

## Product Summary

$BV_{DSS}$ (@ $T_J$ Max)	$R_{DS(ON)}$ Max	$I_D$ @ $T_C = +25^\circ C$
650V	$3.5\Omega$ @ $V_{GS} = 10V$	2.8A

## Features and Benefits

- Low On-Resistance
- High  $BV_{DSS}$  Rating for Power Application
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Description and Applications

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

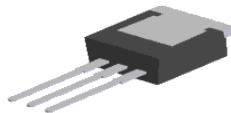
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Mechanical Data

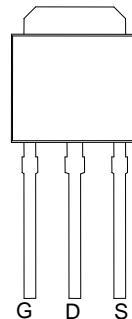
- Case: TO251 (Type TH)
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (Approximate)



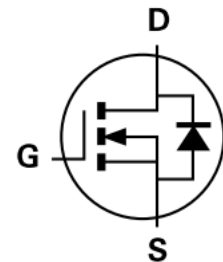
Top View



Bottom View



Top View  
Pin Configuration



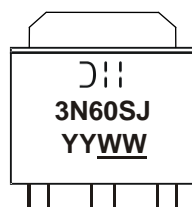
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMG3N60SJ3	TO251 (Type TH)	75 Pieces/Tube

- 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](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



= Manufacturer's Marking  
 3N60SJ = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 17 = 2017)  
 WW or WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	600	V
Gate-Source Voltage			V <sub>GSS</sub>	±30	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>C</sub> = +25°C T <sub>C</sub> = +100°C	I <sub>D</sub>	2.8 1.8	A
Maximum Body Diode Forward Current (Note 5)			I <sub>S</sub>	2.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	4.2	A
Avalanche Current, L = 60mH (Note 7)			I <sub>AS</sub>	1.0	A
Avalanche Energy, L = 60mH (Note 7)			E <sub>AS</sub>	33	mJ
Peak Diode Recovery dv/dt			dv/dt	5	V/ns

