

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D $T_A = +25^\circ C$
-30V	8m Ω @ $V_{GS} = -10V$	-17A
	10.2m Ω @ $V_{GS} = -4.5V$	-14.5A

Description

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

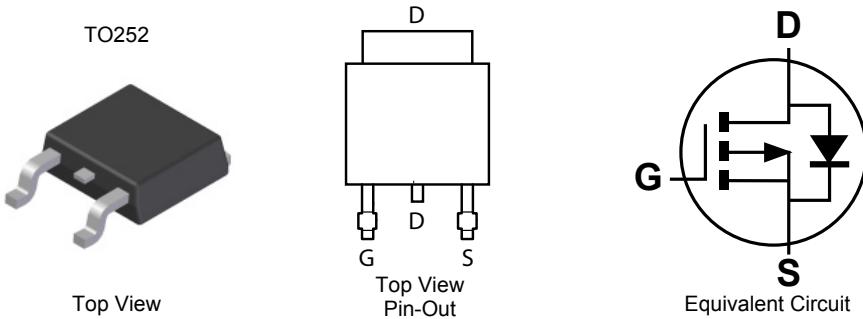
- DC-DC Converters
- Power management functions
- Backlighting

Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- Lead-Free Finish; 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
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.33 grams (approximate)



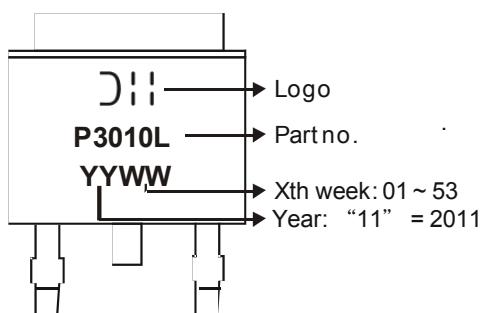
Ordering Information (Note 4 & 5)

Part Number	Compliance	Case	Packaging
DMP3010LK3-13	Standard	TO252	2,500/Tape & Reel
DMP3010LK3Q-13	Automotive	TO252	2,500/Tape & Reel

Notes:

- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information



Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 7) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-17.0 -13.0	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-27.0 -21.0	A
Continuous Drain Current (Note 7) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-14.5 -11.5	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-23.0 -18.0	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	-100	A
Maximum Body Diode Forward Current (Note 7)			I_S	5.5	A
Avalanche Current (Note 8)			I_{AS}	47	A
Avalanche Energy (Note 8)			E_{AS}	113	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 6)			P_D	1.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state		$R_{\theta JA}$	72	°C/W
	$t < 10\text{s}$			29	°C/W
Total Power Dissipation (Note 7)			P_D	3.4	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady state		$R_{\theta JA}$	37	°C/W
	$t < 10\text{s}$			15	°C/W
Operating and Storage Temperature Range			T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	-1.1	-1.6	-2.1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	6.5	8	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -10\text{A}$
		—	7.2	10.2		$V_{GS} = -4.5\text{V}, I_D = -10\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	30	—	S	$V_{DS} = -15\text{V}, I_D = -10\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.65	-1.0	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	6234	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	1500	—		
Reverse Transfer Capacitance	C_{rss}	—	774	—		
Gate Resistance	R_G	—	1.28	—	μ	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	Q_g	—	59.2	—	nC	$V_{DS} = -15\text{V}, V_{GS} = -4.5\text{V},$ $I_D = -10\text{A}$
Gate-Source Charge	Q_{gs}	—	16.1	—		
Gate-Drain Charge	Q_{gd}	—	15.7	—		
Turn-On Delay Time	$t_{D(\text{on})}$	—	11.4	—	ns	$V_{DS} = -15\text{V}, V_{GEN} = -10\text{V},$ $R_G = 6\Omega, I_D = -1\text{A}$
Turn-On Rise Time	t_r	—	9.4	—		
Turn-Off Delay Time	$t_{D(\text{off})}$	—	260.7	—		
Turn-Off Fall Time	t_f	—	99.3	—		

Notes:

6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
8. UIS in production with $L = 0.1\text{mH}, T_J = +25^\circ\text{C}$.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to production testing.

