

Product Summary

BV _{DSS}	R _{D(S)} max	I _D max T _C = +25°C
30V	5.5mΩ @ V _{GS} = 10V	80A
	9.0mΩ @ V _{GS} = 4.5V	60A

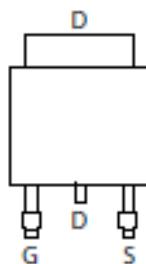
Description and Applications

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

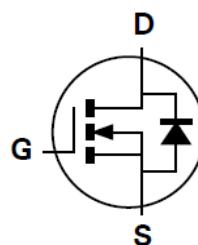
- Power Management Functions
- DC-DC Converters
- Industrial



Top View



Pin Out Top View



Equivalent Circuit

Features

- Low On-Resistance
- Low Input Capacitance
- 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
- Weight: 0.33 grams (Approximate)

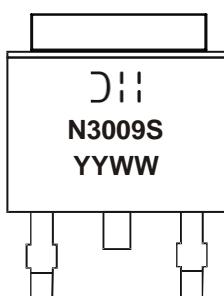
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3009SK3-13	TO252 (DPAK)	2,500/Tape & Reel

Notes:

1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. 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.
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/products/packages.html>.

Marking Information



DII = Manufacturer's Marking
 N3009S = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 17 = 2017)
 WW = Week Code (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}	± 20	V	
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 7)	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	80 60	A
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	20 16	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	100	A	
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	20	A	
Pulsed Continuous Body Diode Forward Current (10 μs Pulse, Duty Cycle = 1%)	I_{SM}	100	A	
Avalanche Current, $L = 0.1\text{mH}$ (Note 8)	I_{AS}	33	A	
Avalanche Energy, $L = 0.1\text{mH}$ (Note 8)	E_{AS}	55	mJ	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	1.6	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	78	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	3.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	37	$^\circ\text{C/W}$
Total Power Dissipation (Note 7)	$T_C = +25^\circ\text{C}$	P_D	44	W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	2.8	$^\circ\text{C/W}$
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
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	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
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	$V_{GS(TH)}$	1	-	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	2.5	5.5	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 30\text{A}$
		-	4.0	9.0		$V_{GS} = 4.5\text{V}, I_D = 15\text{A}$
Diode Forward Voltage	V_{SD}	-	0.7	1	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	-	2000	-	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	-	315	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	247	-	pF	
Gate Resistance	R_g	-	2.2	-	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	-	20	-	nC	$V_{DS} = 15\text{V}, I_D = 15\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	-	42	-	nC	
Gate-Source Charge	Q_{gs}	-	4.7	-	nC	
Gate-Drain Charge	Q_{gd}	-	7.4	-	nC	
Turn-On Delay Time	$t_{D(ON)}$	-	3.9	-	ns	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_G = 3.3\Omega, I_D = 15\text{A}$
Turn-On Rise Time	t_R	-	4.1	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	31	-	ns	
Turn-Off Fall Time	t_F	-	15	-	ns	
Reverse Recovery Time	t_{RR}	-	15	-	ns	$I_F = 15\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	-	6.0	-	nC	

Notes:

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. Thermal resistance from junction to soldering point (on the exposed drain pad).
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.

