

## Product Summary

$BV_{DSS}$	$R_{DS(ON)\text{ MAX}}$	$I_D \text{ MAX}$ $T_C = +25^\circ\text{C}$
-30V	25mΩ @ $V_{GS} = -10\text{V}$	-27A
	38mΩ @ $V_{GS} = -4.5\text{V}$	-22A

## Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

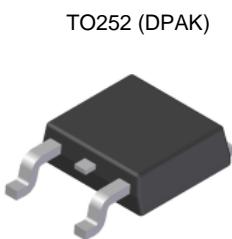
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features

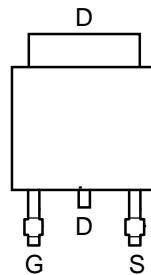
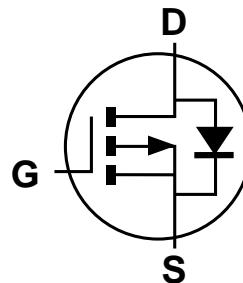
- 100% Unclamped Inductive Switch (UIS) Test In Production
- Low On-Resistance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

## 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
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.33 grams (Approximate)



Top View


 Top View  
Pin-Out


Equivalent Circuit

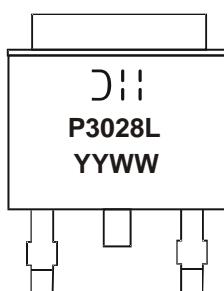
## Ordering Information (Note 5)

Product	Case	Packaging
DMP3028LK3Q-13	TO252 (DPAK)	2,500/Tape & Reel

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/quality/lead\\_free.html](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.
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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



III = Manufacturer's Marking  
 P3028L = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 16 = 2016)  
 WW = Week (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	-30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 7) $V_{GS} = -10\text{V}$	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	$I_D$	-27 -22	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	-11 -8.6	A
Maximum Body Diode Continuous Current			$I_S$	-2.5	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	-40	A
Avalanche Current (Note 8) $L = 0.1\text{mH}$			$I_{AS}$	-22	A
Avalanche Energy (Note 8) $L = 0.1\text{mH}$			$E_{AS}$	24	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	1.6	W
	$T_A = +70^\circ\text{C}$		1.0	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	77	$^\circ\text{C/W}$
	$t < 10\text{s}$		34	
Total Power Dissipation (Note 7)	$T_A = +25^\circ\text{C}$	$P_D$	2.8	W
	$T_A = +70^\circ\text{C}$		1.8	
Thermal Resistance, Junction to Ambient (Note 7)	Steady state	$R_{\theta JA}$	45	$^\circ\text{C/W}$
	$t < 10\text{s}$		29	
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$		4.5	
Operating and Storage Temperature Range	$T_J, T_{STG}$		-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (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 $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	-1	$\mu\text{A}$	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b> (Note 9)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	-1	—	-2.4	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	20	25	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -7\text{A}$
			29	38		$V_{GS} = -4.5\text{V}, I_D = -6.2\text{A}$
Diode Forward Voltage	$V_{SD}$	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -2.1\text{A}$
<b>DYNAMIC CHARACTERISTICS</b> (Note 10)						
Input Capacitance	$C_{iss}$	—	1241	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	147	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	110	—	pF	
Gate Resistance	$R_G$	—	15	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = -10\text{V}$ )	$Q_g$	—	22	—	nC	$V_{DS} = -15\text{V}, I_D = -7\text{A}$
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	—	11	—	nC	
Gate-Source Charge	$Q_{gs}$	—	3.5	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	4.7	—	nC	
Turn-On Delay Time	$t_{D(\text{ON})}$	—	9.7	—	ns	$V_{GS} = -10\text{V}, V_{DD} = -15\text{V}, R_{\text{GEN}} = 6\Omega, I_D = -7\text{A}$
Turn-On Rise Time	$t_R$	—	17.1	—	ns	
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	60.5	—	ns	
Turn-Off Fall Time	$t_F$	—	40.4	—	ns	

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

8.  $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .