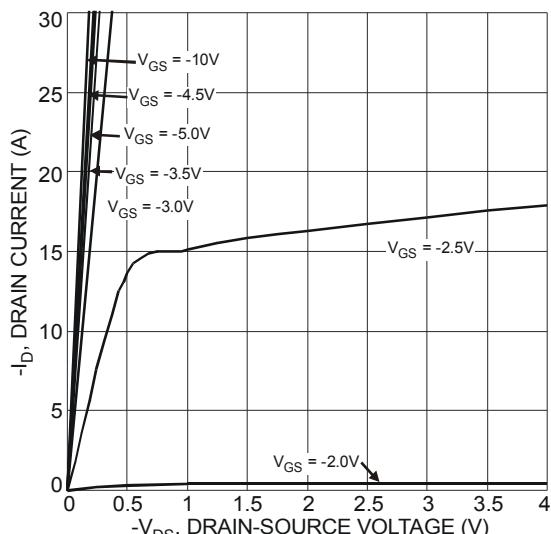


Figure 1 Typical Output Characteristics

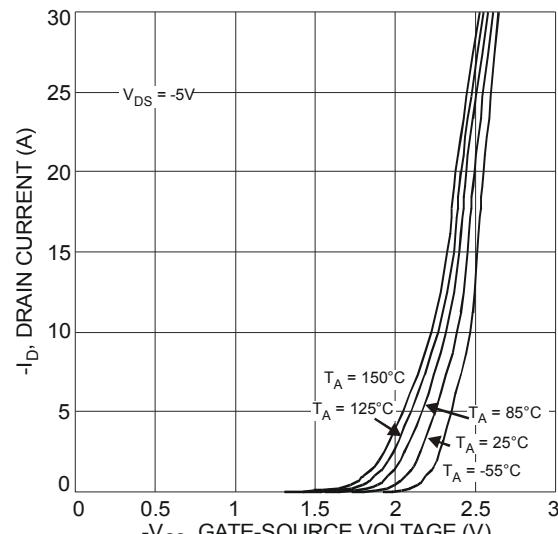


Figure 2 Typical Transfer Characteristics

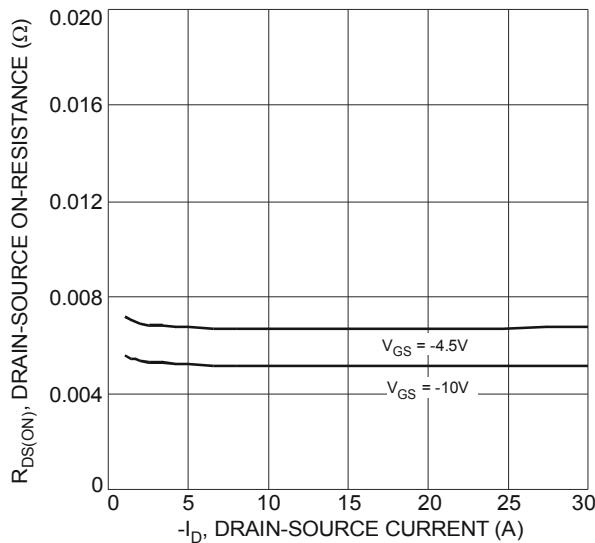


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

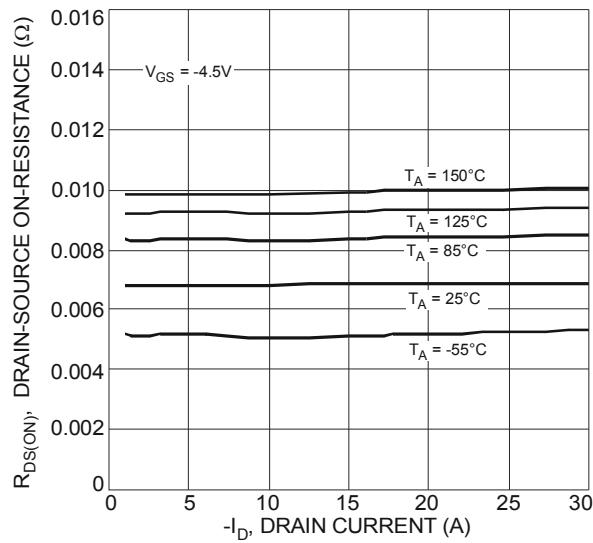


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

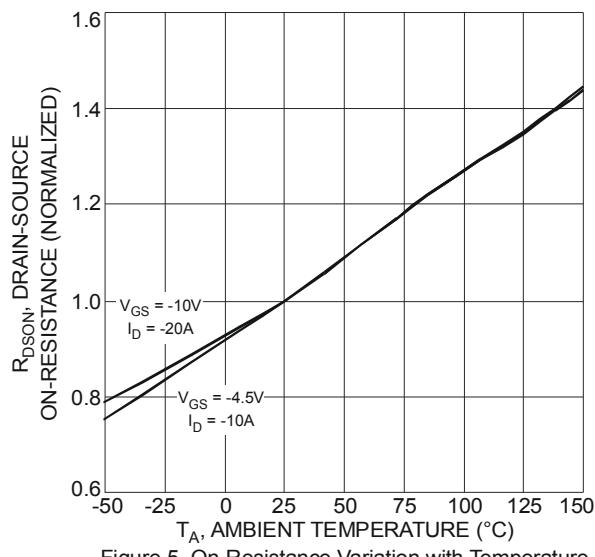


