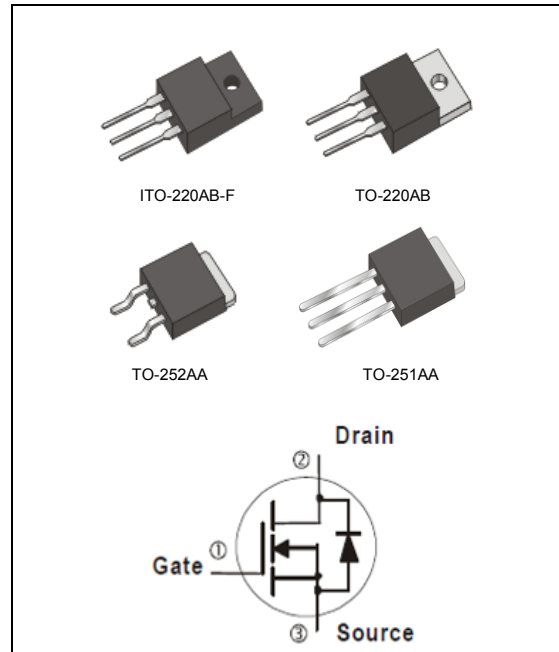
**Voltage** **650 V** **Current** **7.5 A**

#### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V, I_D@3.75A < 1.2\Omega$
- High switching speed
- Improved dv/dt capability
- Low Gate Charge
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2011/65/EU directive.
- Green molding compound as per IEC61249 Std. (Halogen Free)

#### Mechanical Data

- Case: TO-251AA, TO-252AA, TO-220AB, ITO-220AB-F Package
- Terminals : Solderable per MIL-STD-750, Method 2026



### 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		$V_{DS}$	650				V
Gate-Source Voltage		$V_{GS}$	+30				V
Continuous Drain Current		$I_D$	7.5				A
Pulsed Drain Current		$I_{DM}$	30				A
Single Pulse Avalanche Energy <sup>(Note 1)</sup>		$E_{AS}$	245				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							
- 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	2.89	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3.75A$	-	0.91	1.2	$\Omega$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	1.0	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
Diode Forward Voltage	$V_{SD}$	$I_S=7.5A, V_{GS}=0V$	-	0.9	1.4	V
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$Q_g$	$V_{DS}=520V, I_D=7.5A,$ $V_{GS}=10V$ (Note 2,3)	-	29	-	nC
Gate-Source Charge	$Q_{gs}$		-	5.5	-	
Gate-Drain Charge	$Q_{gd}$		-	9.7	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHZ}$	-	1245	-	pF
Output Capacitance	$C_{oss}$		-	105	-	
Reverse Transfer Capacitance	$C_{rss}$		-	50	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=325V, I_D=7.5A,$ $R_G=25\Omega$ (Note 2,3)	-	15	-	ns
Turn-On Rise Time	$t_r$		-	27	-	
Turn-Off Delay Time	$t_{d(off)}$		-	92	-	
Turn-Off Fall Time	$t_f$		-	36	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$	---	-	-	7.5	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	---	-	-	30	A
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=7.5A$	-	360	-	ns
Reverse Recovery Charge	$Q_{rr}$	$di_F/dt=100A/\mu s$ (Note 2)	-	3.31	-	$\mu C$

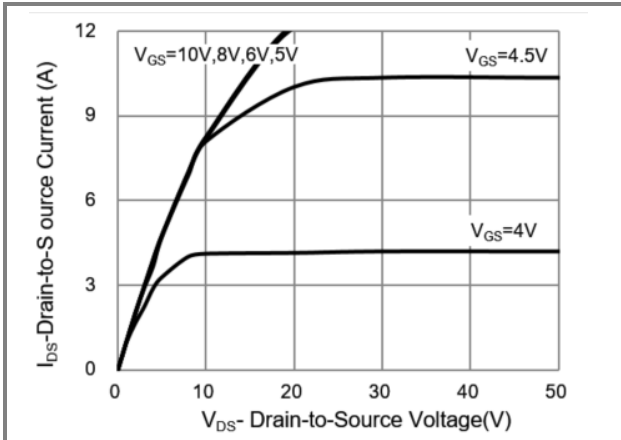
NOTES :