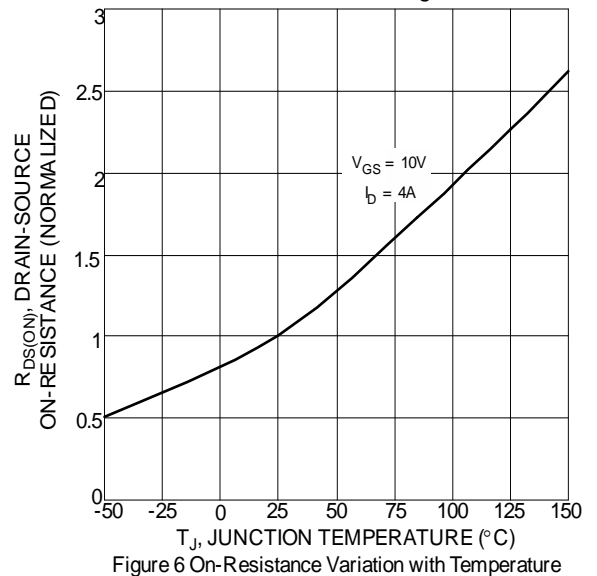
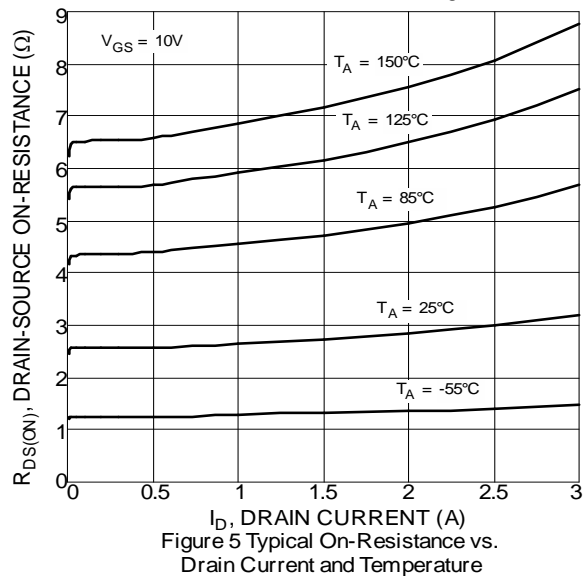
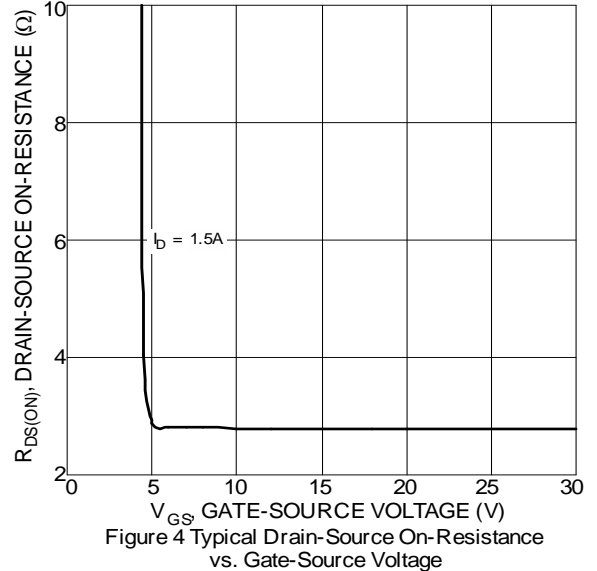
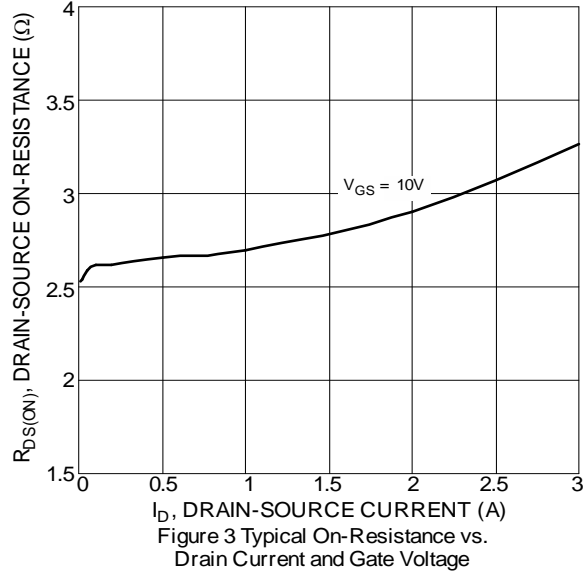
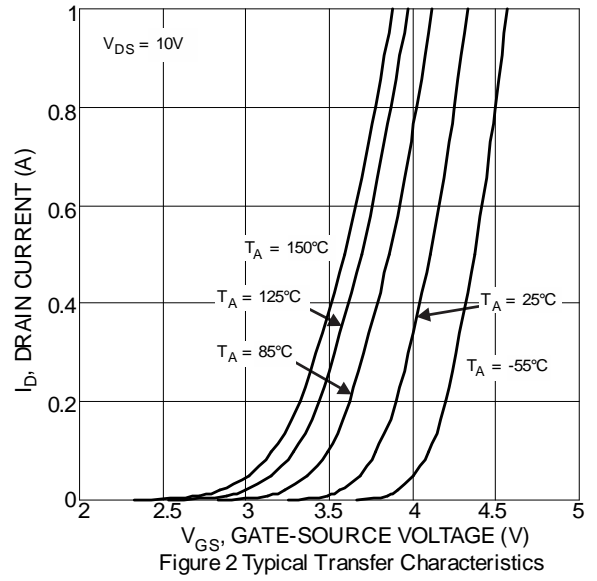
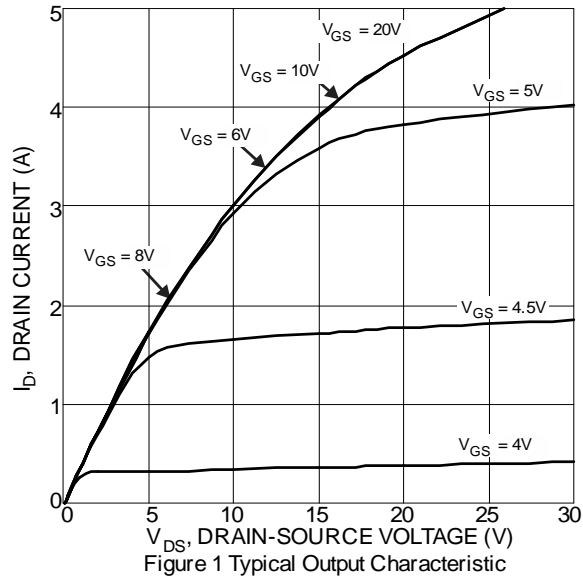
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>C</sub> = +25°C	P <sub>D</sub>	41	W
	T <sub>C</sub> = +100°C		16	
Thermal Resistance, Junction to Ambient (Note 6)		R <sub>θJA</sub>	49	°C/W
Thermal Resistance, Junction to Case (Note 5)		R <sub>θJC</sub>	3.0	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 8)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	600	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 8)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	2.0	—	4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	3.5	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5A
Diode Forward Voltage	V <sub>SD</sub>	—	—	1.5	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 3.0A
<b>DYNAMIC CHARACTERISTICS</b> (Note 7)						
Input Capacitance	C <sub>iss</sub>	—	354	—	pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
Output Capacitance	C <sub>oss</sub>	—	41	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	4	—		
Gate Resistance	R <sub>G</sub>	—	2.6	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge	Q <sub>G</sub>	—	12.6	—	nC	V <sub>DD</sub> = 480V, I <sub>D</sub> = 2.5A, V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>GS</sub>	—	1.7	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	7.1	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	10.6	—	ns	V <sub>DD</sub> = 300V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 2.5A, V <sub>GS</sub> = 10V
Turn-On Rise Time	t <sub>R</sub>	—	22	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	34	—		
Turn-Off Fall Time	t <sub>F</sub>	—	28	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	198	—	ns	dI/dt = 100A/µs, V <sub>DS</sub> = 100V, I <sub>F</sub> = 2.5A
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	952	—	nC	