Figure 5 On-Resistance Variation with Temperature

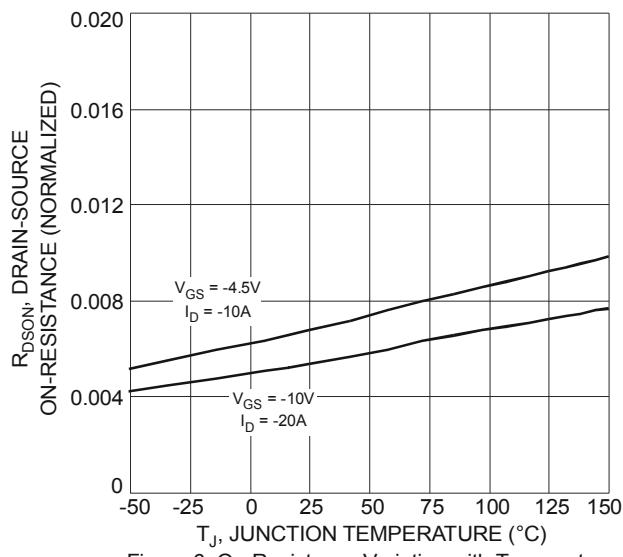


Figure 6 On-Resistance Variation with Temperature

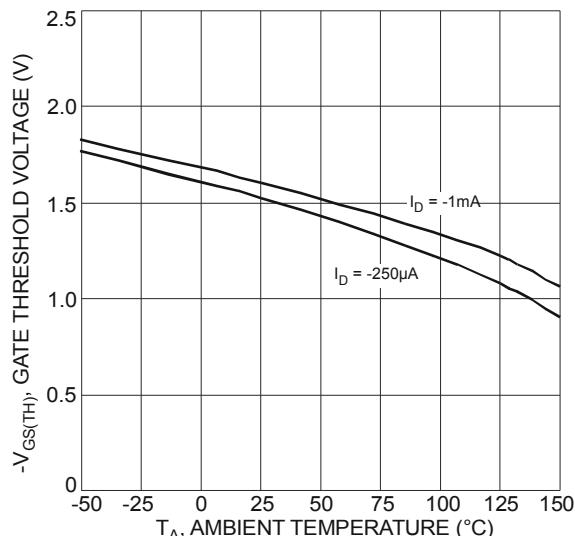


Figure 7 Gate Threshold Variation vs. Ambient Temperature

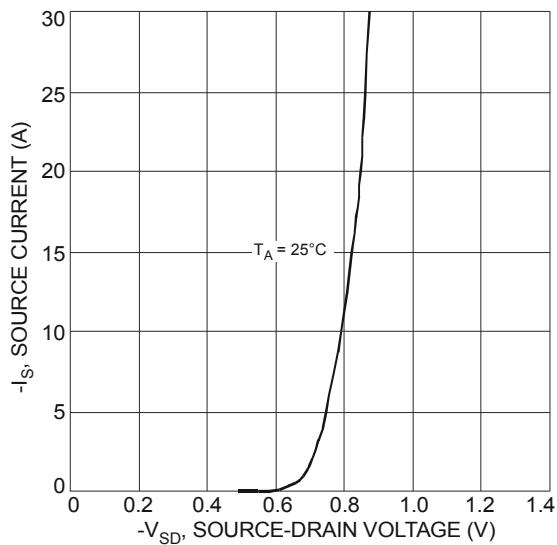


Figure 8 Diode Forward Voltage vs. Current

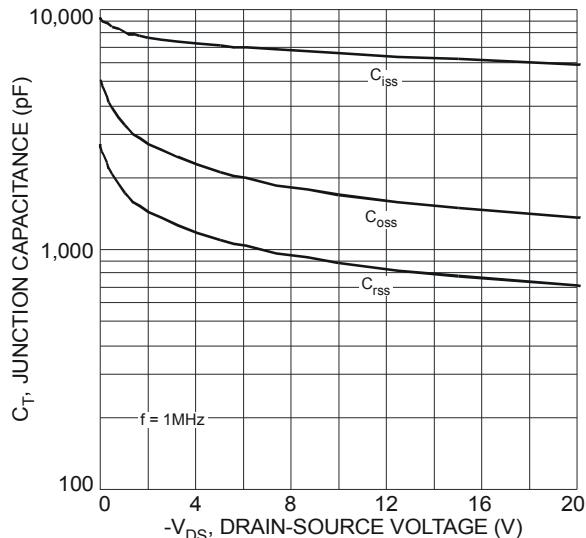


Figure 9 Typical Total Capacitance

