

## Product Summary

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

## 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.

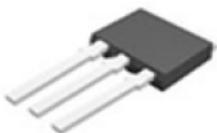
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features and Benefits

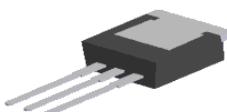
- Low On-Resistance
- High  $BV_{DSS}$  Rating for Power Application
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

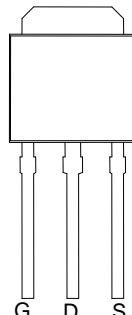
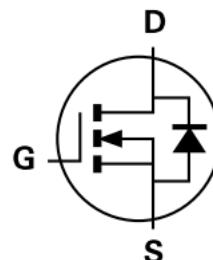
- Case: TO251 (Type TH)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.33 grams (Approximate)



Top View



Bottom View


 Top View  
Pin Configuration


Internal Schematic

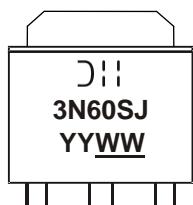
## Ordering Information (Note 4)

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



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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	600	V
Gate-Source Voltage			$V_{GSS}$	$\pm 30$	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	$I_D$	2.8 1.8	A
Maximum Body Diode Forward Current (Note 5)			$I_S$	2.5	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	4.2	A
Avalanche Current, $L = 60\text{mH}$ (Note 7)			$I_{AS}$	1.0	A
Avalanche Energy, $L = 60\text{mH}$ (Note 7)			$E_{AS}$	33	mJ
Peak Diode Recovery $dv/dt$			$dv/dt$	5	V/ns

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_C = +25^\circ\text{C}$	$P_D$	41	W
	$T_C = +100^\circ\text{C}$		16	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	49	°C/W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	3.0	
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
<b>OFF CHARACTERISTICS</b> (Note 8)						
Drain-Source Breakdown Voltage	$BV_{DSS}$	600	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 600\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	100	nA	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b> (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	3.5	$\Omega$	$V_{GS} = 10\text{V}, I_D = 1.5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	—	1.5	V	$V_{GS} = 0\text{V}, I_S = 3.0\text{A}$
<b>DYNAMIC CHARACTERISTICS</b> (Note 7)						
Input Capacitance	$C_{iss}$	—	354	—	pF	$V_{DS} = 25\text{V}, f = 1.0\text{MHz}, V_{GS} = 0\text{V}$
Output Capacitance	$C_{oss}$	—	41	—		
Reverse Transfer Capacitance	$C_{rss}$	—	4	—		
Gate Resistance	$R_G$	—	2.6	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	$Q_G$	—	12.6	—	nC	$V_{DD} = 480\text{V}, I_D = 2.5\text{A}, V_{GS} = 10\text{V}$
Gate-Source Charge	$Q_{GS}$	—	1.7	—		
Gate-Drain Charge	$Q_{GD}$	—	7.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	10.6	—	ns	$V_{DD} = 300\text{V}, R_G = 25\Omega, I_D = 2.5\text{A}, V_{GS} = 10\text{V}$
Turn-On Rise Time	$t_R$	—	22	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	34	—		
Turn-Off Fall Time	$t_F$	—	28	—	ns	$dl/dt = 100\text{A}/\mu\text{s}, V_{DS} = 100\text{V}, I_F = 2.5\text{A}$
Body Diode Reverse Recovery Time	$t_{RR}$	—	198	—		
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	952	—	nC	

Notes:

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

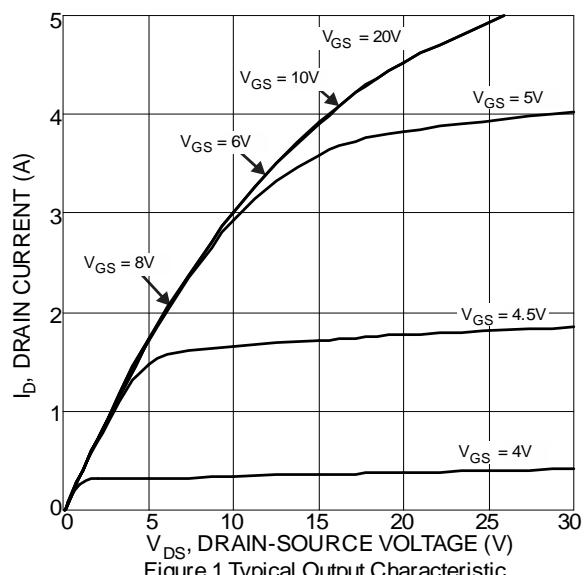


Figure 1 Typical Output Characteristic

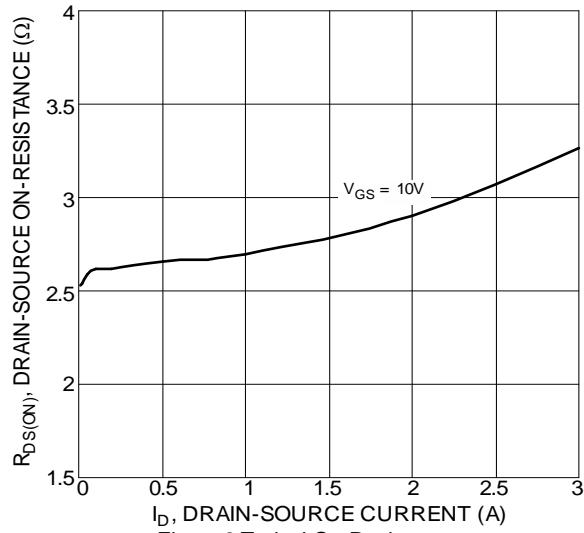


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

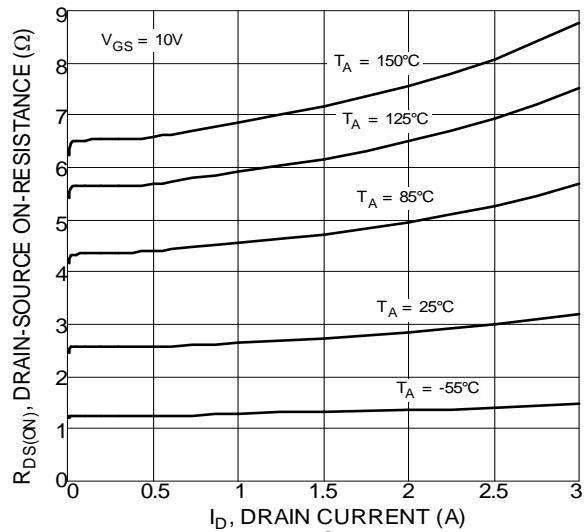


Figure 5 Typical On-Resistance vs.  