9. Short duration pulse test used to minimize self-heating effect.

10. Guaranteed by design. Not subject to product testing.

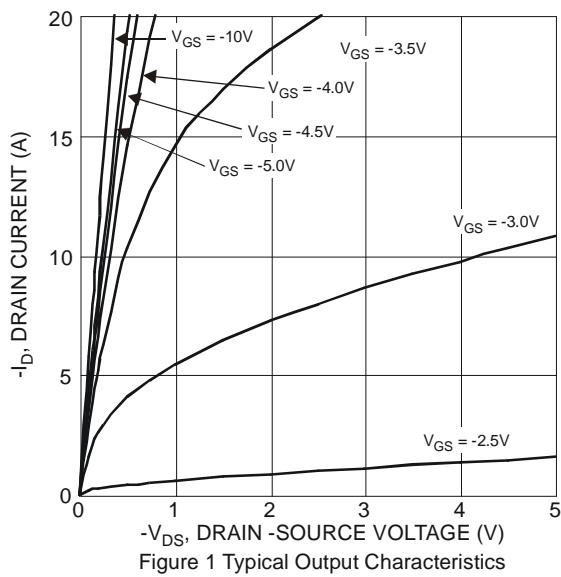


Figure 1 Typical Output Characteristics

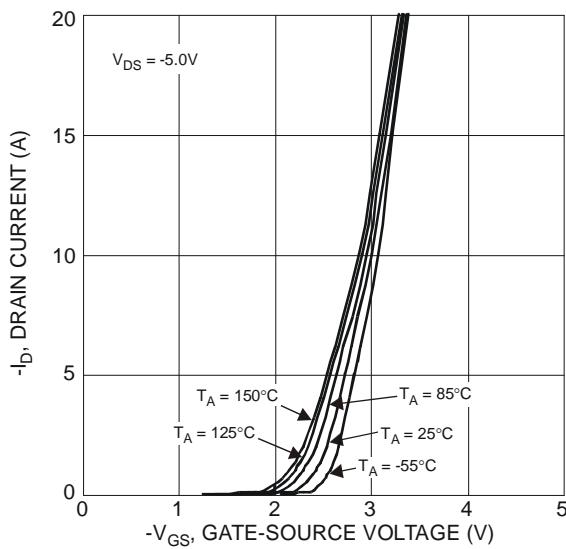


Figure 2 Typical Transfer Characteristics

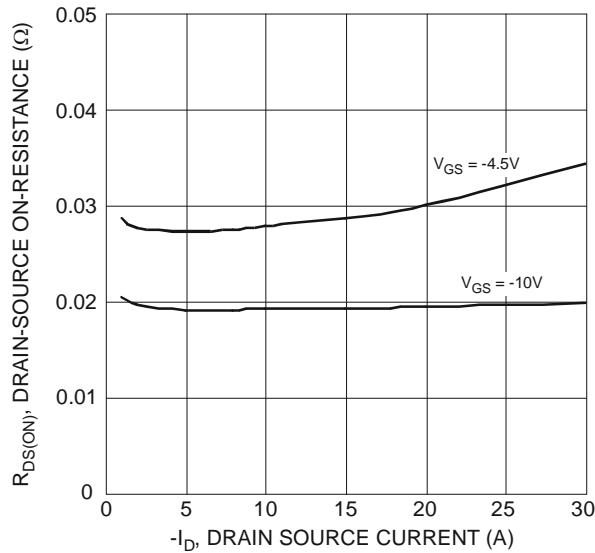


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

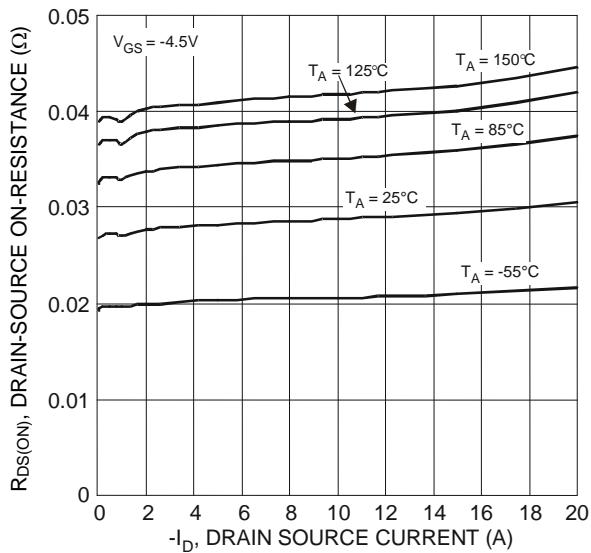


