



FEATURES

- ❑ Originative New Design
- ❑ 100% EAS Test
- ❑ Rugged Gate Oxide Technology
- ❑ Extremely Low Intrinsic Capacitances
- ❑ Remarkable Switching Characteristics
- ❑ Unequalled Gate Charge : 15 nC (Typ.)
- ❑ Extended Safe Operating Area
- ❑ Lower $R_{DS(ON)}$: 3.8 Ω (Typ.) @ $V_{GS}=10V$

APPLICATION

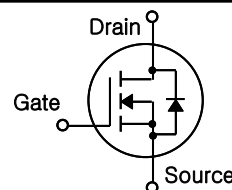
- ❑ Low power battery chargers
- ❑ Switch mode power supply (SMPS)
- ❑ AC adaptors

PFU3N80/PFD3N80 800V N-Channel MOSFET

$$BV_{DSS} = 800 V$$

$$R_{DS(on)} = 4.8 \Omega$$

$$I_D = 2.6 A$$

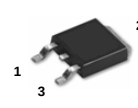


I-PAK(TO-251)



1.Gate 2. Drain 3. Source

D-PAK(TO-252)



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	800	V
I_D	Drain Current – Continuous ($T_C = 25^\circ\text{C}$)	2.6	A
	Drain Current – Continuous ($T_C = 100^\circ\text{C}$)	1.6	A
I_{DM}	Drain Current – Pulsed (Note 1)	10.4	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	320	mJ
I_{AR}	Avalanche Current (Note 1)	2.6	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	6.25	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation ($T_A=25^\circ\text{C}$) *	2.5	W
	Power Dissipation ($T_C = 25^\circ\text{C}$)	62.5	W
	– Derate above 25°C	0.5	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	2.0	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient*	--	50	
$R_{\theta JA}$	Junction-to-Ambient	--	110	

* When mounted on the minimum pad size recommended (PCB Mount)

Electrical Characteristics $T_C=25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V _{GS}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	3.0	--	5.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 1.3 A	--	3.8	4.8	Ω
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	800	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25℃	--	1.0	--	V/℃
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 800 V, V _{GS} = 0 V	--	--	10	μA
		V _{DS} = 640 V, T _C = 125℃	--	--	100	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	650	800	pF
C _{oss}	Output Capacitance		--	60	80	pF
C _{rss}	Reverse Transfer Capacitance		--	8	10	pF
Switching Characteristics						
t _{d(on)}	Turn-On Time	V _{DS} = 400 V, I _D = 3.0 A, R _G = 25 Ω (Note 4,5)	--	20	50	ns
t _r	Turn-On Rise Time		--	50	110	ns
t _{d(off)}	Turn-Off Delay Time		--	40	90	ns
t _f	Turn-Off Fall Time		--	40	90	ns
Q _g	Total Gate Charge	V _{DS} = 640 V, I _D = 3.0 A, V _{GS} = 10 V (Note 4,5)	--	15	20	nC
Q _{gs}	Gate-Source Charge		--	3.5	--	nC
Q _{gd}	Gate-Drain Charge		--	7.5	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I _S	Continuous Source-Drain Diode Forward Current		--	--	2.6	A
I _{SM}	Pulsed Source-Drain Diode Forward Current		--	--	10.4	
V _{SD}	Source-Drain Diode Forward Voltage	I _S = 3.0 A, V _{GS} = 0 V	--	--	1.5	V
trr	Reverse Recovery Time	I _S = 3.0 A, V _{GS} = 0 V	--	550	--	ns
Qrr	Reverse Recovery Charge	di _F /dt = 100 A/μs (Note 4)	--	0.3	--	μC

Notes ;

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $I_{AS}=3.0\text{ A}$, $V_{DD}=50\text{ V}$, $R_G=25\text{ }\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. $I_{SD}\leq 3.0\text{ A}$, $di/dt\leq 300\text{ A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature

Typical Characteristics

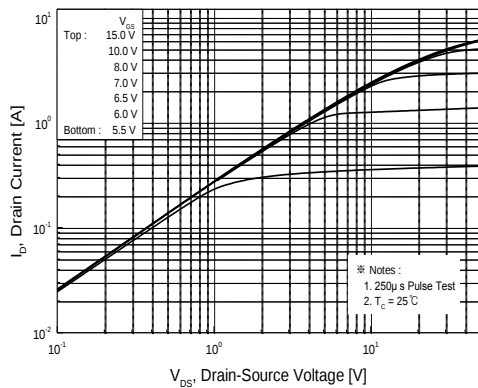


Figure 1. On Region Characteristics

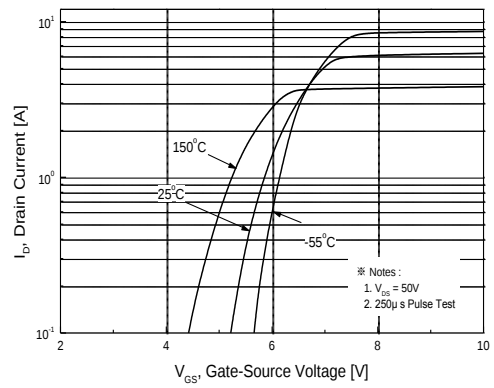


Figure 2. Transfer Characteristics

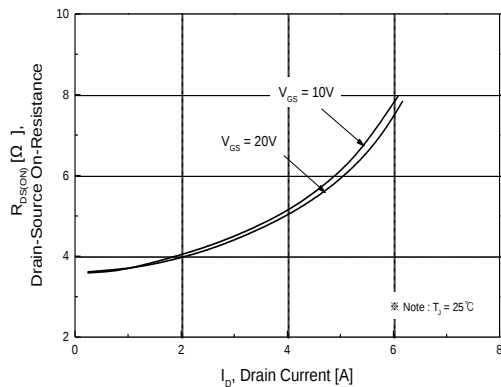


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

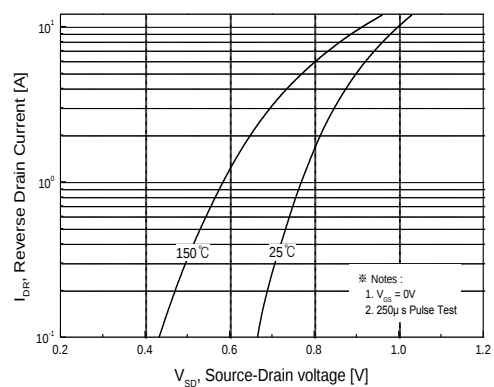


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

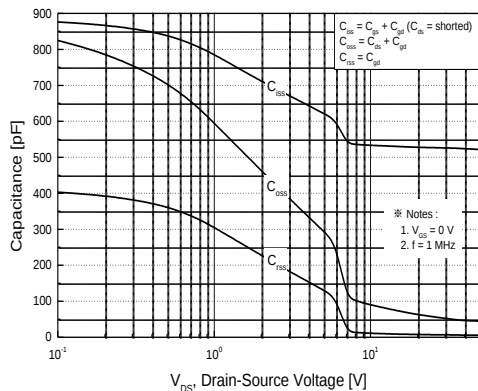


Figure 5. Capacitance Characteristics

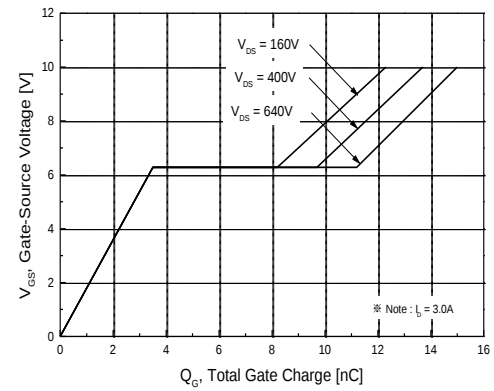


Figure 6. Gate Charge Characteristics

Typical Characteristics (continued)