1.  $L=10\text{mH}, I_{AS}=7A, V_{DD}=50V, R_G=25\text{ohm},$  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. Guaranteed by design, not subject to production testing

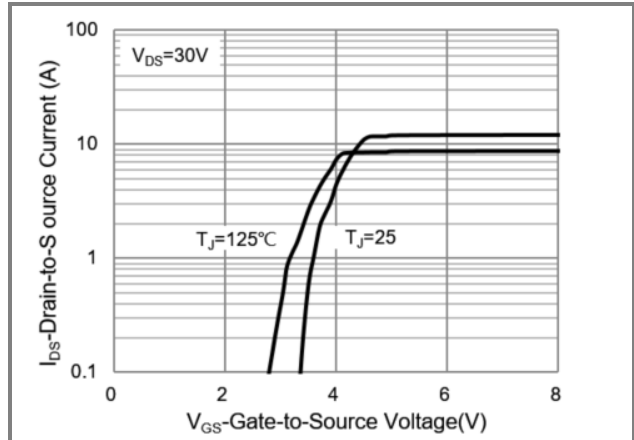


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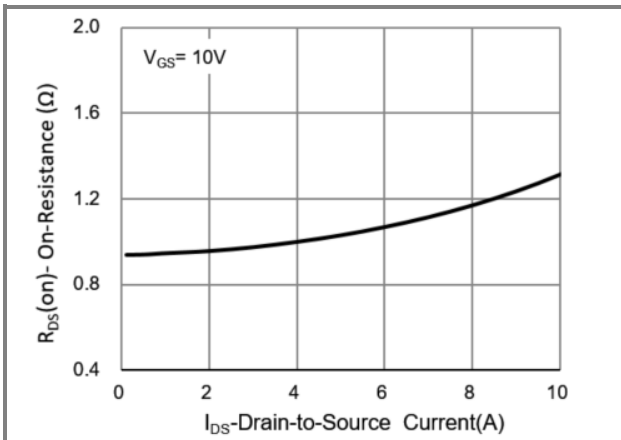
**TYPICAL CHARACTERISTIC CURVES**



