DMP4025LK3

40V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(on)}$ max	I_D max T_A = +25°C (Notes 6)
-40V	25mΩ @ V_{GS} = -10V	-8.6A
	45mΩ @ V_{GS} = -4.5V	-7.0A

Description

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Motor control
- Backlighting
- DC-DC Converters
- Printer equipment

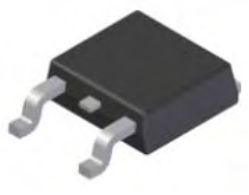
Features

- Low On-Resistance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

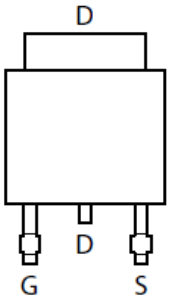
Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.315 grams (approximate)

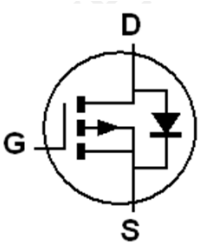
TO252



Top View



Top View
Pin Out



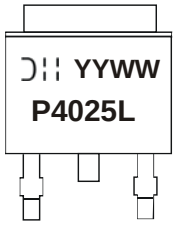
Device symbol

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP4025LK3-13	P4025L	13	12	2,500

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen and Antimony free,"Green" and Lead-Free.
3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com

Marking Information



= Manufacturer's Marking
P4025L = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 10 = 2010)
WW = Week (01 - 53)

Maximum Ratings (@T_A = +25°C unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-40	V
Gate-Source Voltage			V_{GSS}	±20	
Continuous Drain Current	V_{GS} = -10V	(Notes 6)	I_D	-8.6	A
		T_A = +70°C (Notes 6)		-6.9	
		(Notes 5)		-6.7	
Pulsed Drain Current	V_{GS} = -10V	(Notes 7)	I_{DM}	-35	
Continuous Source Current (Body diode)		(Notes 7)	I_S	-8.6	
Pulsed Source Current (Body diode)		(Notes 7)	I_{SM}	-35	

Thermal Characteristics (@T_A = +25°C unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Notes 5)	P_D	1.7	W
	(Notes 6)		2.78	
Thermal Resistance, Junction to Ambient	(Notes 5)	$R_{\theta JA}$	74	°C/W
	(Notes 6)		45	
Thermal Resistance, Junction to Lead	(Notes 8)	$R_{\theta JL}$	1.43	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device surface mounted on minimum recommended FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. Same as note (5), except the device is surface mounted on 25mm X 25mm X 1.6mm FR4 PCB.
7. Repetitive rating on 25mm X 25mm FR4 PCB, D=0.02, pulse width 300µs – pulse width by maximum junction temperature.
8. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