Drain Current and Temperature

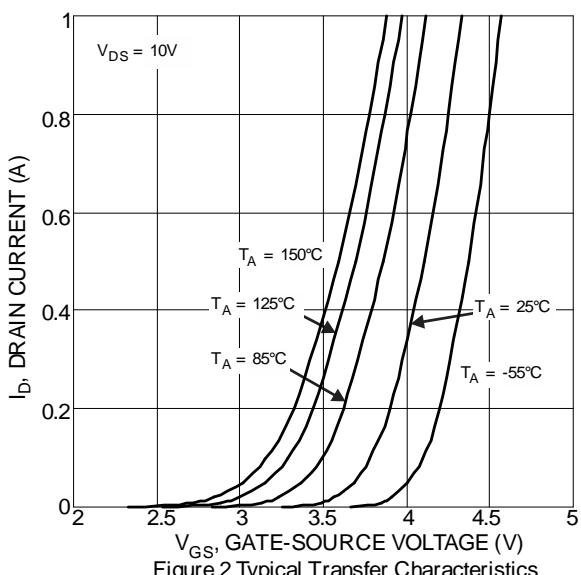


Figure 2 Typical Transfer Characteristics

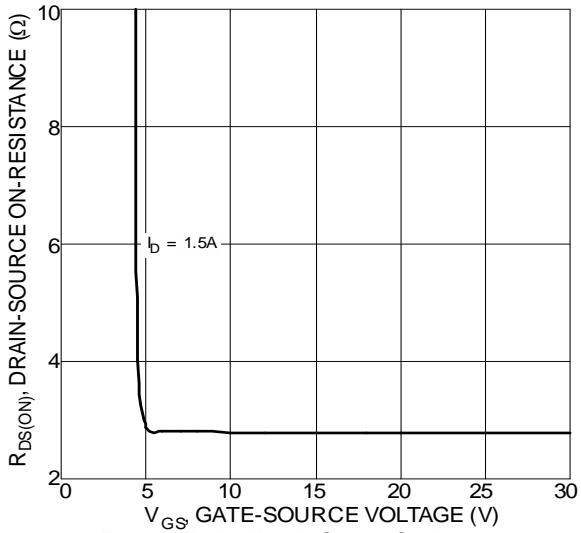


Figure 4 Typical Drain-Source On-Resistance  
vs. Gate-Source Voltage

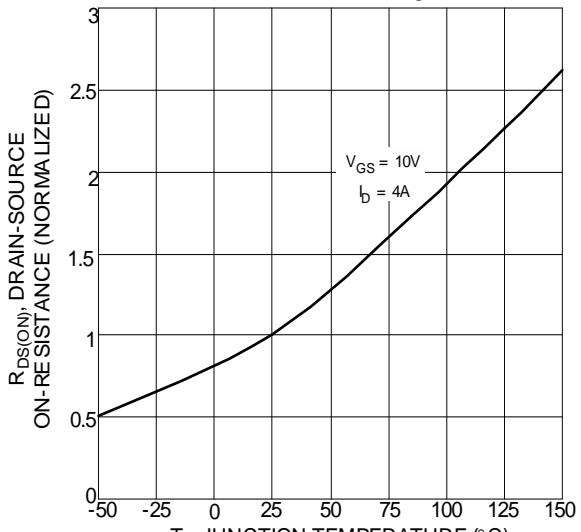