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

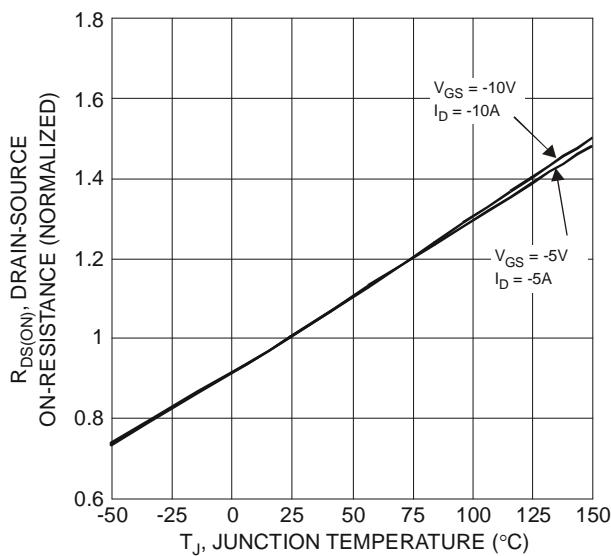


Figure 5 On-Resistance Variation with Temperature

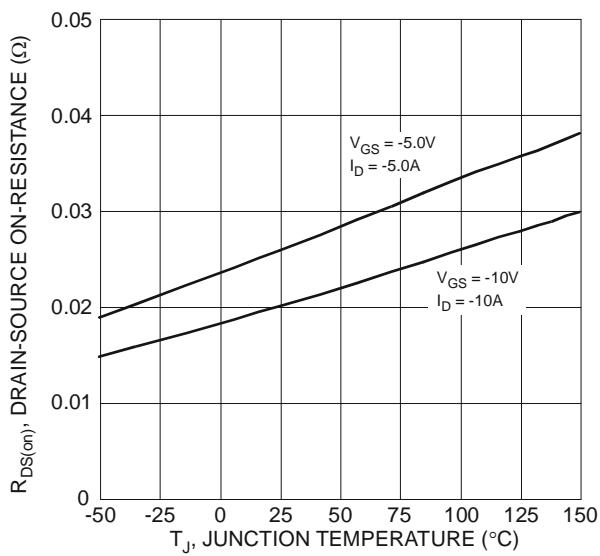


Figure 6 On-Resistance Variation with Temperature

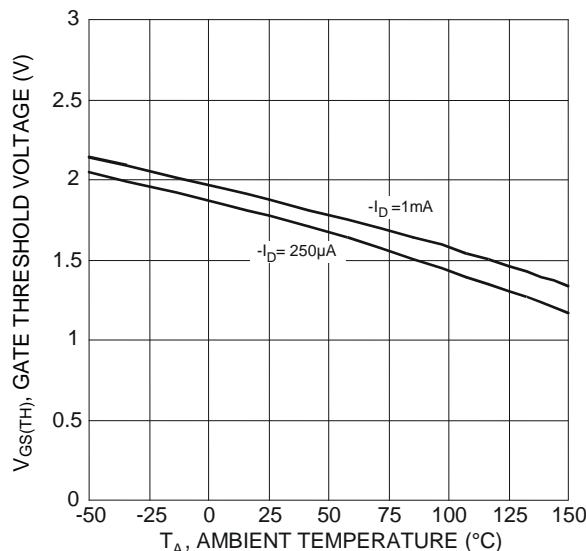


Figure 7 Gate Threshold Variation vs. Ambient Temperature

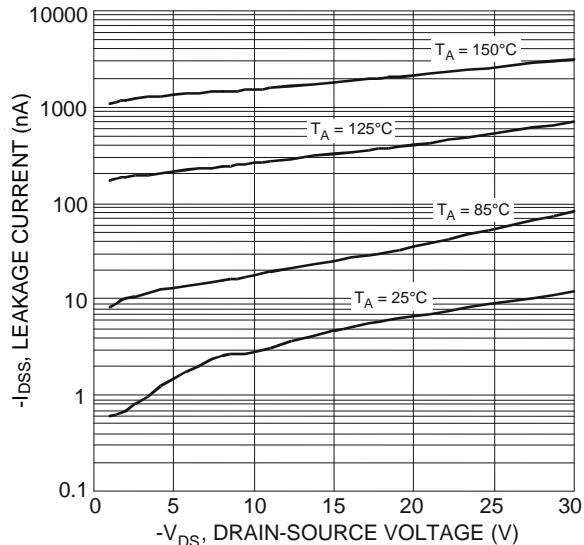


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