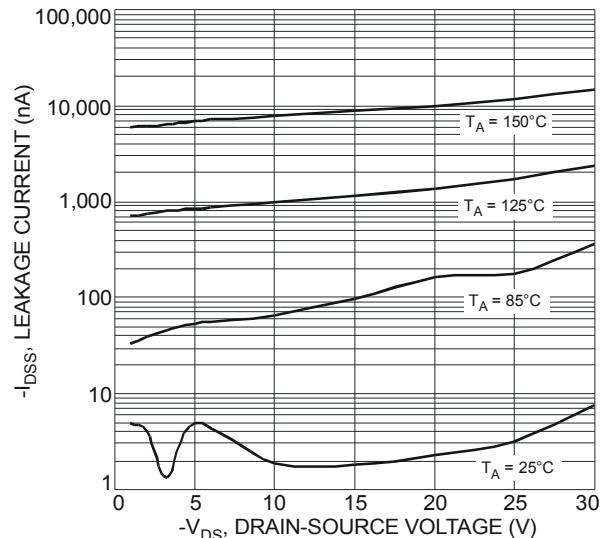


Figure 10 Typical Leakage Current vs. Drain-Source Voltage

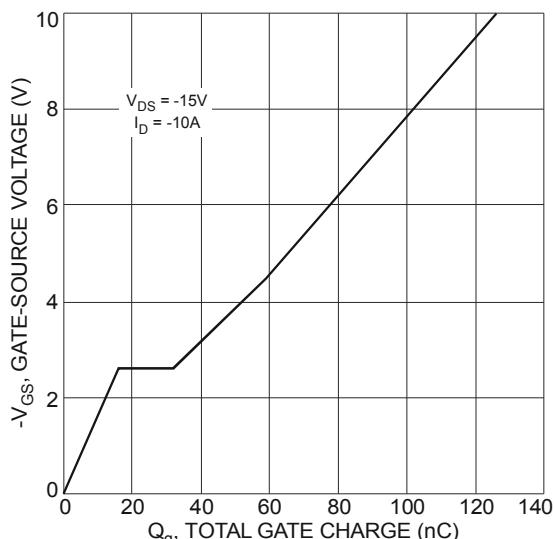


Figure 11 Gate-Source Voltage vs. Total Gate Charge

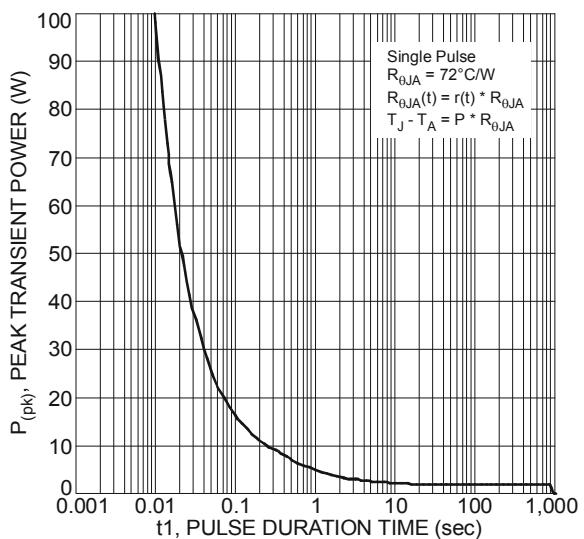


Figure 12 Single Pulse Maximum Power Dissipation

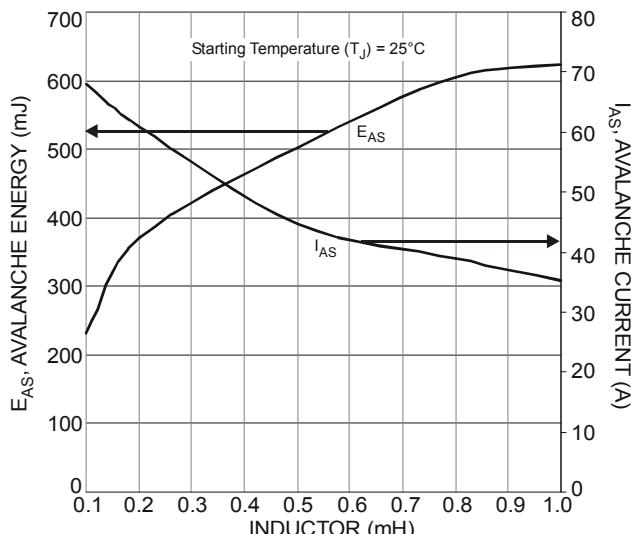


Figure 13 Single-Pulse Avalanche Tested

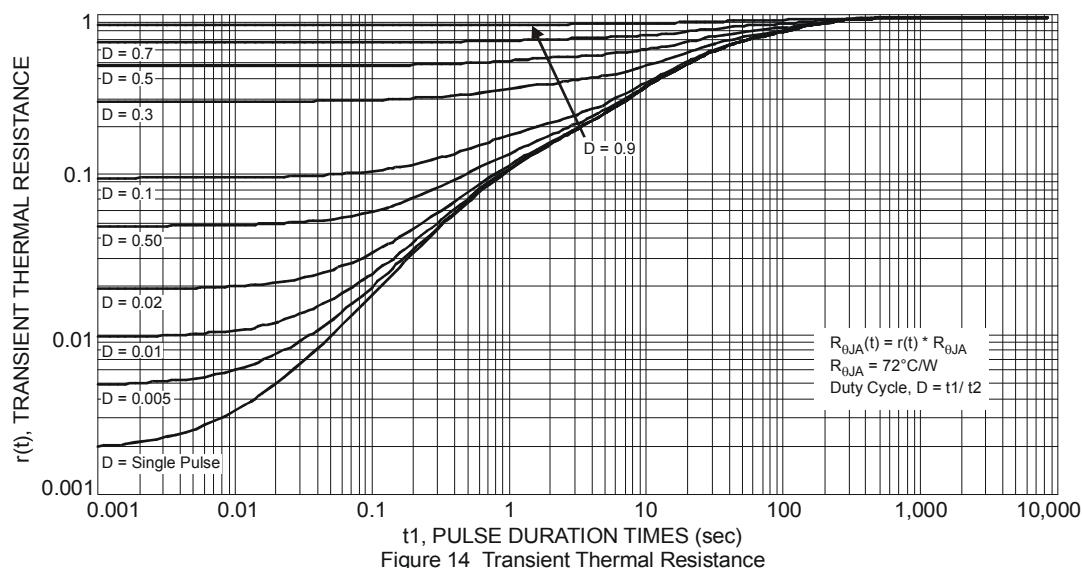