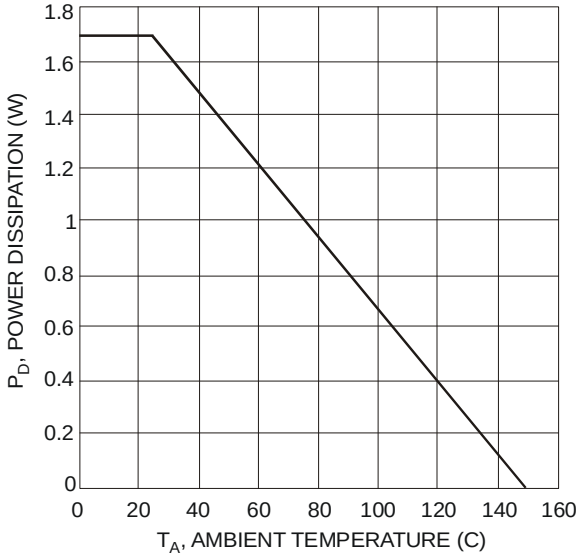


Figure 1. Power Dissipation vs. Ambient Temperature

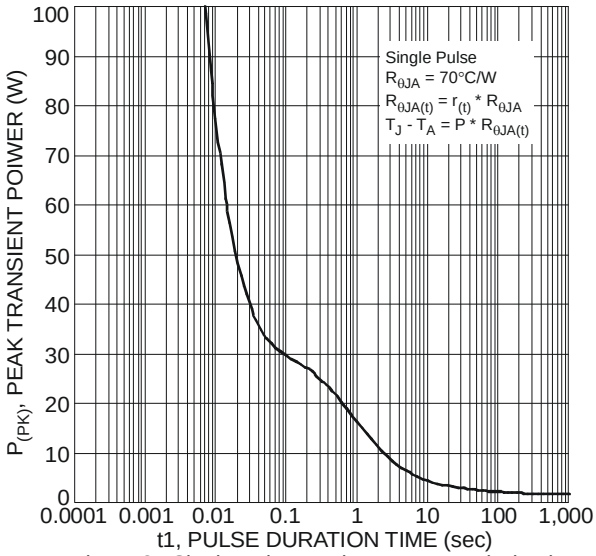


Figure 2. Single Pulse Maximum Power Dissipation

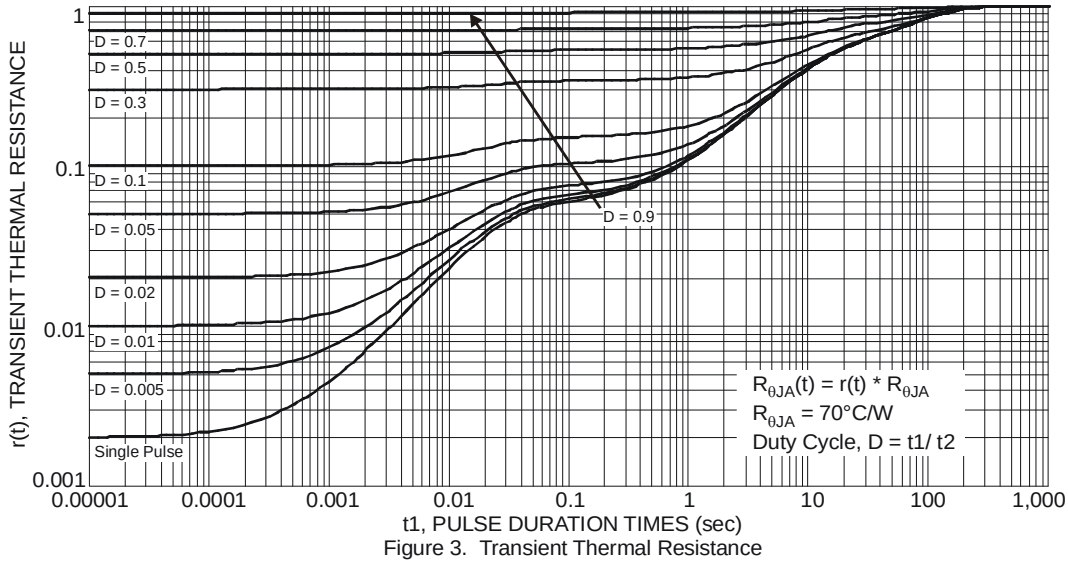


Figure 3. Transient Thermal Resistance

Electrical Characteristics (@T_A = +25°C unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	I_D = -250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	µA	V_{DS} = -40V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-0.8	-1.3	-1.8	V	I_D = -250µA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 9)	$R_{DS\ (ON)}$	—	18	25	mΩ	V_{GS} = -10V, I_D = -3A
			30	45		V_{GS} = -4.5V, I_D = -3A
Forward Transconductance (Notes 9 & 10)	g_{fs}	—	16.6	—	S	V_{DS} = -5V, I_D = -3A
Diode Forward Voltage (Note 9)	V_{SD}	—	-0.7	-1.0	V	I_S = -1A, V_{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	1643	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	179	—		
Reverse Transfer Capacitance	C_{rss}	—	128	—		
Gate Resistance	R_g	—	6.43	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (Note 11)	Q_g	—	14.0	—	nC	V_{GS} = -4.5V; V_{DS} = -20V, I_D = -3A
Total Gate Charge (Note 11)	Q_g	—	33.7	—		V_{GS} = -10V; V_{DS} = -20V, I_D = -3A
Gate-Source Charge (Note 11)	Q_{gs}	—	5.5	—		
Gate-Drain Charge (Note 11)	Q_{gd}	—	7.3	—		
Turn-On Delay Time (Note 11)	$t_{D(on)}$	—	6.9	—	ns	V_{DD} = -20V, V_{GS} = -10V I_D = -3A
Turn-On Rise Time (Note 11)	t_r	—	14.7	—		
Turn-Off Delay Time (Note 11)	$t_{D(off)}$	—	53.7	—		
Turn-Off Fall Time (Note 11)	t_f	—	30.9	—		