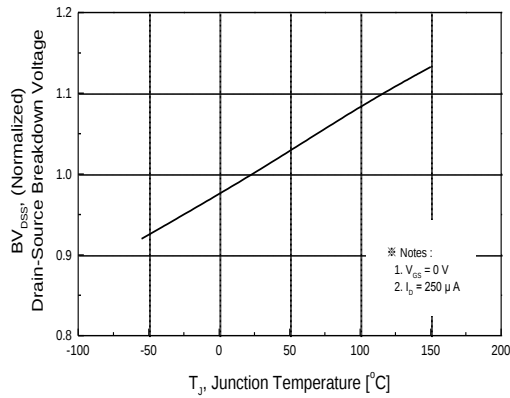


Figure 7. Breakdown Voltage Variation vs Temperature

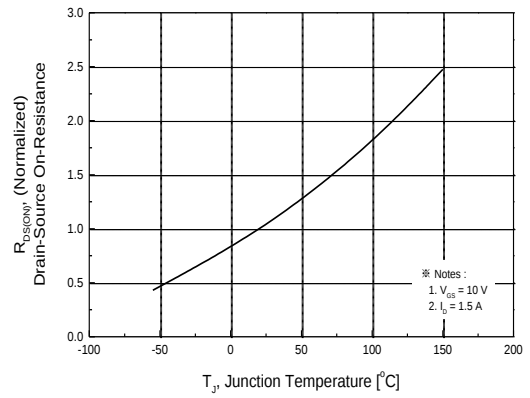


Figure 8. On-Resistance Variation vs Temperature

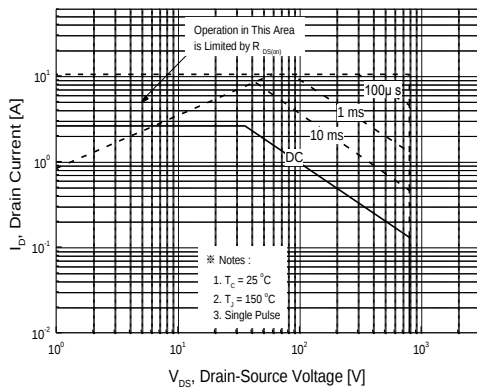


Figure 9. Maximum Safe Operating Area

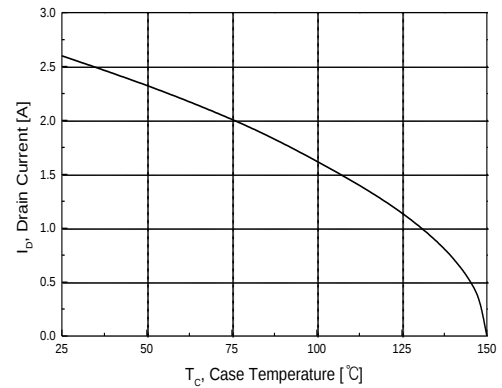


Figure 10. Maximum Drain Current vs Case Temperature

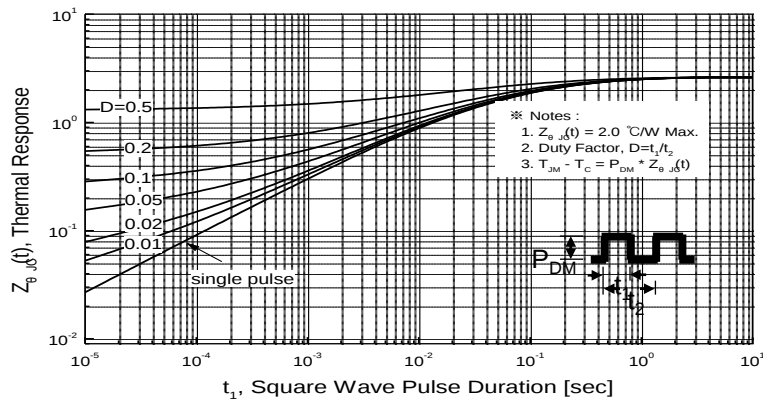