- Notes:
- Device mounted on infinite heatsink.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
  - Guaranteed by design. Not subject to production testing.
  - Short duration pulse test used to minimize self-heating effect.



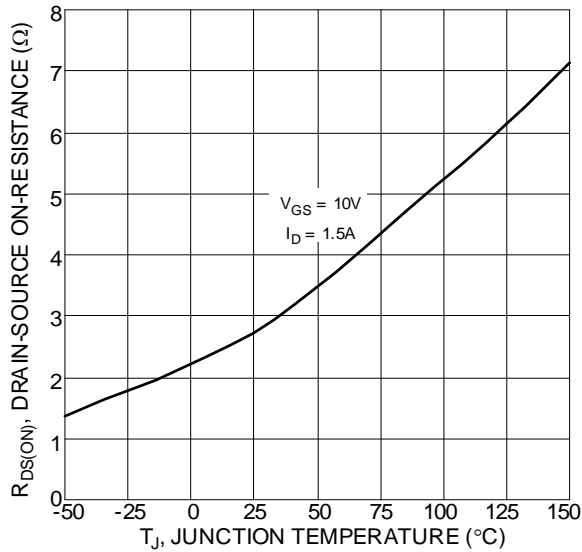


Figure 7 On-Resistance Variation with Temperature

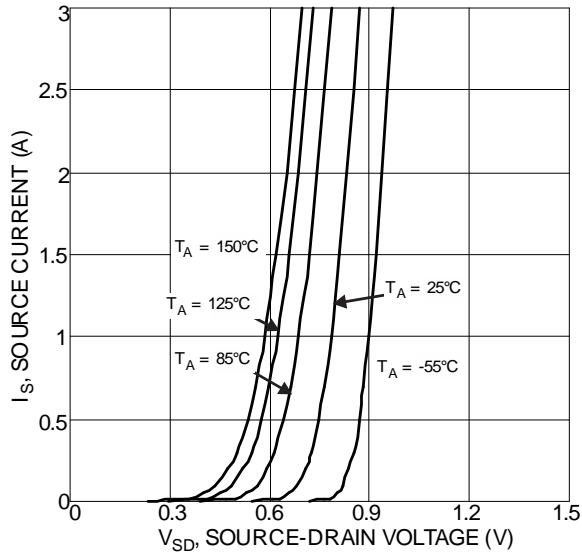


Figure 9 Diode Forward Voltage vs. Current

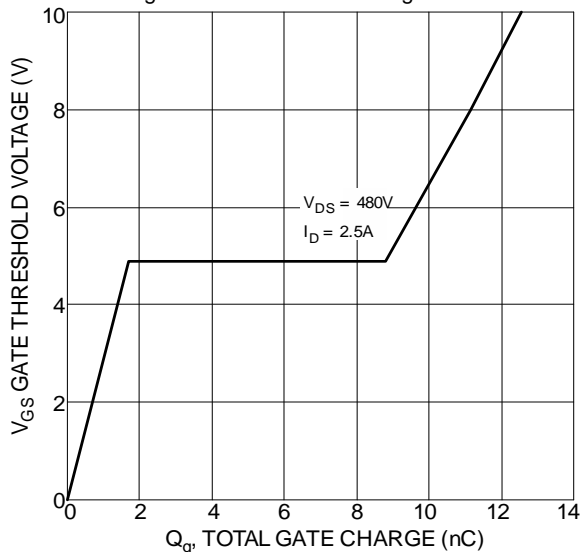


Figure 11 Gate Charge

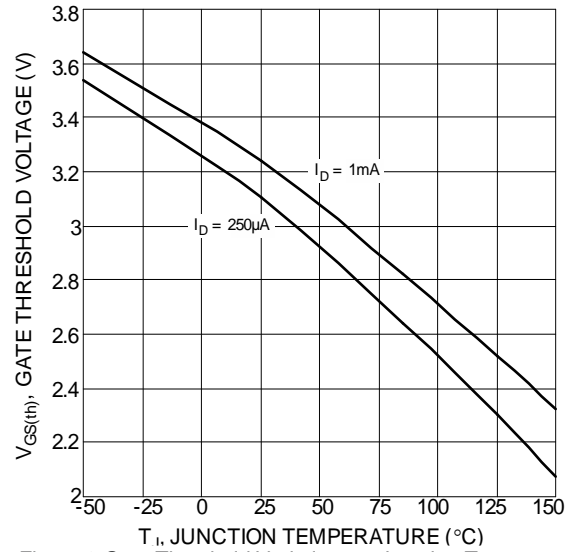


Figure 8 Gate Threshold Variation vs. Junction Temperature

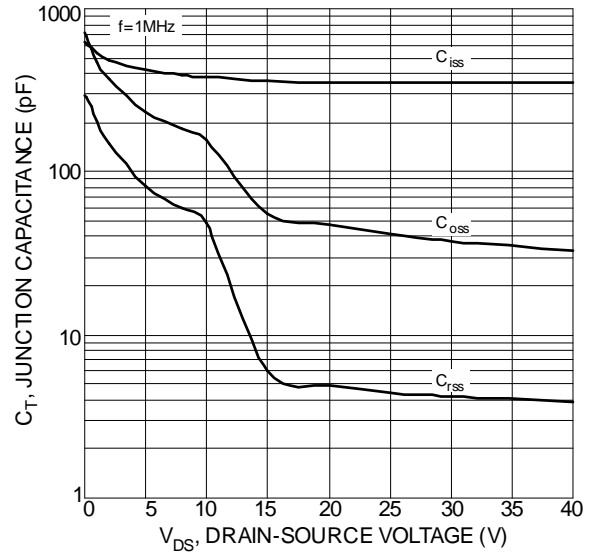


Figure 10 Typical Junction Capacitance

