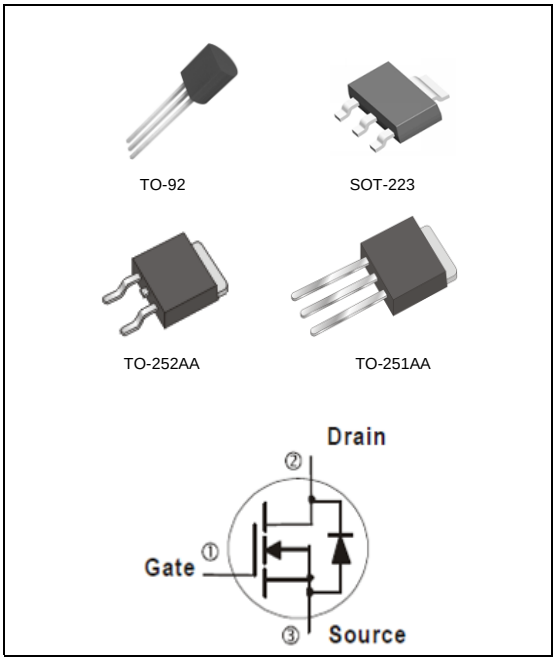
PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

500V N-Channel MOSFET

Voltage	500 V	Current	1 A



Features

- $R_{DS(ON)}$, V_{GS}@10V,I_D@0.5A<9Ω
- 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, SOT-223, TO-92 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
- SOT-223 Approx. Weight : 0.043 ounces, 0.123grams
- TO-92 Approx. Weight : 0.007 ounces, 0.196grams

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

PARAMETER		SYMBOL	TO-251AA	TO-252AA	SOT-223	TO-92	UNITS
Drain-Source Voltage		V_{DS}	500				V
Gate-Source Voltage		V_{GS}	±30				V
Continuous Drain Current		I_D	1		0.3		A
Pulsed Drain Current		I_{DM}	4		1.2		A
Single Pulse Avalanche Energy (Note 1)		E_{AS}	42				mJ
Power Dissipation	T_C=25°C	P_D	25		3.3	3	W
	Derate above 25°C		0.2		0.026	0.024	W/°C
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55~150				°C
Typical Thermal resistance							
- Junction to Case		$R_{\theta JC}$	5		-	-	°C/W
- Junction to Ambient		$R_{\theta JA}$	110		37.9 (Note 4)	140	

- Limited only By Maximum Junction Temperature

PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

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	500	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2	3.02	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=0.5A	-	7.6	9	Ω
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=500V,V_{GS}=0V	-	0.02	1.0	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V	-	±20	±100	nA
Diode Forward Voltage	V_{SD}	I_S=1A,V_{GS}=0V	-	0.86	1.4	V
Dynamic (Note 5)						
Total Gate Charge	Q_g	V_{DS}=400V, I_D=1A, V_{GS}=10V (Note 2,3)	-	4.2	-	nC
Gate-Source Charge	Q_{gs}		-	1.7	-	
Gate-Drain Charge	Q_{gd}		-	1.4	-	
Input Capacitance	Ciss	V_{DS}=25V, V_{GS}=0V, f=1.0MHZ	-	95	-	pF
Output Capacitance	Coss		-	23	-	
Reverse Transfer Capacitance	Crss		-	0.3	-	
Turn-On Delay Time	$td_{(on)}$	V_{DD}=250V, I_D=1A, R_G=25Ω (Note 2,3)	-	5	-	ns
Turn-On Rise Time	t_r		-	20	-	
Turn-Off Delay Time	$td_{(off)}$		-	8	-	
Turn-Off Fall Time	t_f		-	24	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	-	-	1	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	-	-	4	A
Reverse Recovery Time	trr	V_{GS}=0V, I_S=1A	-	155	-	ns
Reverse Recovery Charge	Qrr	dI_F/ dt=100A/us (Note 2)	-	0.53	-	uC

NOTES :