Figure 11. Transient Thermal Response Curve

Characteristics Test Circuit & Waveform

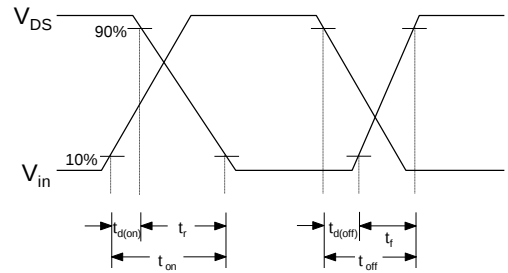
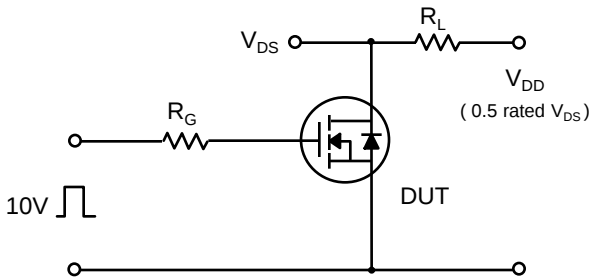


Fig 14. Resistive Switching Test Circuit & Waveforms

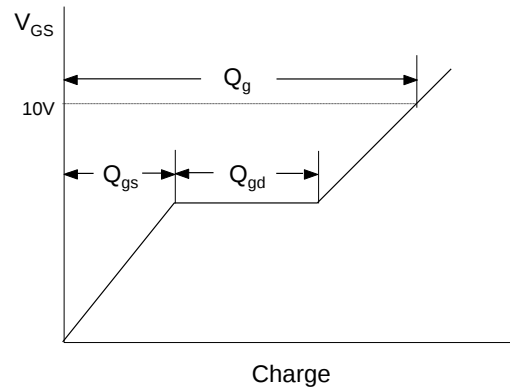
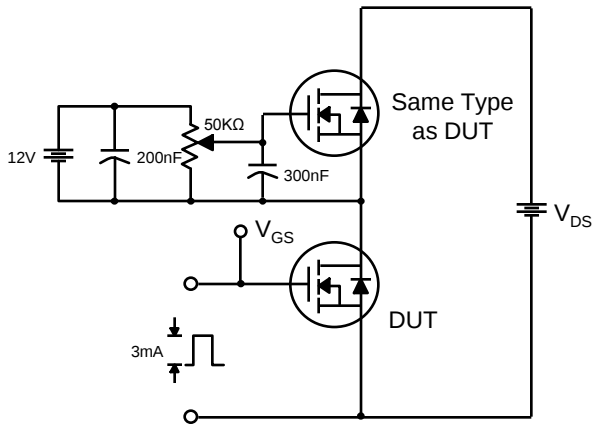


Fig 15. Gate Charge Test Circuit & Waveform

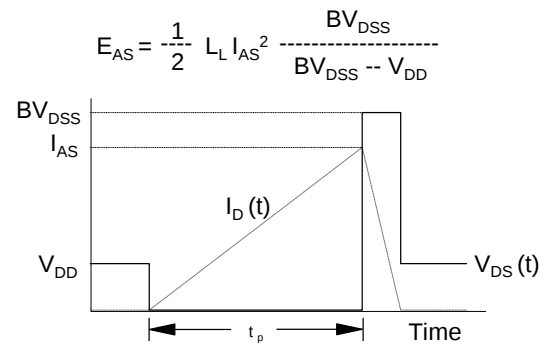
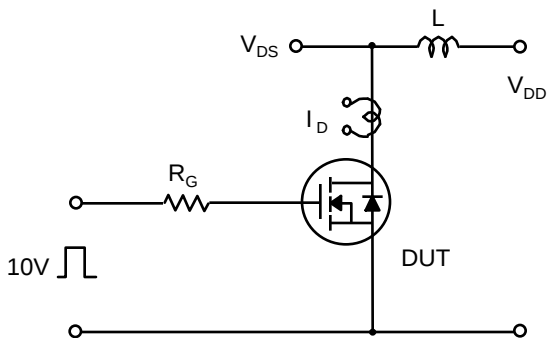