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
10. For design aid only, not subject to production testing.
11. Switching characteristics are independent of operating junction temperatures.

Typical Characteristics

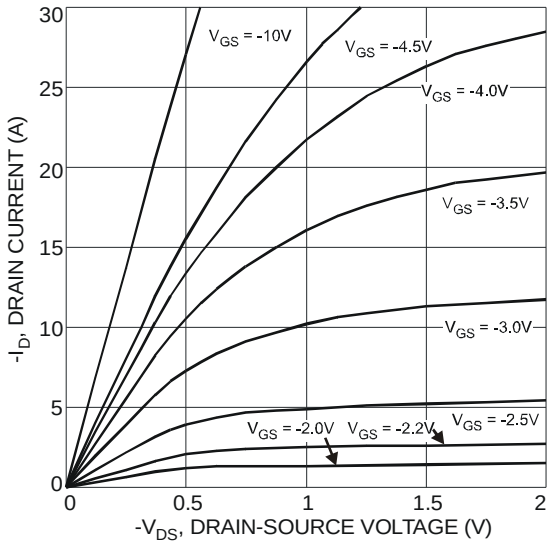


Figure 4. Typical Output Characteristic

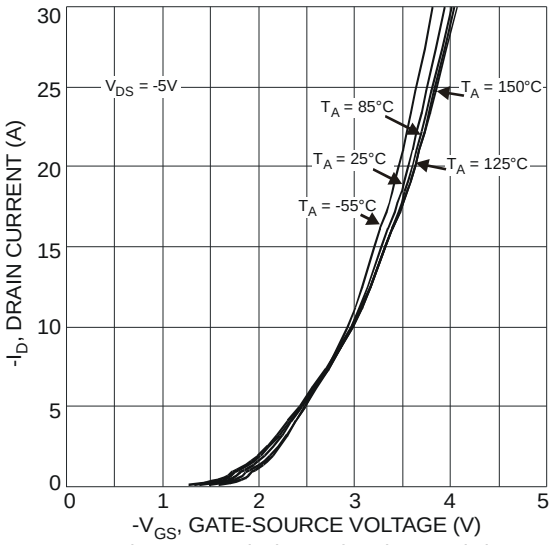


Figure 5. Typical Transfer Characteristic

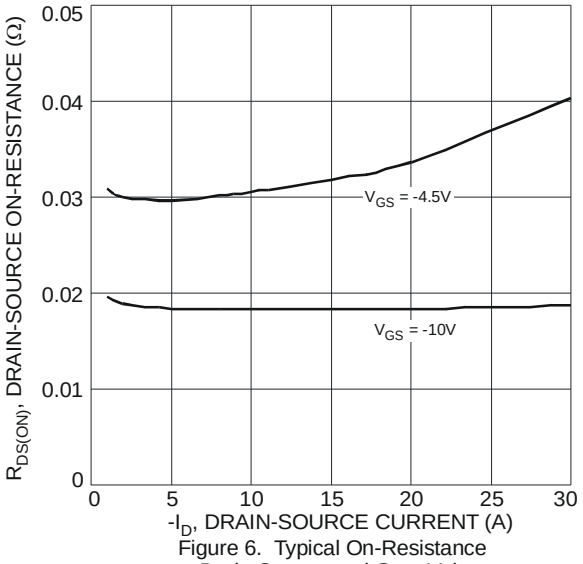