1. L=30mH, I_{AS}=1.6A, V_{DD}=50V, R_G=25 ohm, Starting T_J=25°C
2. Pulse width≤300us, Duty cycle≤2%
3. Essentially independent of operating temperature typical characteristics.
4. $R_{\Theta JA}$ 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 inch FR-4 with 2oz. square pad of copper.
5. Guaranteed by design, not subject to production testing

PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

TYPICAL CHARACTERISTIC CURVES

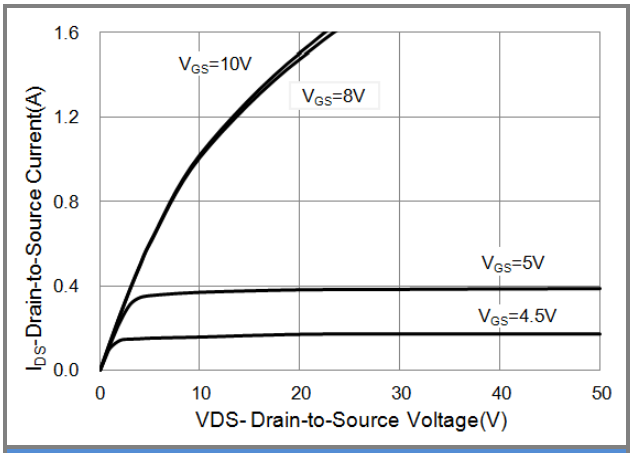


Fig.1 Output Characteristics

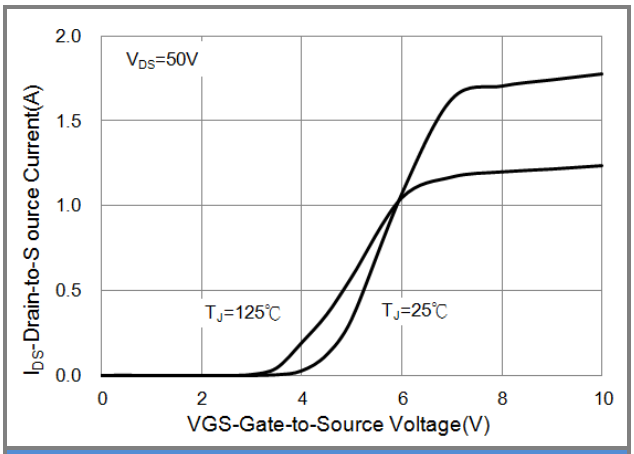


Fig.2 Transfer Characteristics

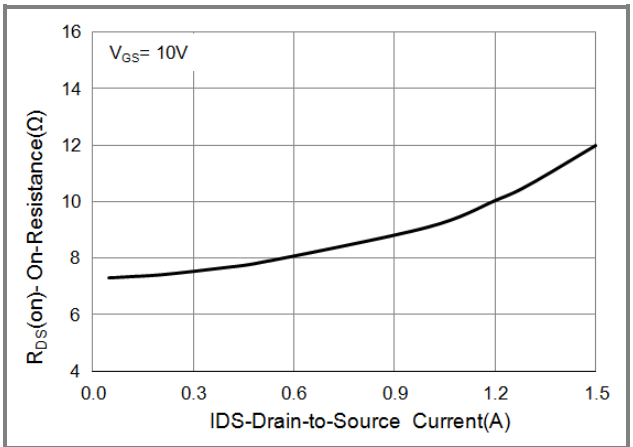


Fig.3 On-Resistance vs. Drain Current

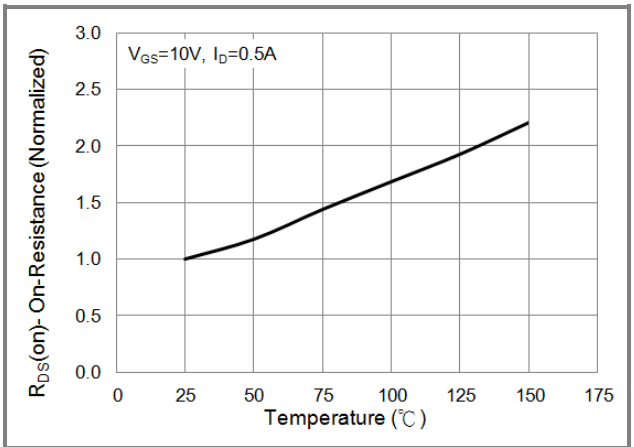


Fig.4 On-Resistance vs. Junction Temperature

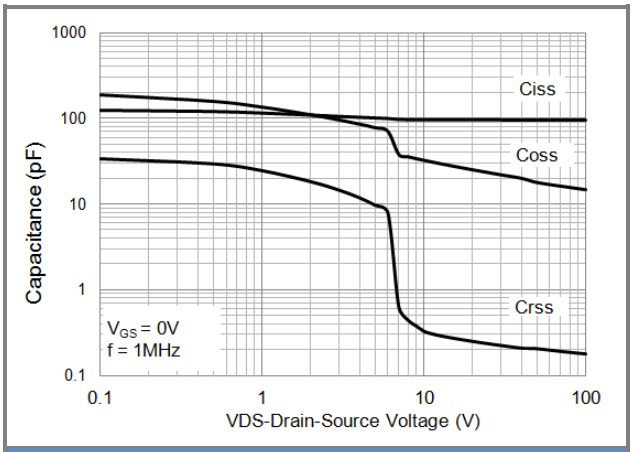