Fig 16. Unclamped Inductive Switching Test Circuit & Waveforms

Characteristics Test Circuit & Waveform (continued)

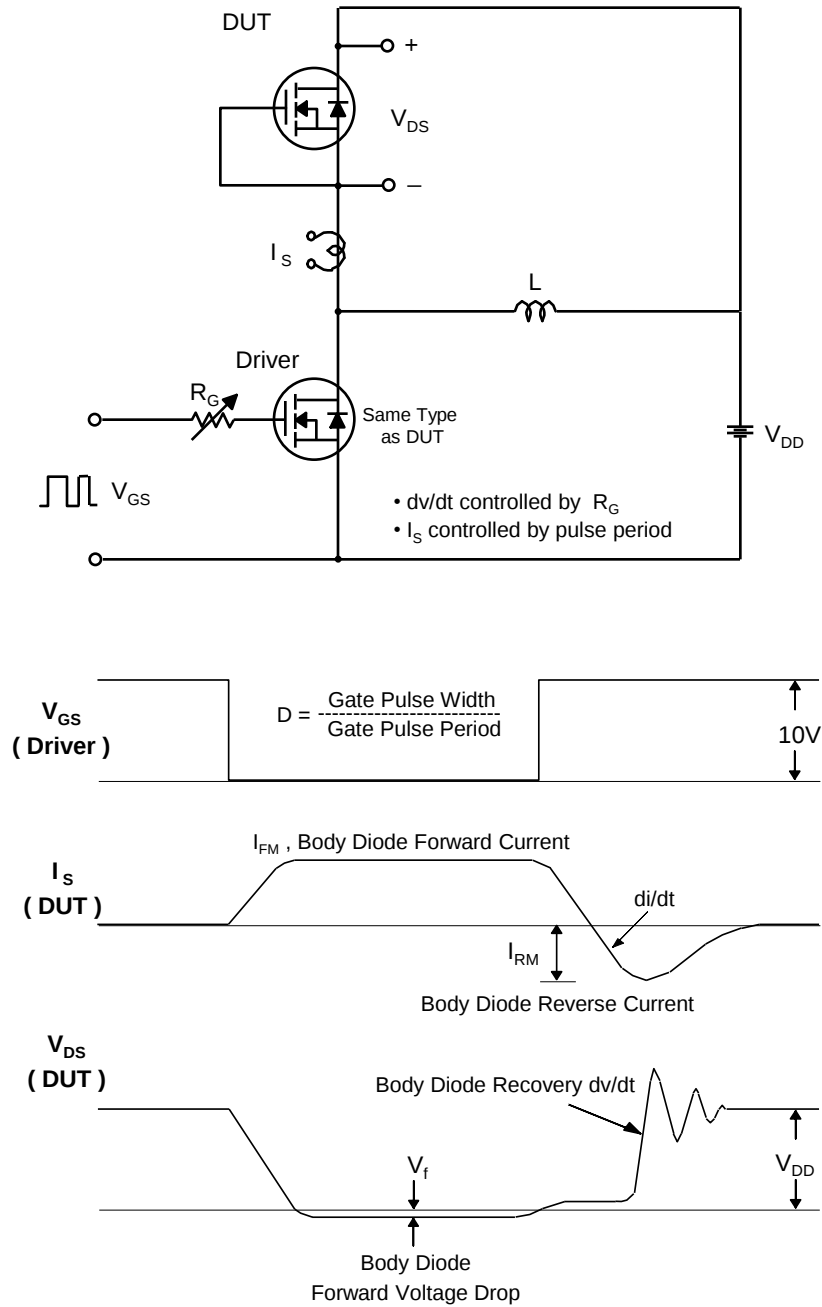
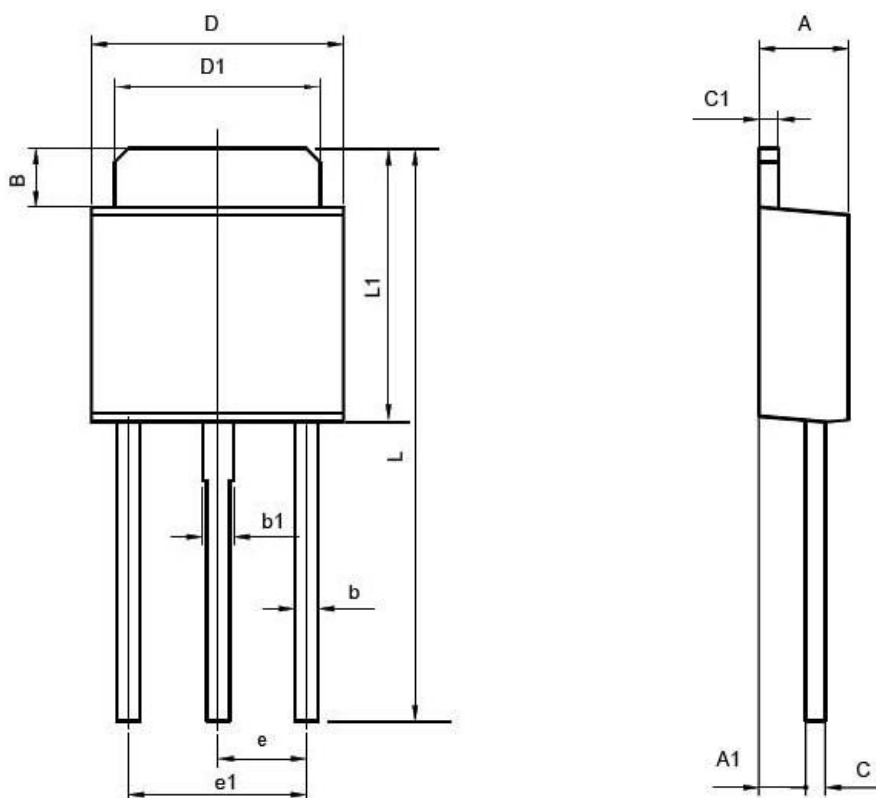