Figure 6 On-Resistance Variation with Temperature

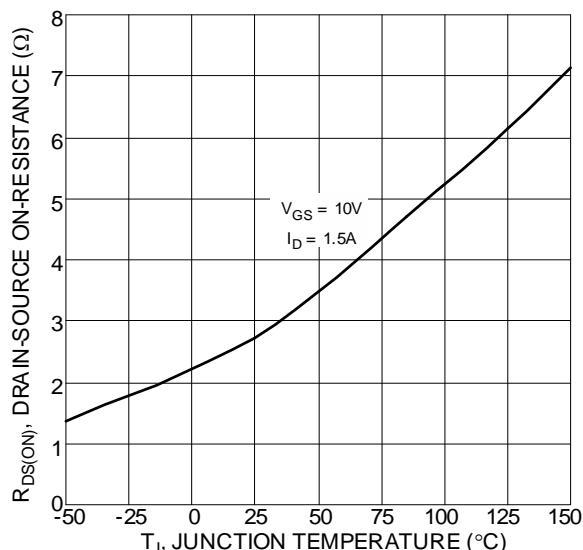


Figure 7 On-Resistance Variation with Temperature

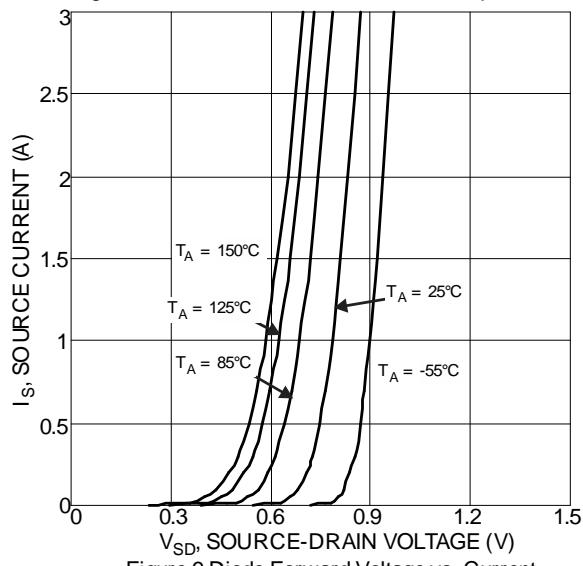


Figure 9 Diode Forward Voltage vs. Current

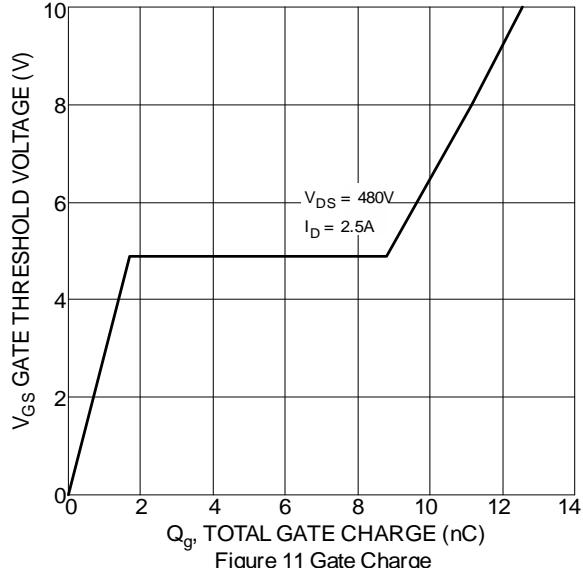


Figure 11 Gate Charge