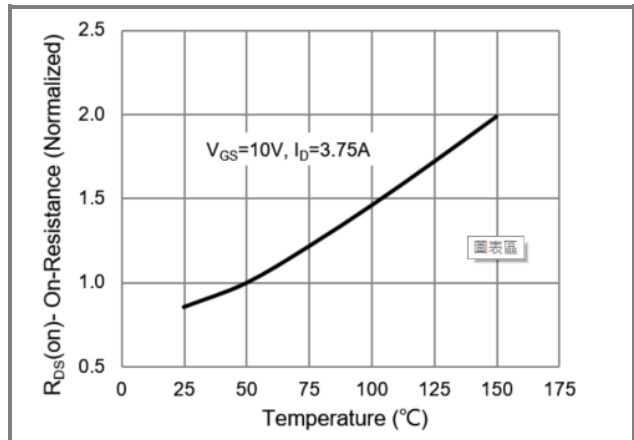
**Fig.1 Output Characteristics**



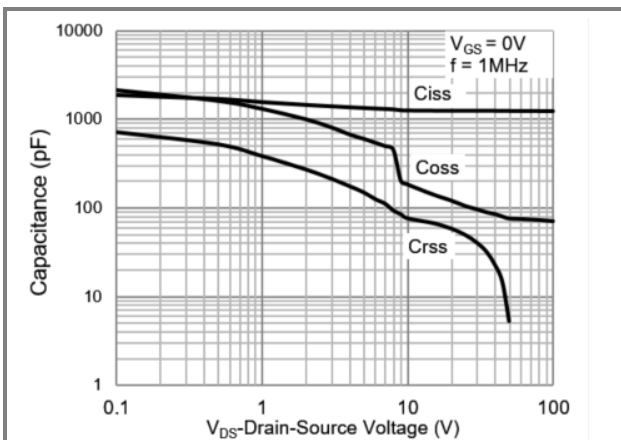
**Fig.2 Transfer Characteristics**



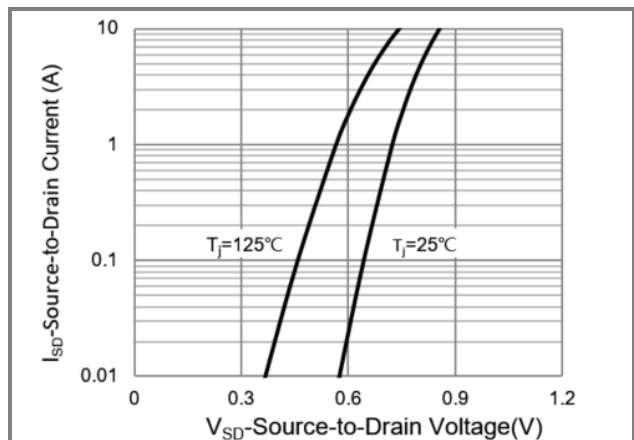
**Fig.3 On-Resistance vs. Drain Current**



**Fig.4 Resistance vs. Junction Temperature**



**Fig.5 Capacitance vs. Drain-Source Voltage**

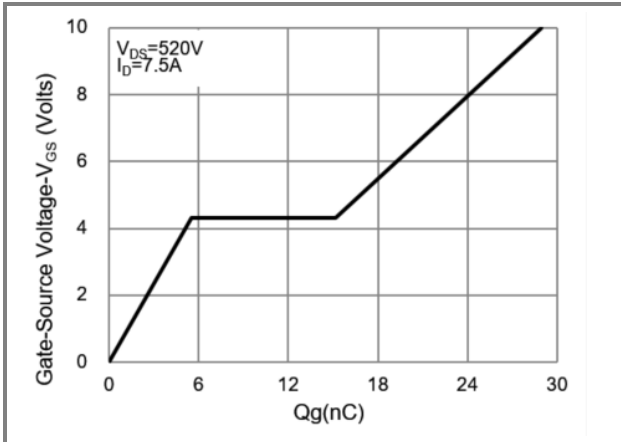


**Fig.6 Source-Drain Diode Forward Voltage**

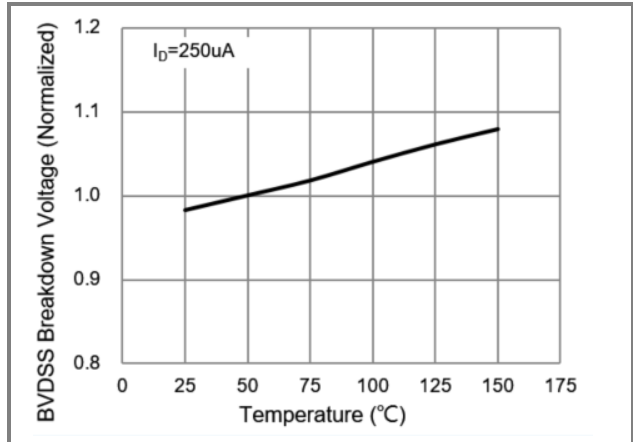


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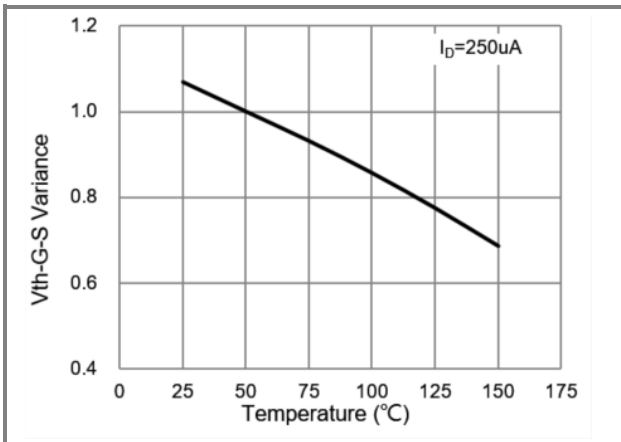
**TYPICAL CHARACTERISTIC CURVES**