Figure 6. Typical On-Resistance vs. Drain Current and Gate Voltage

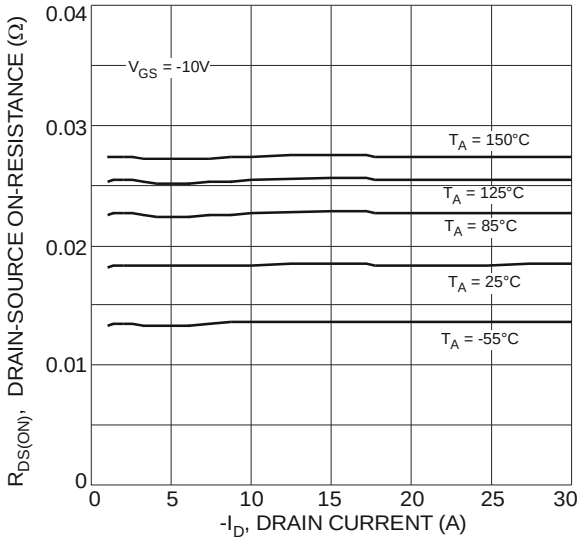


Figure 7. Typical On-Resistance vs. Drain Current and Temperature

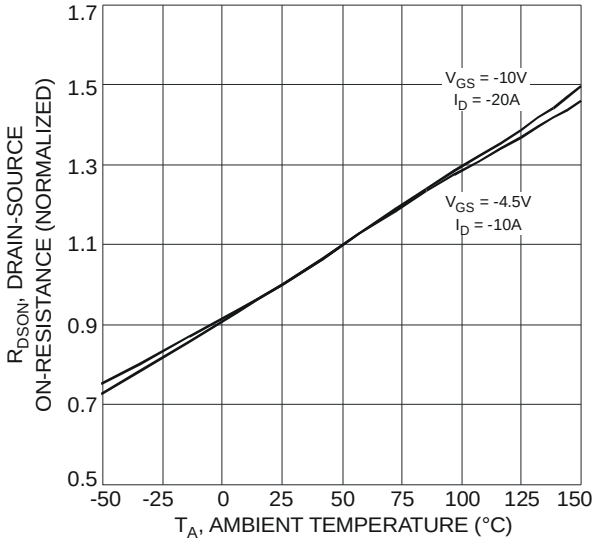


Figure 8. On-Resistance Variation with Temperature

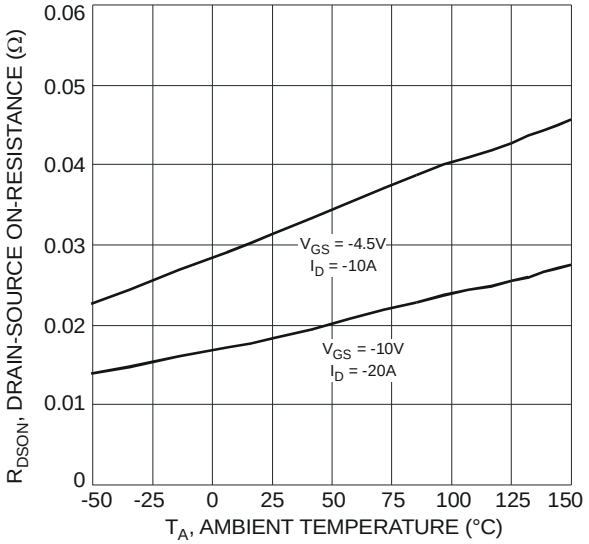


Figure 9. On-Resistance Variation with Temperature

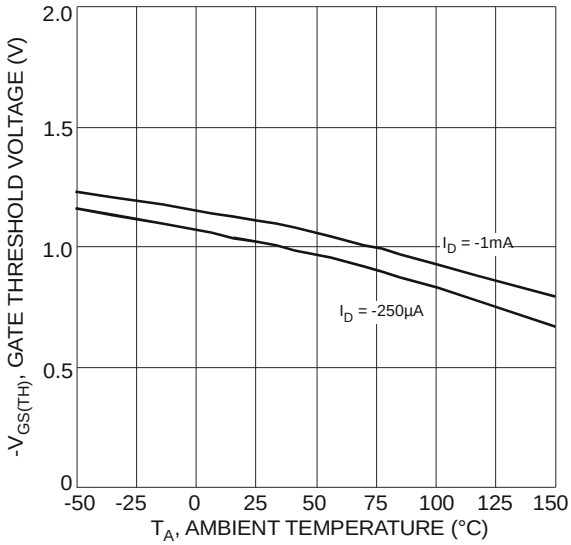