Fig.5 Capacitance vs. Drain-Source Voltage

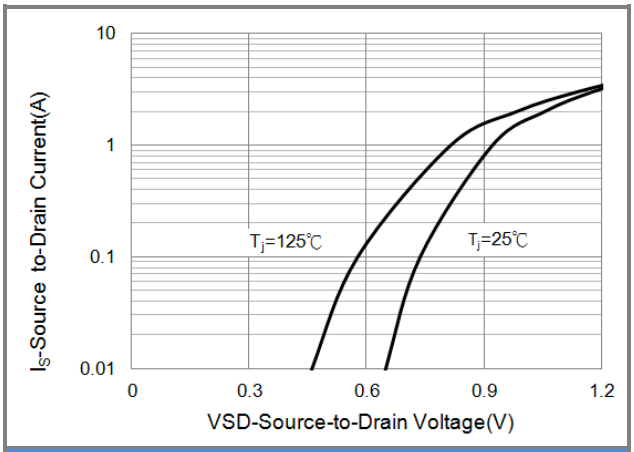


Fig.6 Source-Drain Diode Forward Voltage

PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

TYPICAL CHARACTERISTIC CURVES

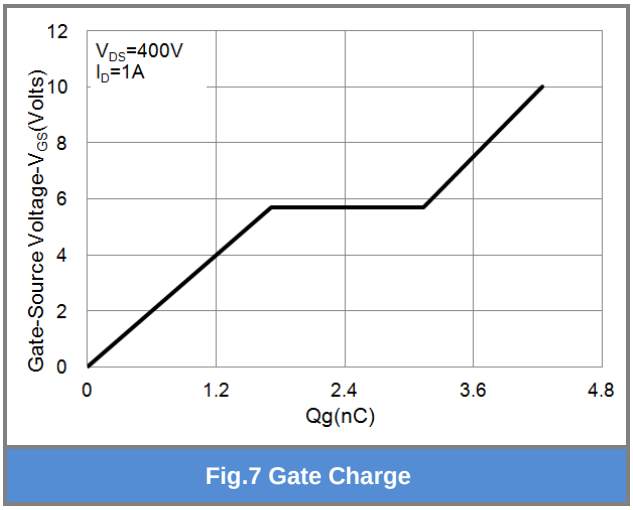


Fig.7 Gate Charge

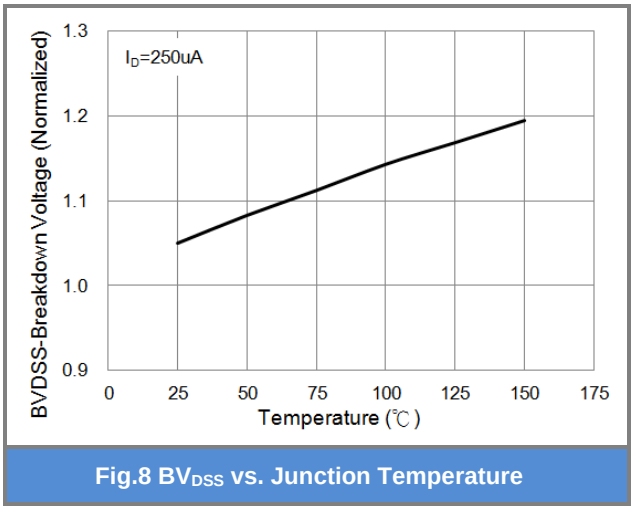


Fig.8 BV_{DSS} vs. Junction Temperature

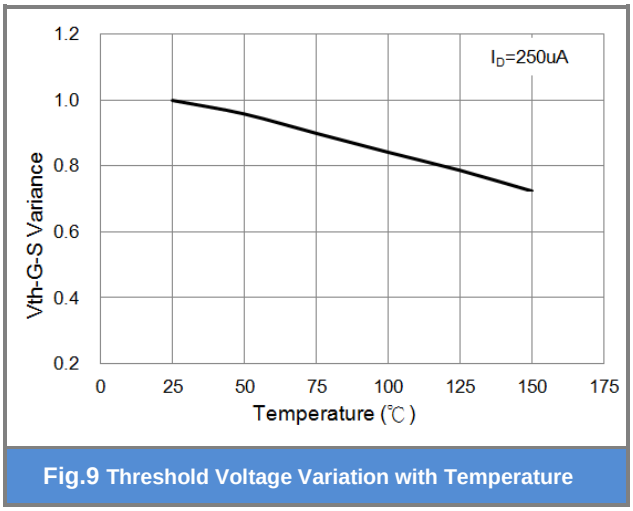