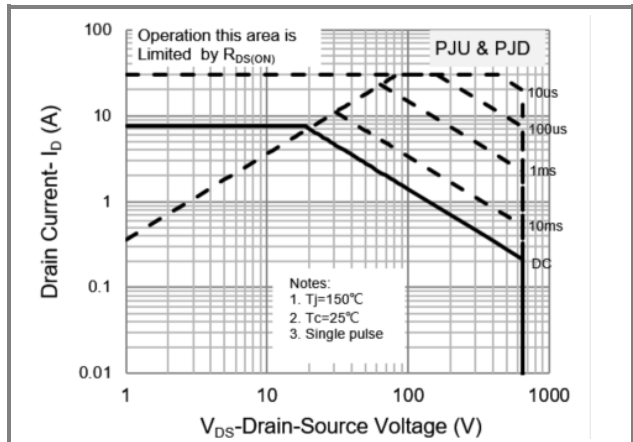
**Fig.7 Gate Charge**



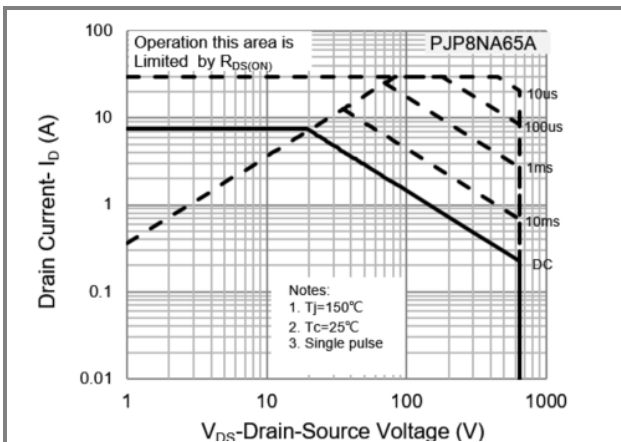
**Fig.8 BV<sub>DSS</sub> vs. Junction Temperature On-**



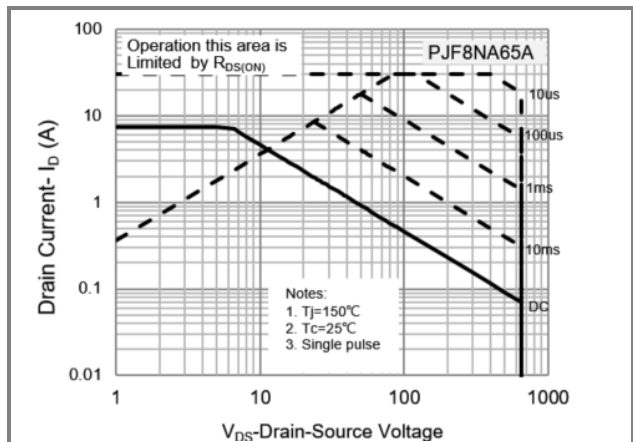
**Fig.9 Threshold Voltage Variation with Temperature**



**Fig.10 Maximum Safe Operating Area**



**Fig.11 Maximum Safe Operating Area**



**Fig.12 Maximum Safe Operating Area**



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**TYPICAL CHARACTERISTIC CURVES**