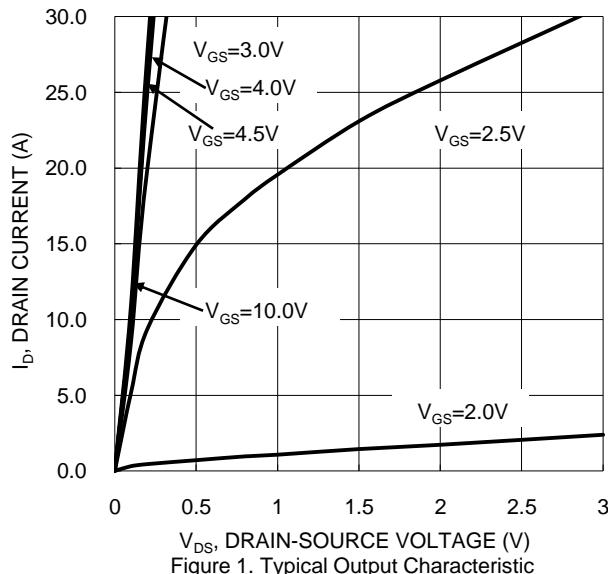


Figure 1. Typical Output Characteristic

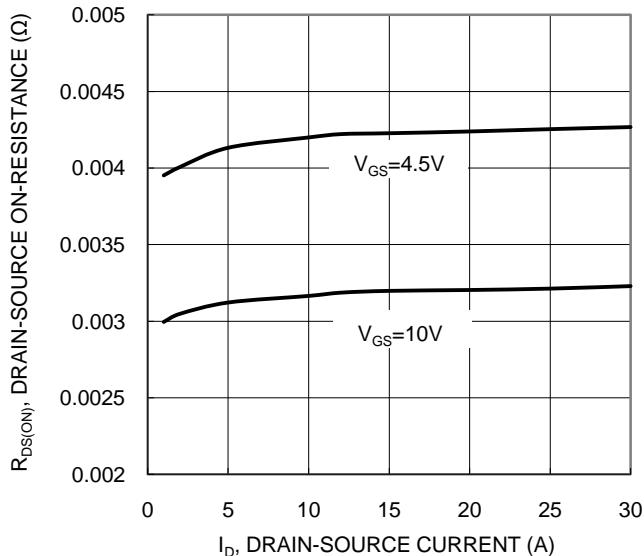


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

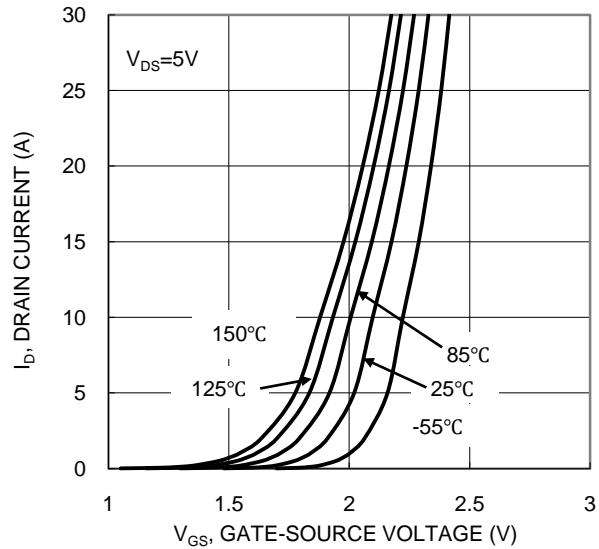


Figure 2. Typical Transfer Characteristic

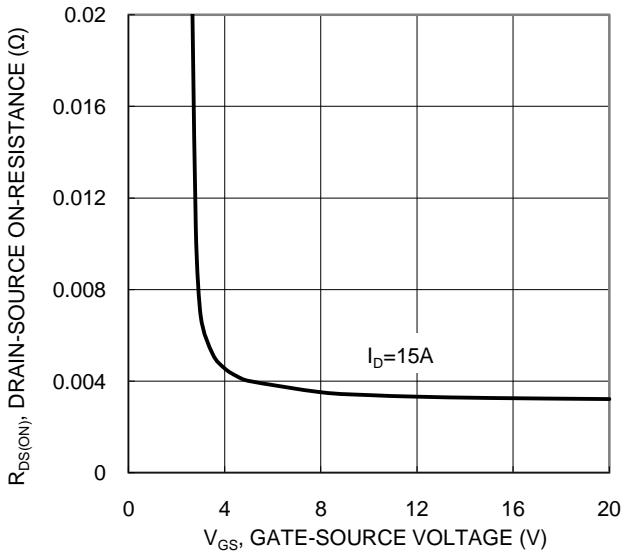


Figure 4. Typical Transfer Characteristic

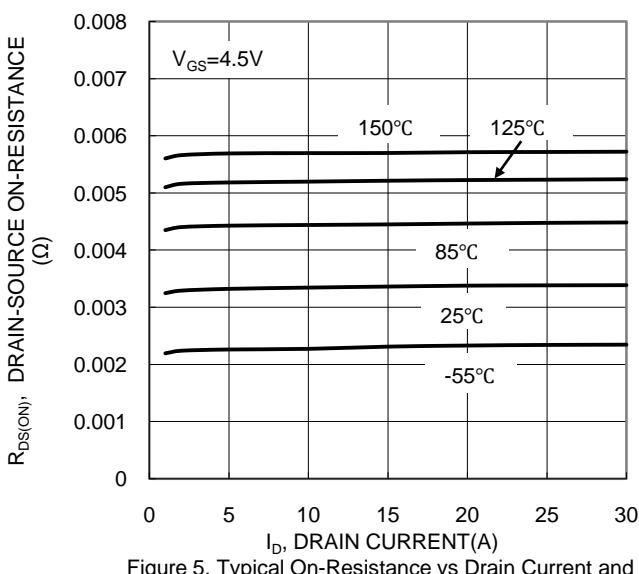