Fig.9 Threshold Voltage Variation with Temperature

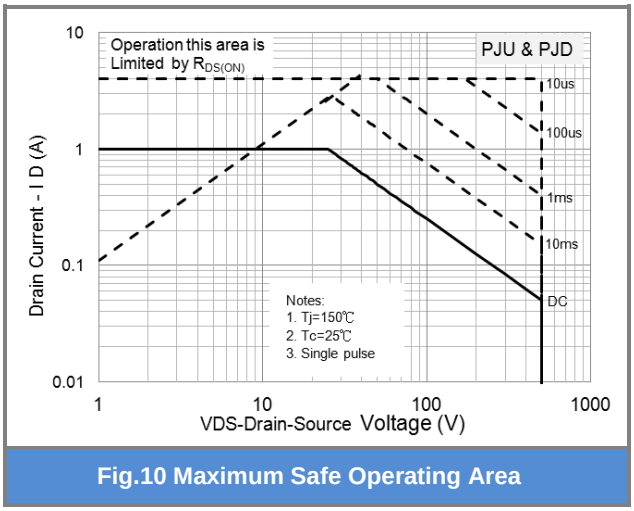


Fig.10 Maximum Safe Operating Area

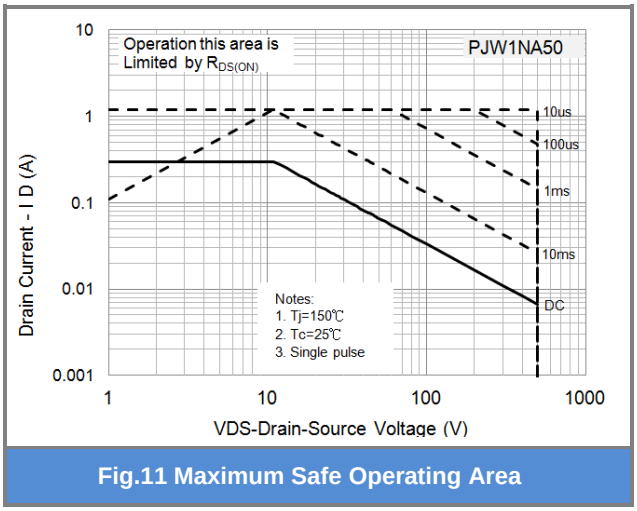


Fig.11 Maximum Safe Operating Area

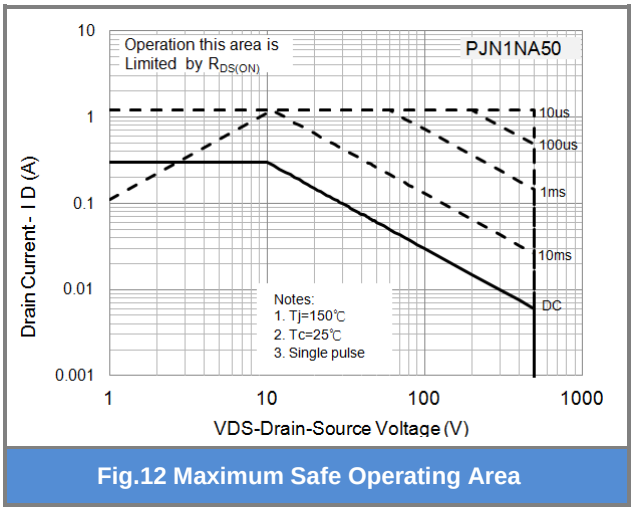


Fig.12 Maximum Safe Operating Area

PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

TYPICAL CHARACTERISTIC CURVES

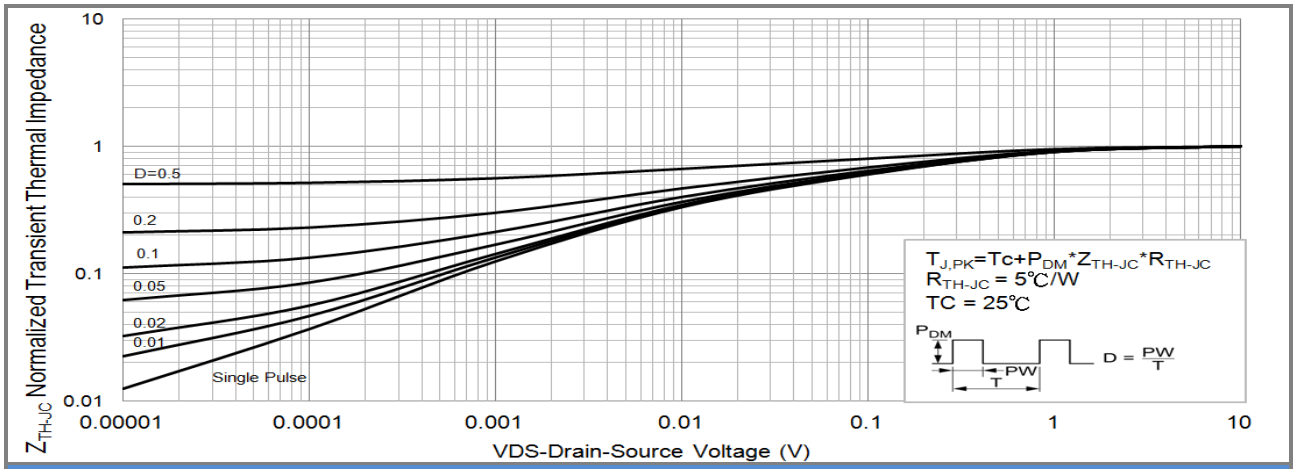