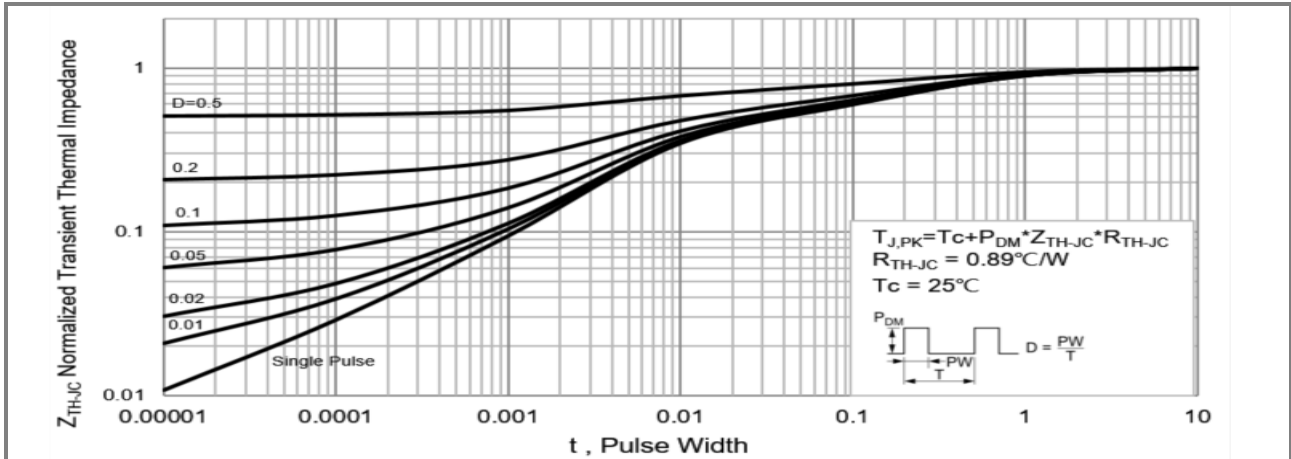


Fig.13 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

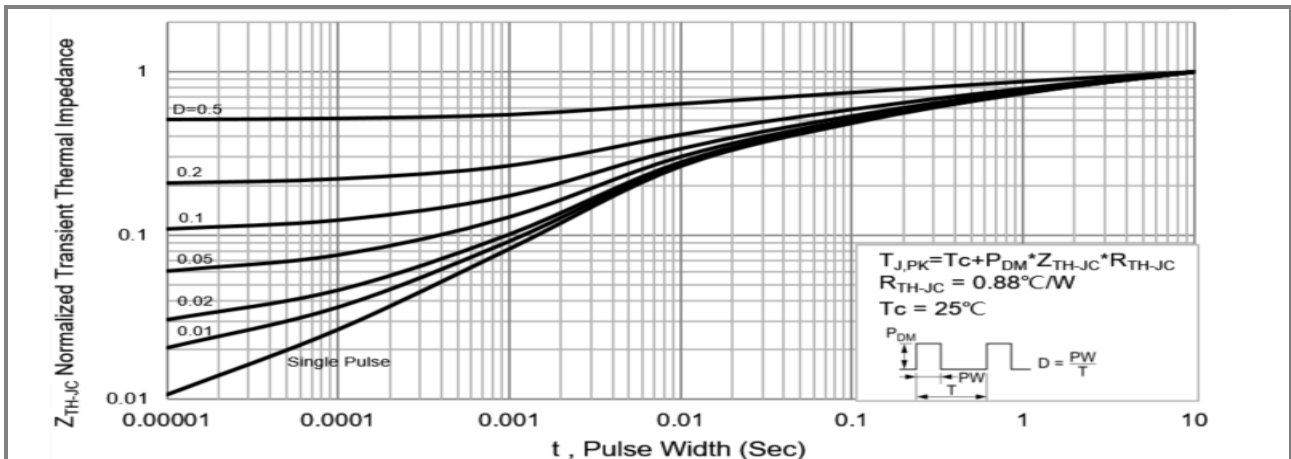


Fig.14 PJP8NA65A Normalized Transient Thermal Impedance vs. Pulse Width

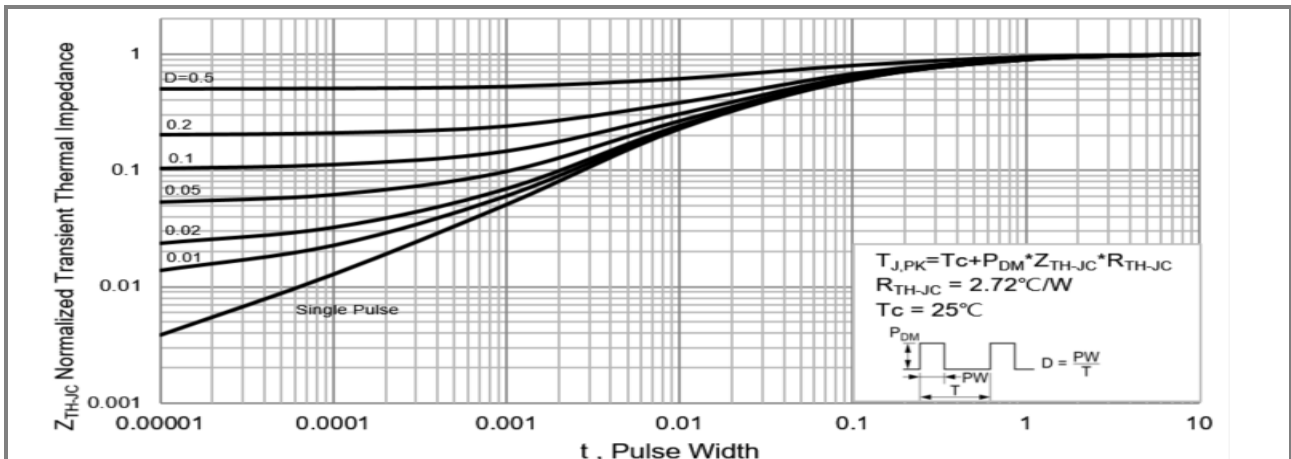
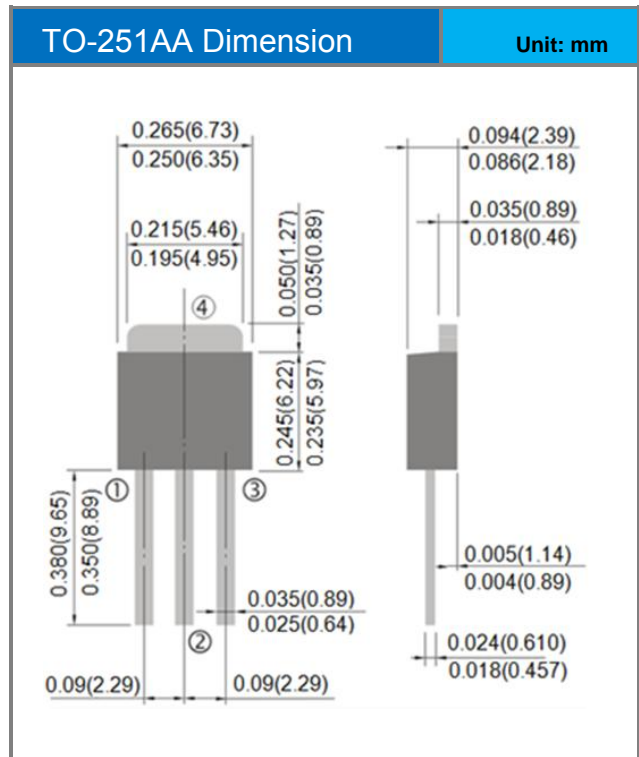
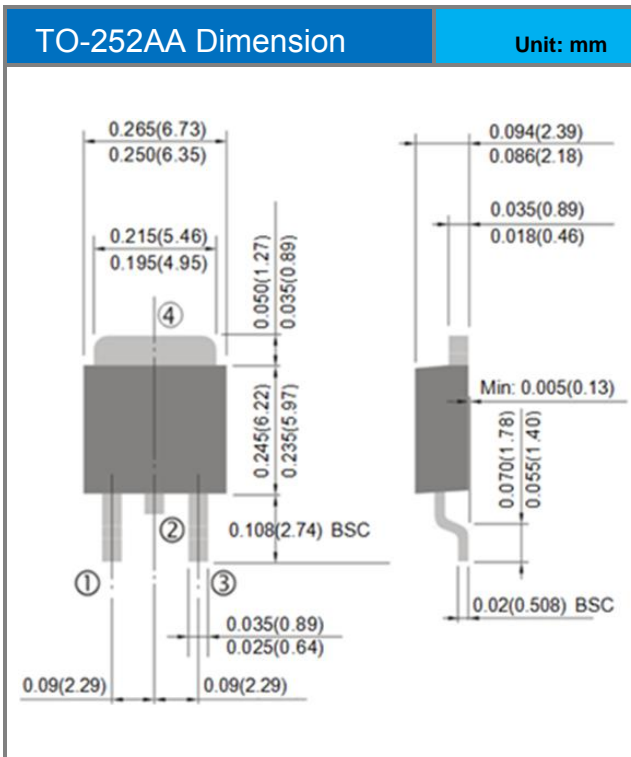