Fig 17. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Package Dimension

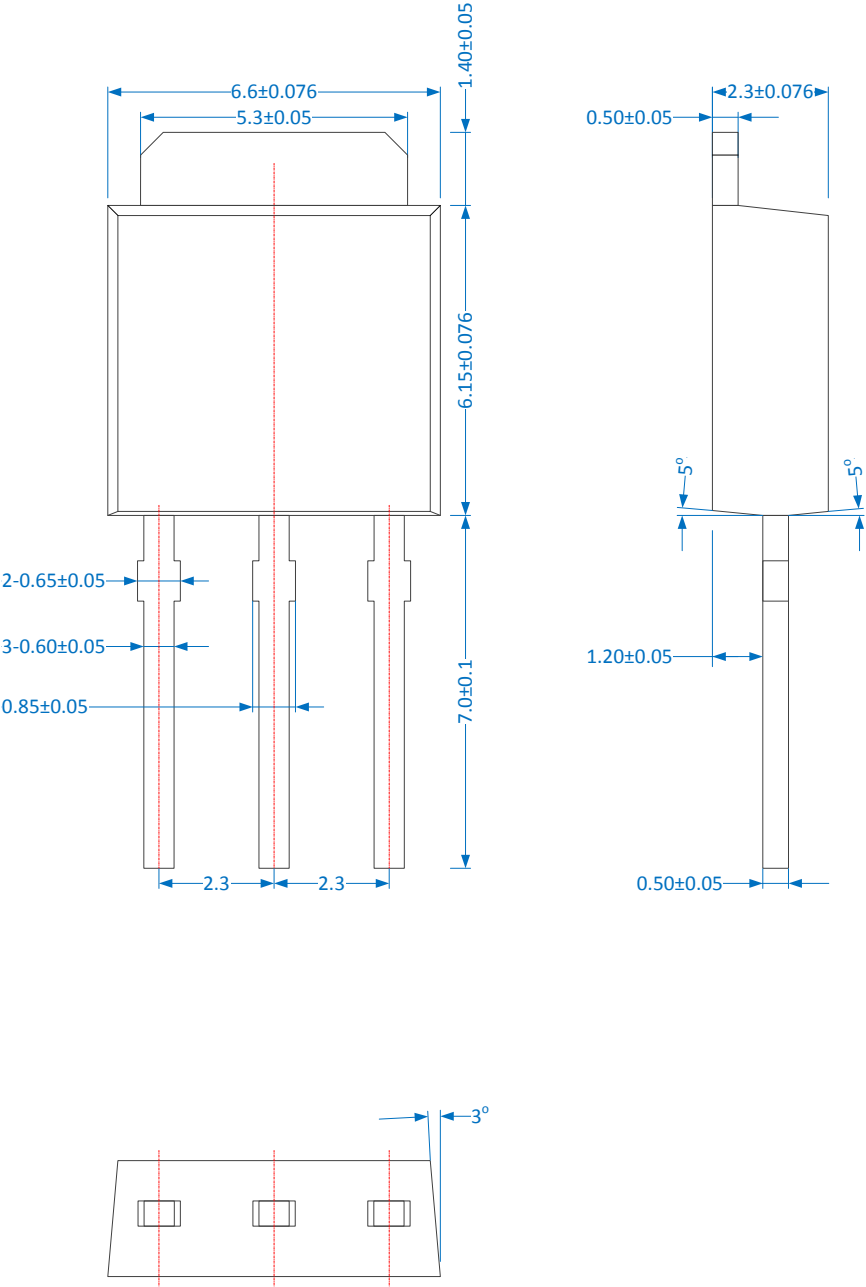
I-PAK(TO-251) - 1



symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	1.10	1.30	0.043	0.051
B	1.30	1.70	0.051	0.067
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.46	0.56	0.018	0.022
c1	0.46	0.56	0.018	0.022
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.213
L1	6.85	7.15	0.270	0.281
e	2.30TYP		0.091TYP	
e1	4.50	4.70	0.177	0.185
L	13.75	14.25	0.541	0.561

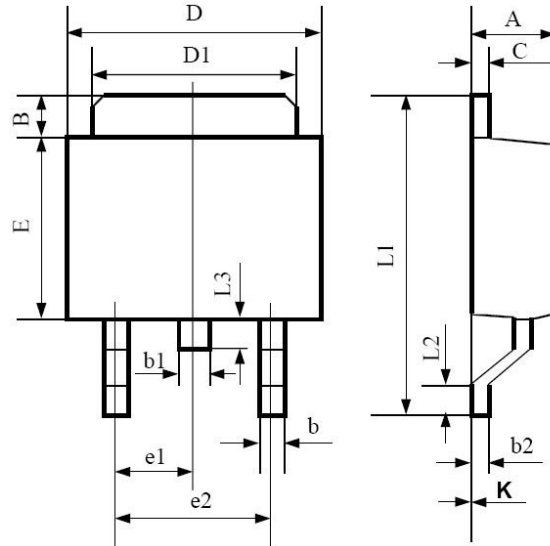
Package Dimension

I-PAK(TO-251) - 2



Package Dimension

D-PAK(TO-252) - 1



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
B	1.35	1.65	0.053	0.065
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
b2	0.46	0.56	0.018	0.022
C	0.46	0.56	0.018	0.022
D	6.35	6.65	0.250	0.262
D1	5.20	5.40	0.205	0.212
E	5.40	5.60	0.212	0.220
e1	2.25	2.35	0.089	0.093
e2	4.50	4.70	0.177	0.185
L1	9.25	9.75	0.346	0.384
L2	0.95	1.45	0.037	0.057
L3	0.90	1.10	0.035	0.043
K	-0.1	0.00	-0.004	0.000

Package Dimension

D-PAK(TO-252) - 2