Fig.13 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

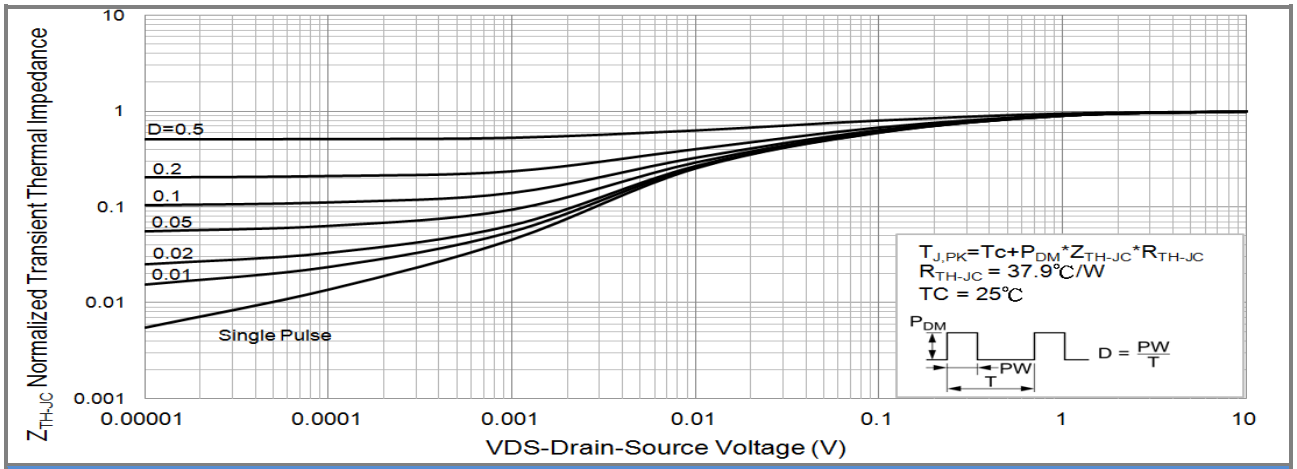


Fig.14 PJW1NA50 Normalized Transient Thermal Impedance vs. Pulse Width

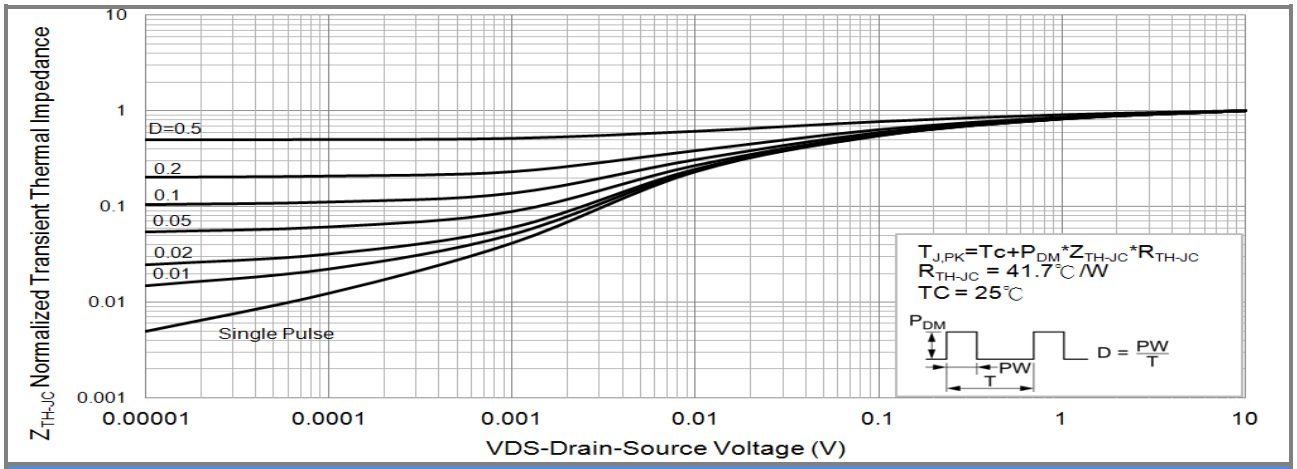


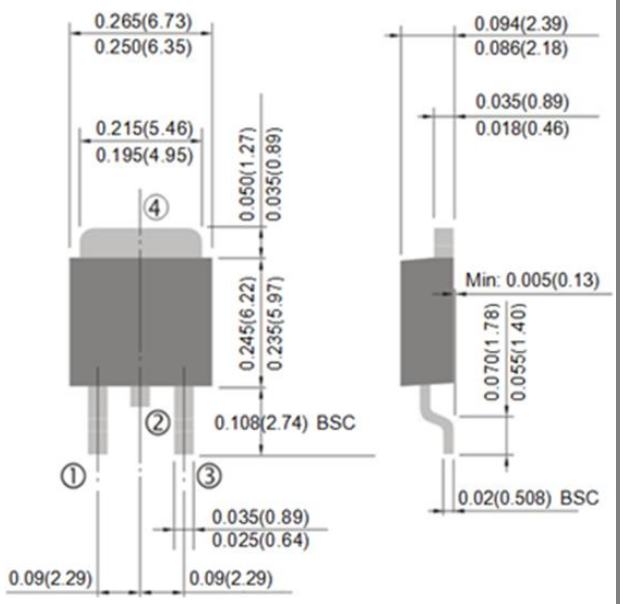
Fig.15 PJN1NA50 Normalized Transient Thermal Impedance vs. Pulse Width

PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

Packaging Information .