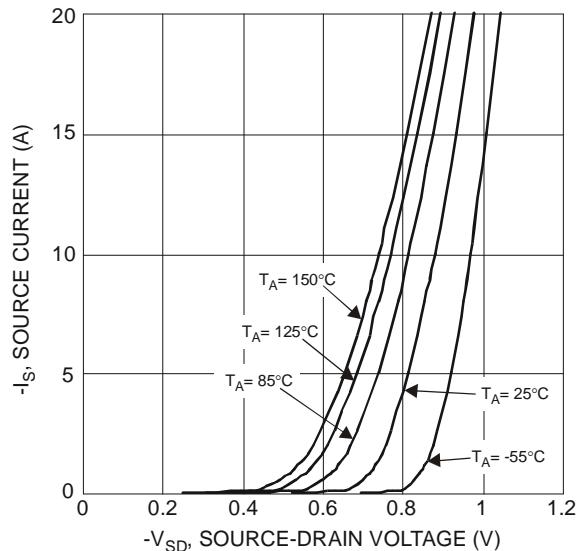


Figure 8 Diode Forward Voltage vs. Current

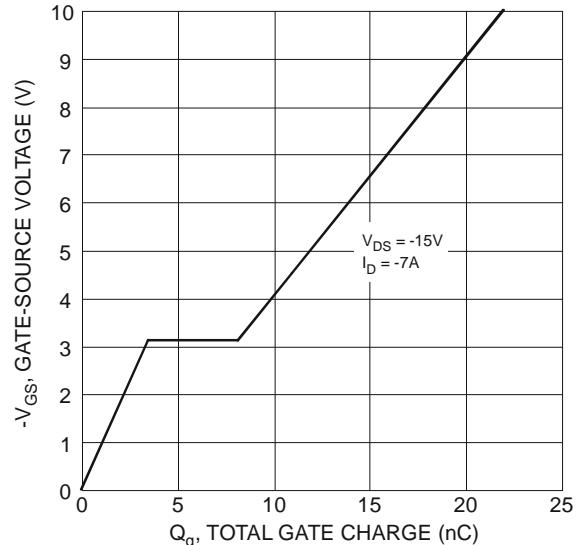


Figure 10 Gate-Charge Characteristics

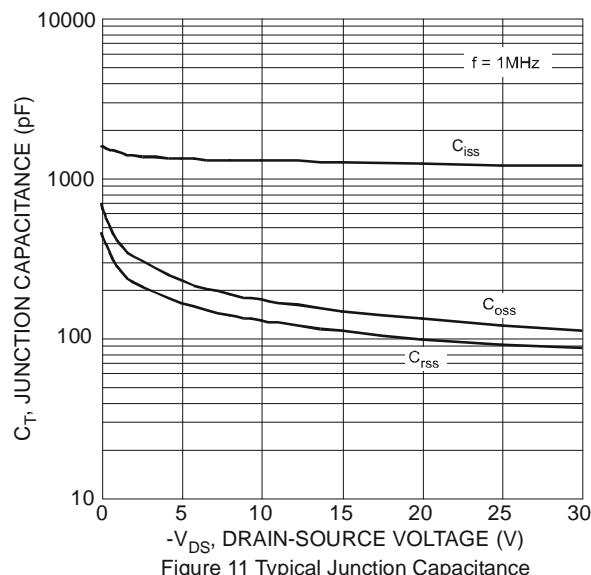


Figure 11 Typical Junction Capacitance

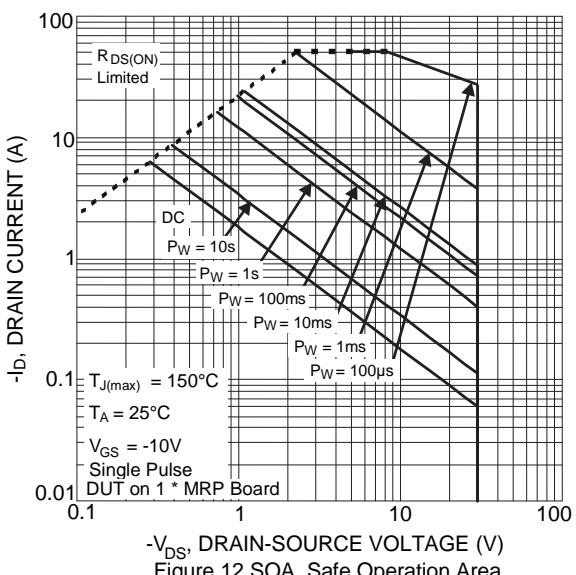


Figure 12 SOA, Safe Operation Area

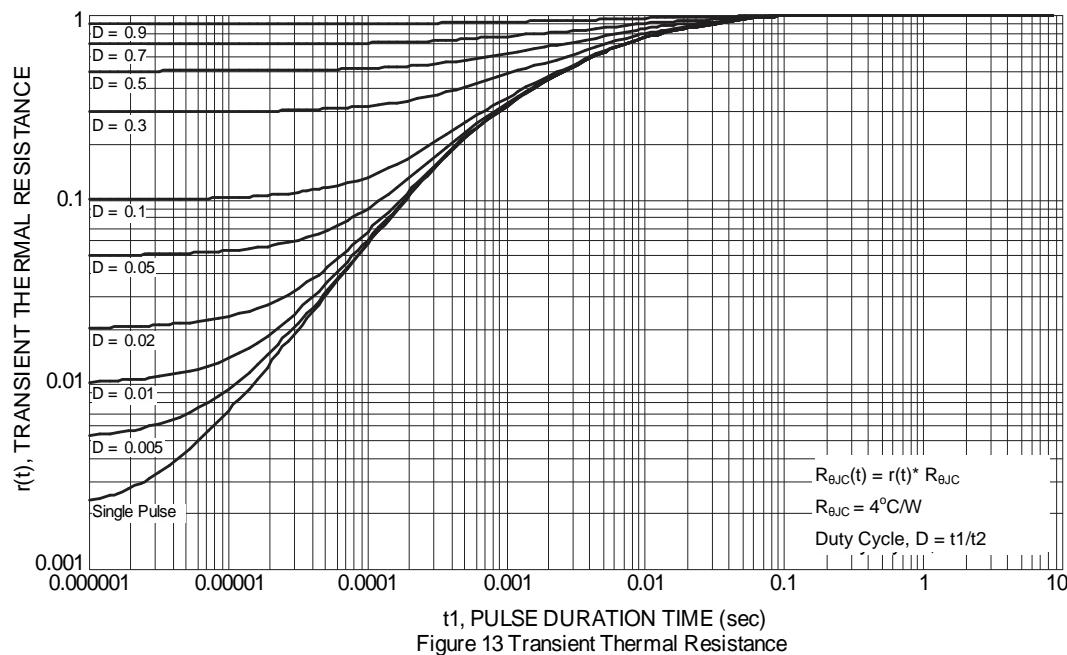
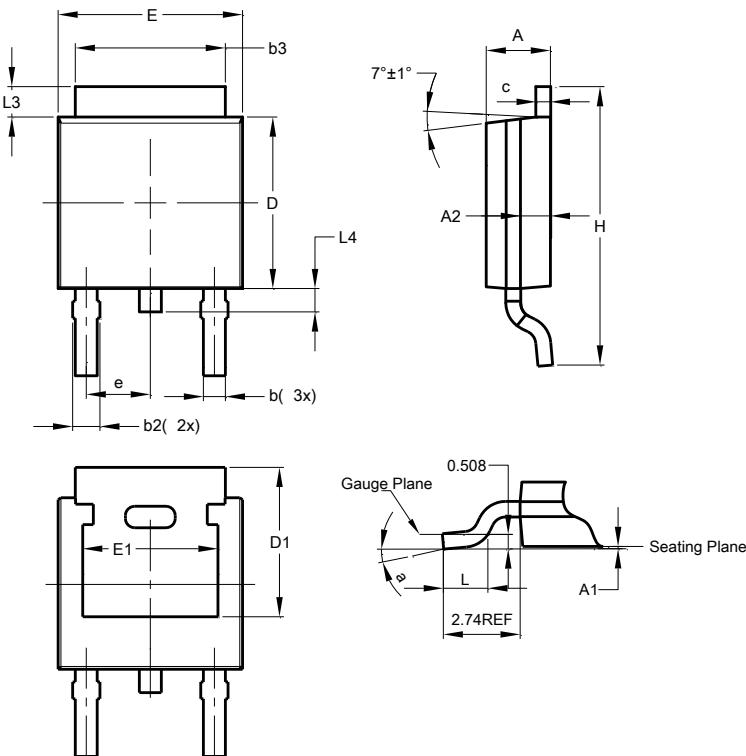


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TO252 (DPAK)



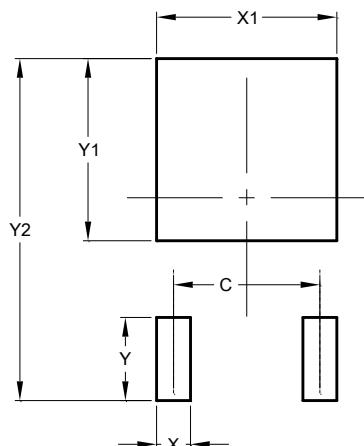
TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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

All Dimensions in mm

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TO252 (DPAK)



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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