Figure 10. Gate Threshold Variation vs. Ambient Temperature

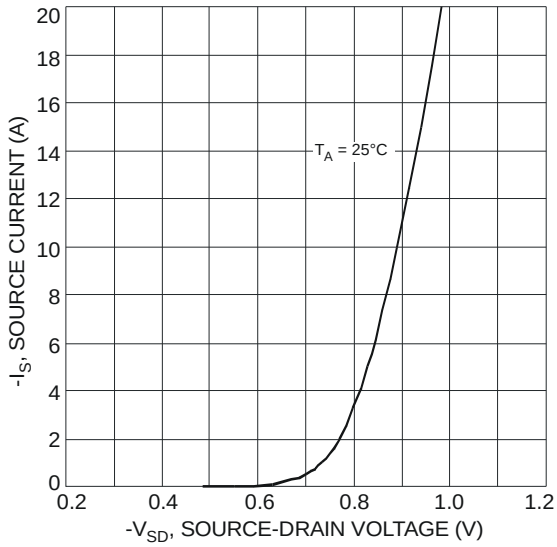


Figure 11. Diode Forward Voltage vs. Current

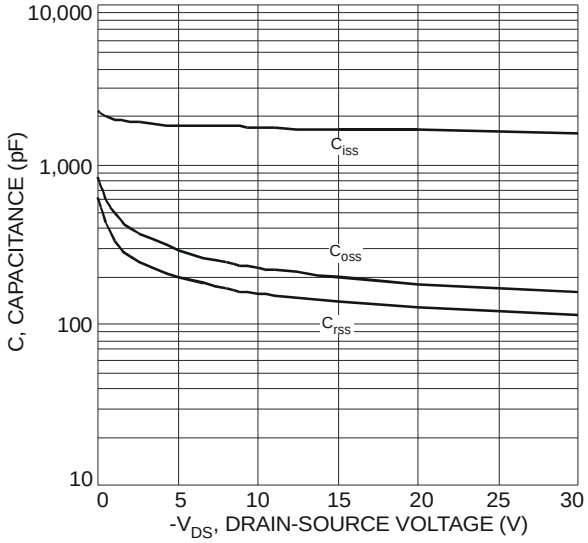


Figure 12. Typical Total Capacitance

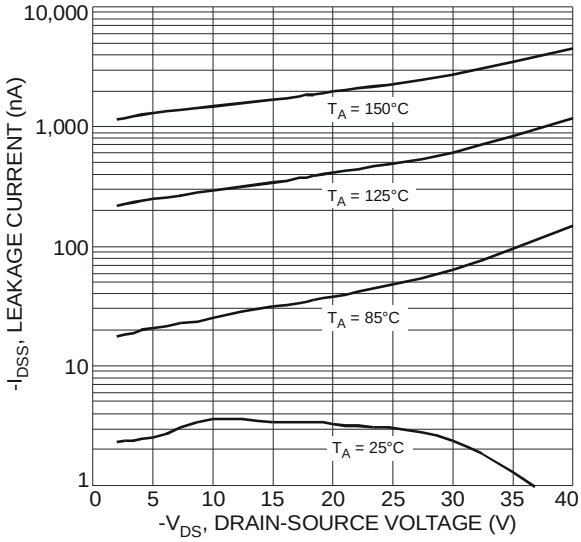


Figure 13. Typical Leakage Current vs. Drain-Source Voltage

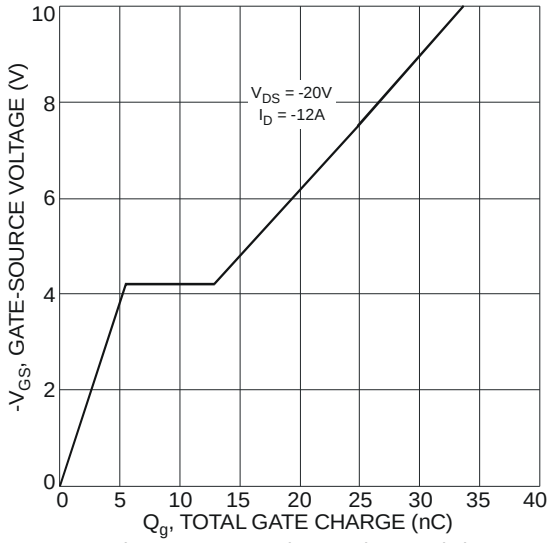


Figure 14. Gate-Charge Characteristics

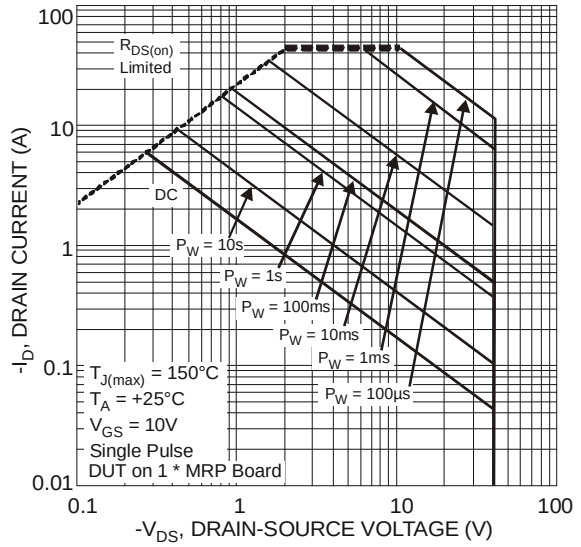