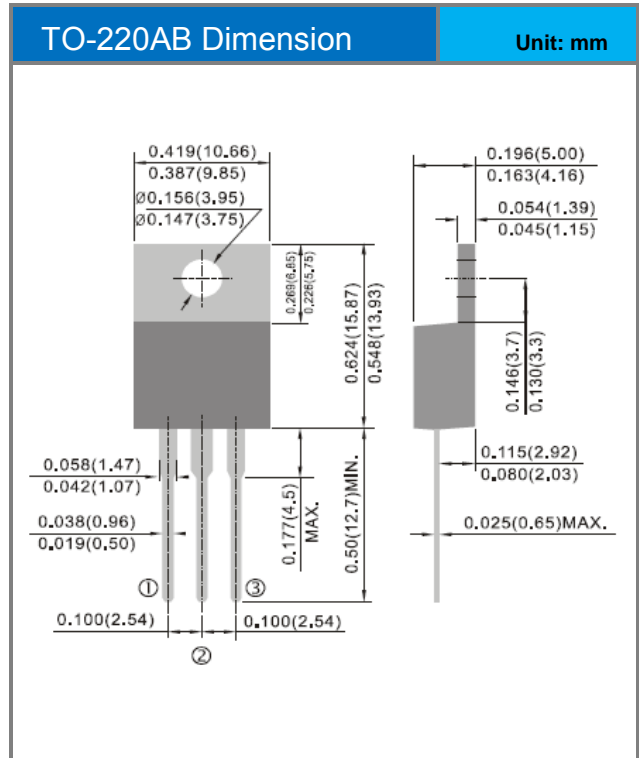
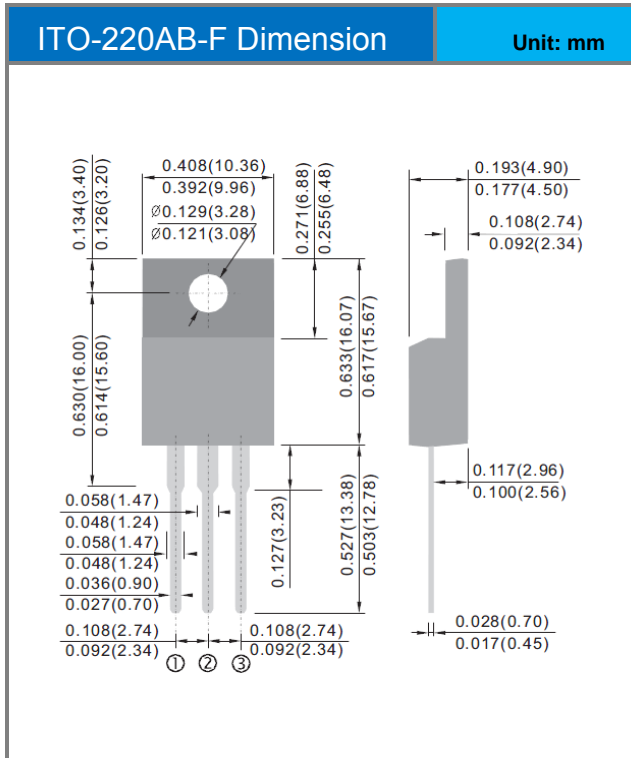


Fig.15 PJF8NA65A Normalized Transient Thermal Impedance vs. Pulse Width



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**Packaging Information**





**PJU8NA65A / PJD8NA65A / PJP8NA65A / PJF8NA65A**

**PART NO PACKING CODE VERSION**

Part No Packing Code	Package Type	Packing Type	Marking	Version
PJU8NA65A_T0_00001	TO-251AA	80pcs / Tube	U8NA65A	Halogen free
PJD8NA65A_L2_00001	TO-252AA	3,000pcs / 13" reel	D8NA65A	Halogen free
PJP8NA65A_T0_00001	TO-220AB	50pcs / Tube	P8NA65A	Halogen free
PJF8NA65A_T0_00001	ITO-220AB-F	50pcs / Tube	F8NA65A	Halogen free



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