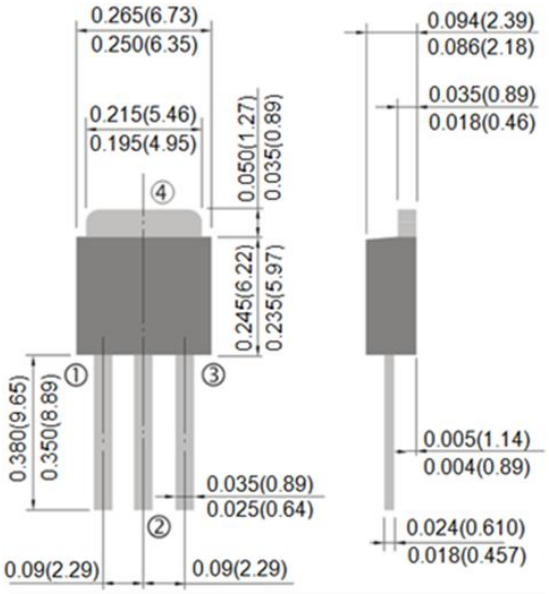
TO-252AA Dimension

Unit: mm



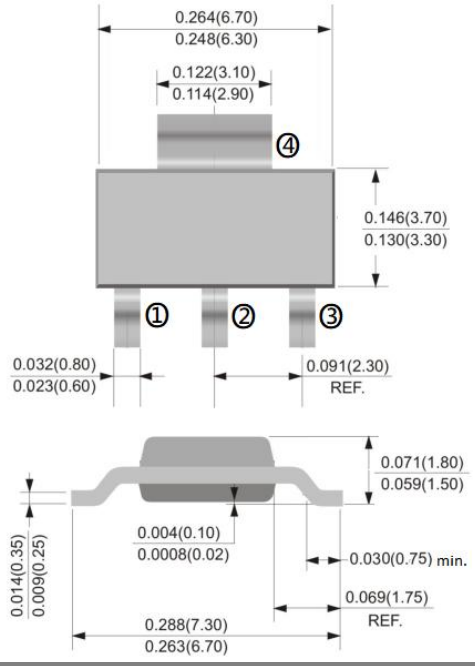
TO-251AA Dimension

Unit: mm



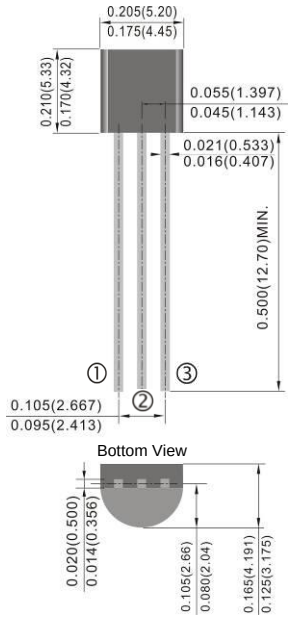
SOT-223 Dimension

Unit: mm



TO-92 Dimension

Unit: mm



PJN1NA50 / PJW1NA50 / PJU1NA50 / PJD1NA50

PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing type	Marking	Version
PJU1NA50_T0_00001	TO-251AA	80pcs / Tube	U1NA50	Halogen free
PJD1NA50_L2_00001	TO-252AA	3,000pcs / 13” reel	D1NA50	Halogen free
PJW1NA50_R2_00001	SOT-223	2,500pcs / 13” reel	1NA50	Halogen free
PJN1NA50_B0_00001	TO-92	1000pcs / bag	1NA50	Halogen free
PJN1NA50_A0_00001	TO-92 AMMO	2000pcs / box	1NA50	Halogen free