Figure 5. Typical On-Resistance vs Drain Current and Temperature

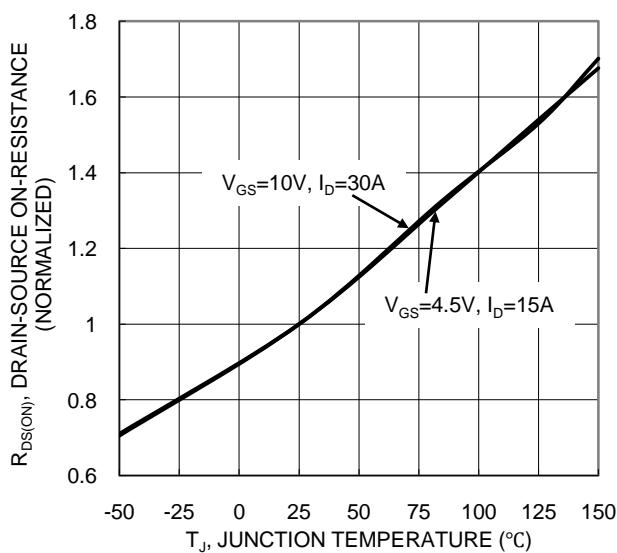


Figure 6. On-Resistance Variation with Temperature

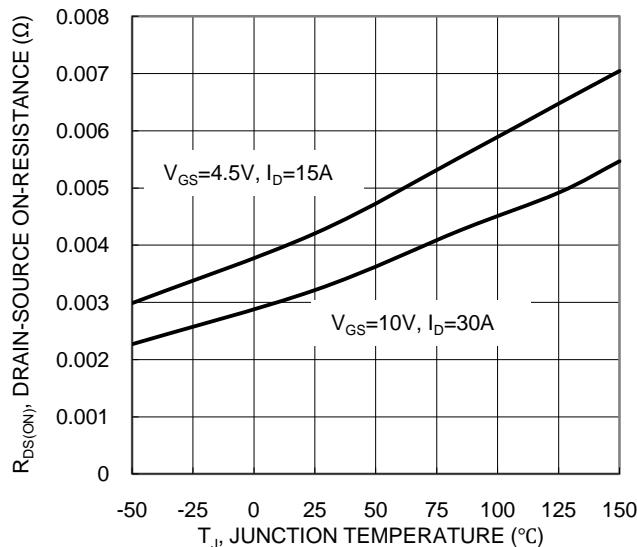


Figure 7. On-Resistance Variation with Temperature

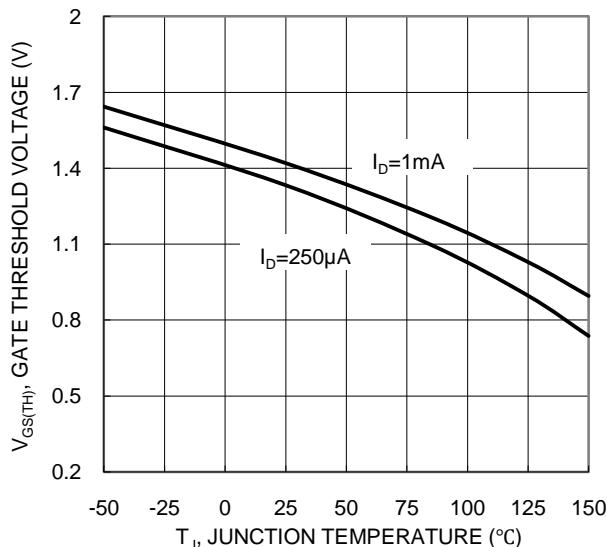


Figure 8. Gate Threshold Variation vs Junction Temperature

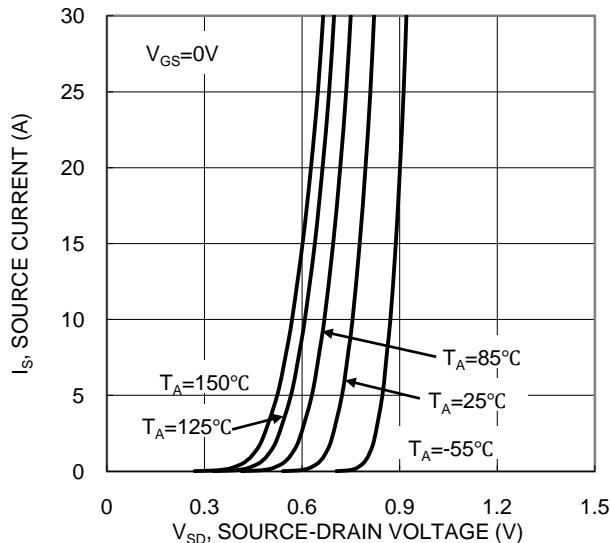