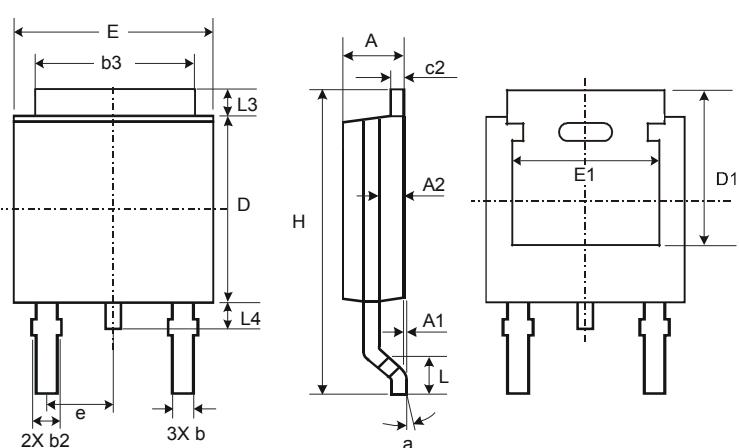


Figure 14 Transient Thermal Resistance

Package Outline Dimensions

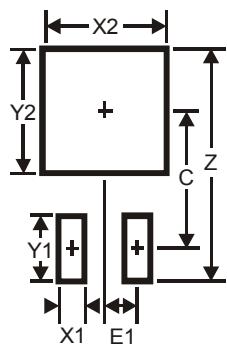
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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°	—

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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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