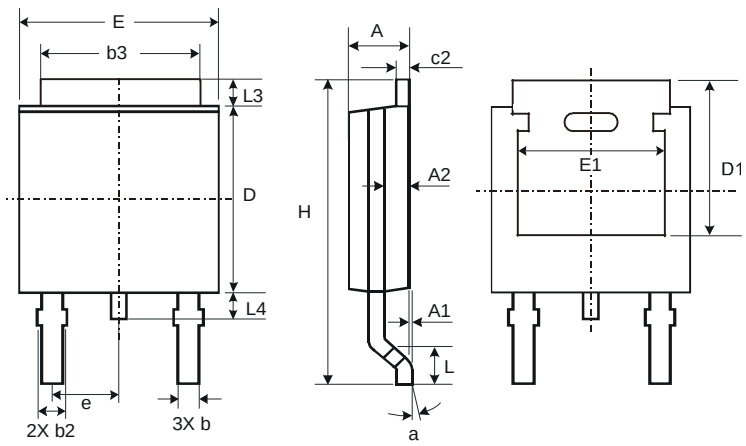


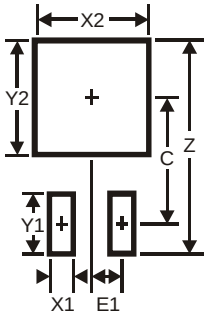
Figure 15. SOA, Safe Operation Area

Package Outline Dimensions



TO252			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	–	–
e	–	–	2.286
E	6.45	6.70	6.58
E1	4.32	–	–
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	–
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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