Figure 9. Diode Forward Voltage vs Current

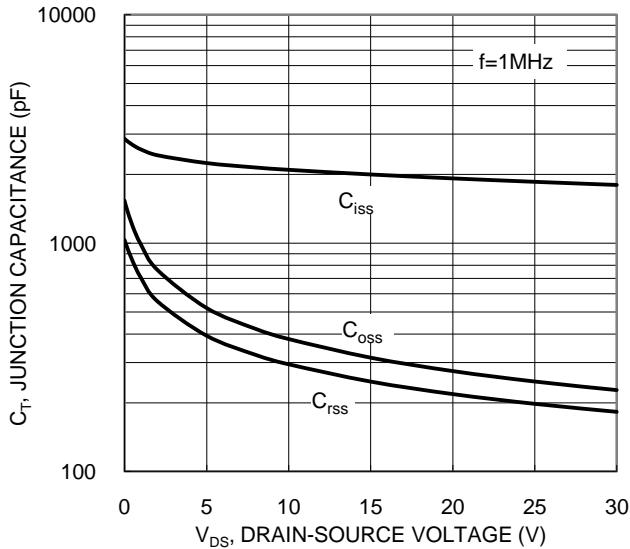


Figure 10. Typical Junction Capacitance

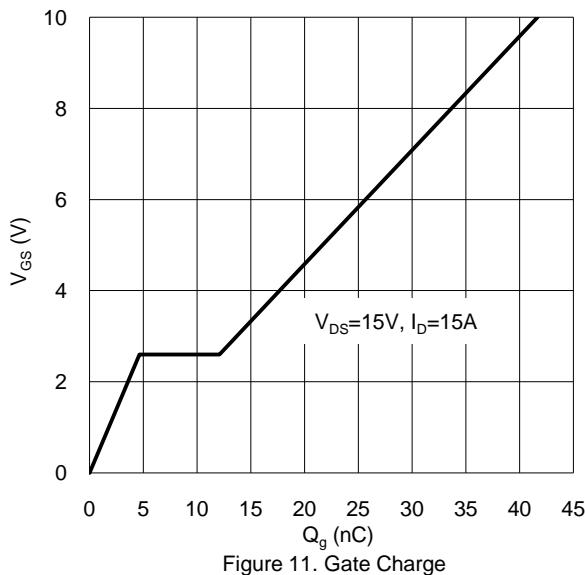


Figure 11. Gate Charge

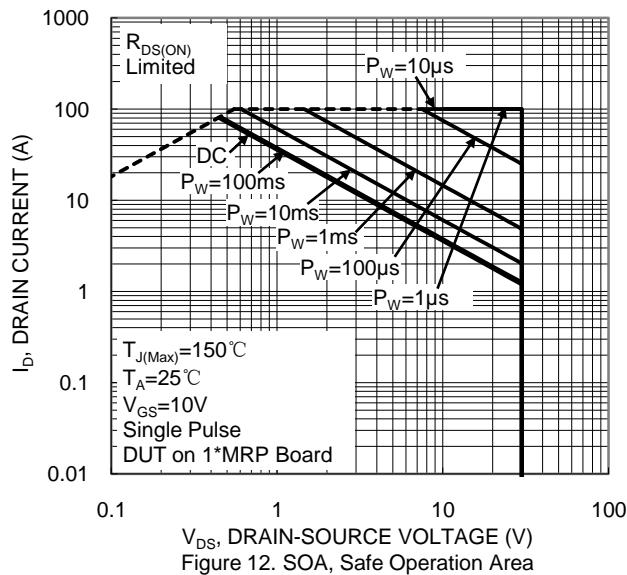


Figure 12. SOA, Safe Operation Area

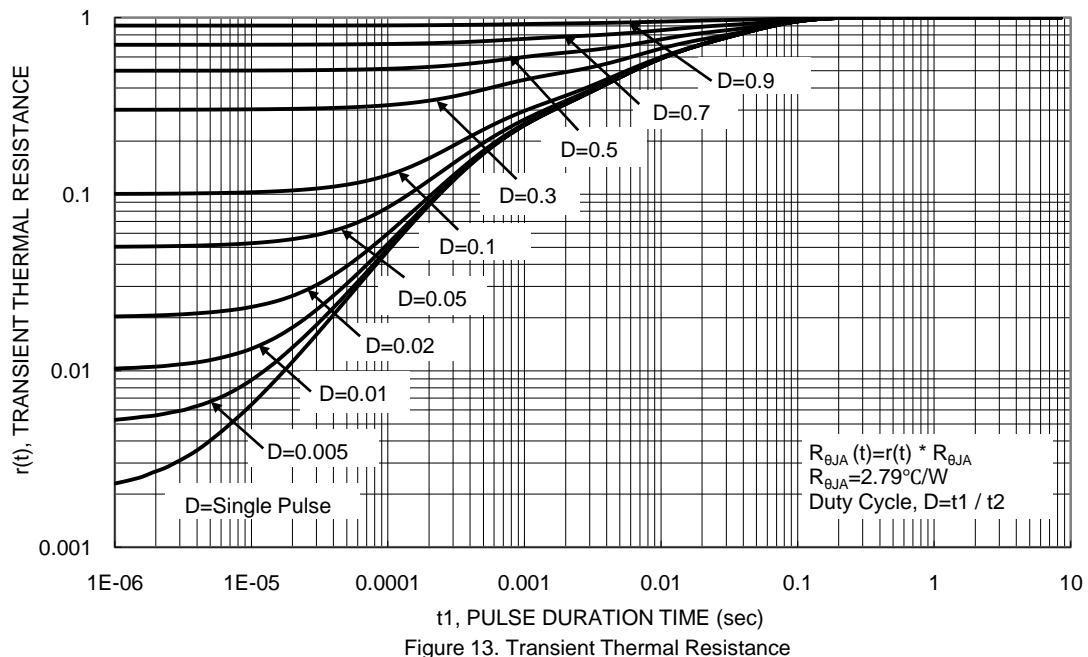
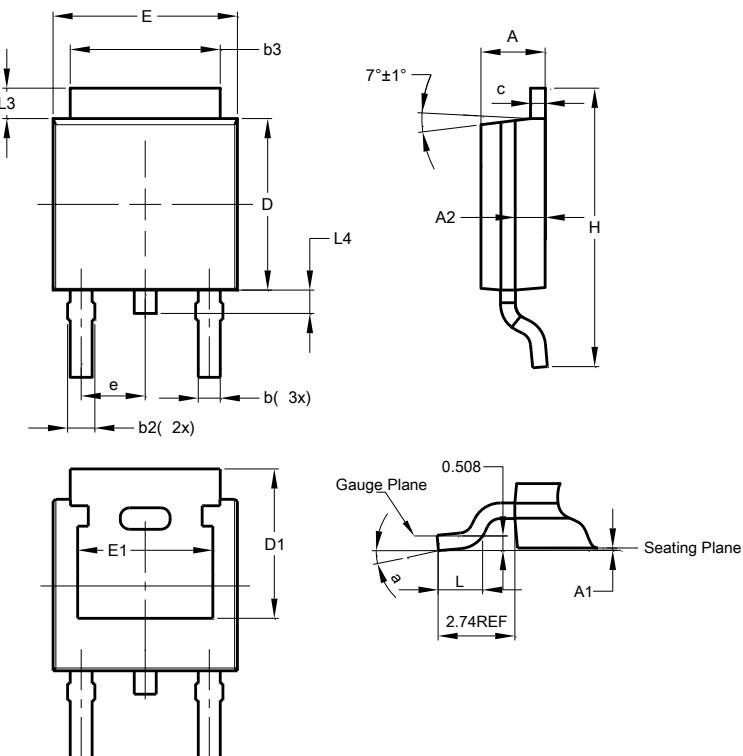


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

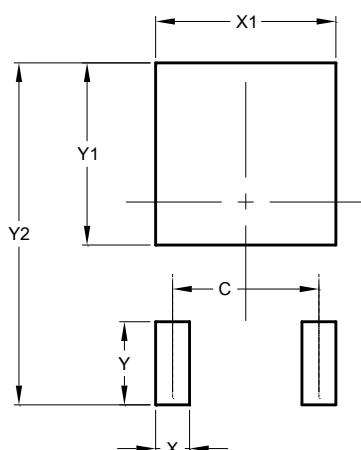


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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

All Dimensions in mm

Suggested Pad Layout

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



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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