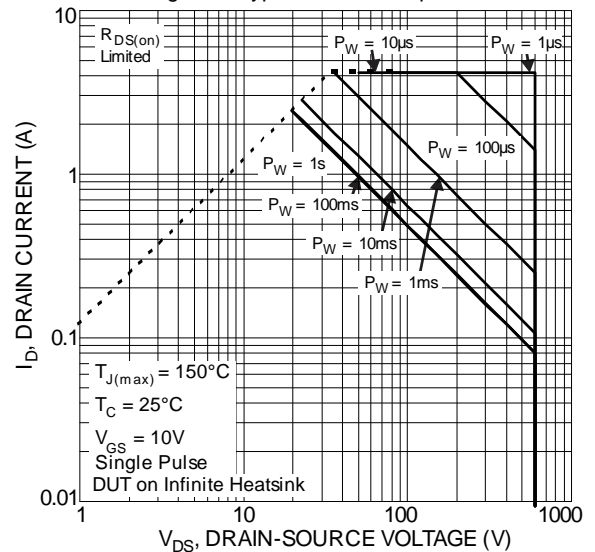
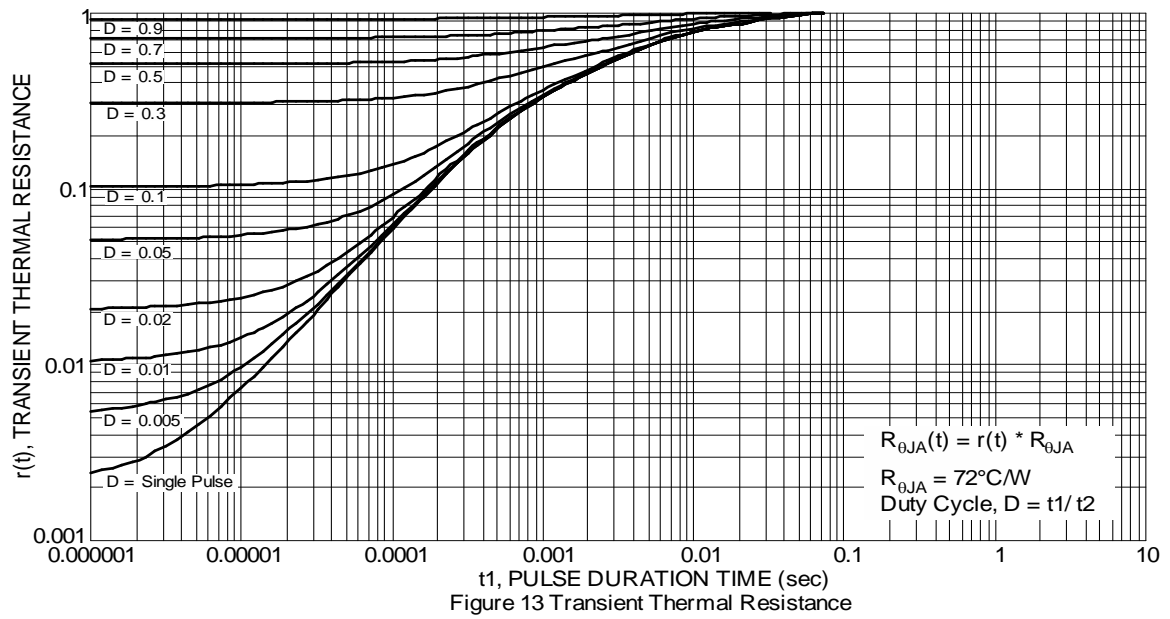


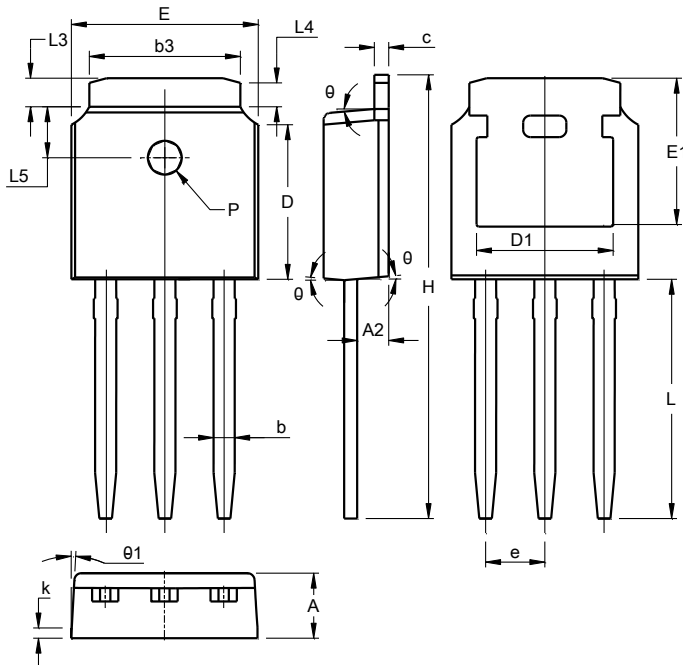
Figure 12 SOA, Safe Operation Area



## Package Outline Dimensions

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

**TO251 (Type TH)**



TO251 (Type TH)			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
A2	0.97	1.17	1.07
b	0.68	0.90	0.78
b3	5.20	5.50	5.33
c	0.43	0.63	0.53
D	5.98	6.22	6.10
D1	5.30 REF		
e	2.286 BSC		
E	6.40	6.80	6.60
E1	4.63	5.03	4.83
H	16.22	16.82	16.52
k	0.40 REF		
L	9.15	9.65	9.40
L3	0.88	1.28	1.02
L4	0.75 REF		
L5	1.65	1.95	1.80
PØ	1.20		
θ	5°	9°	7°
θ1	5°	9°	7°
All Dimensions in mm			

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