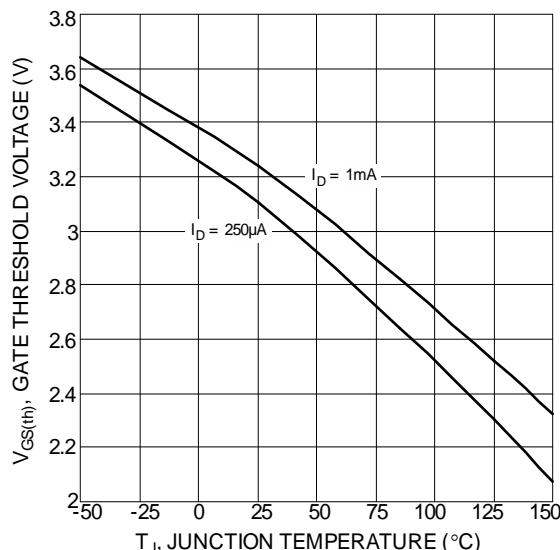


Figure 8 Gate Threshold Variation vs. Junction Temperature

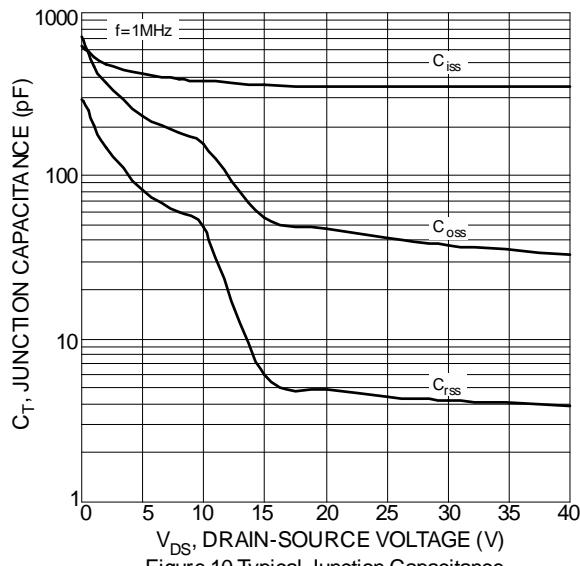


Figure 10 Typical Junction Capacitance

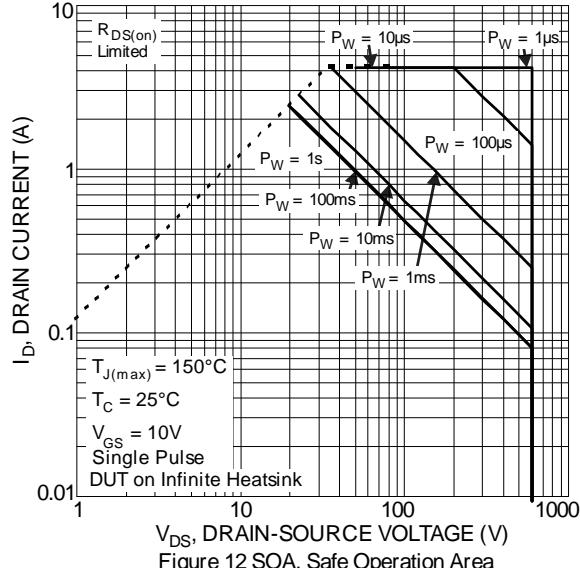


Figure 12 SOA, Safe Operation Area

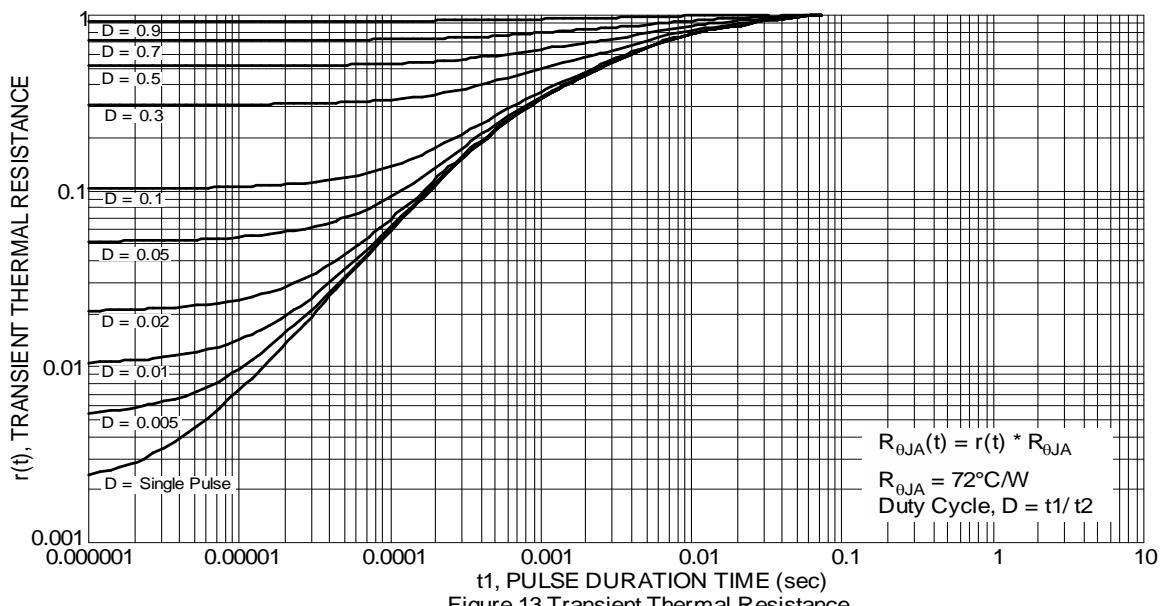
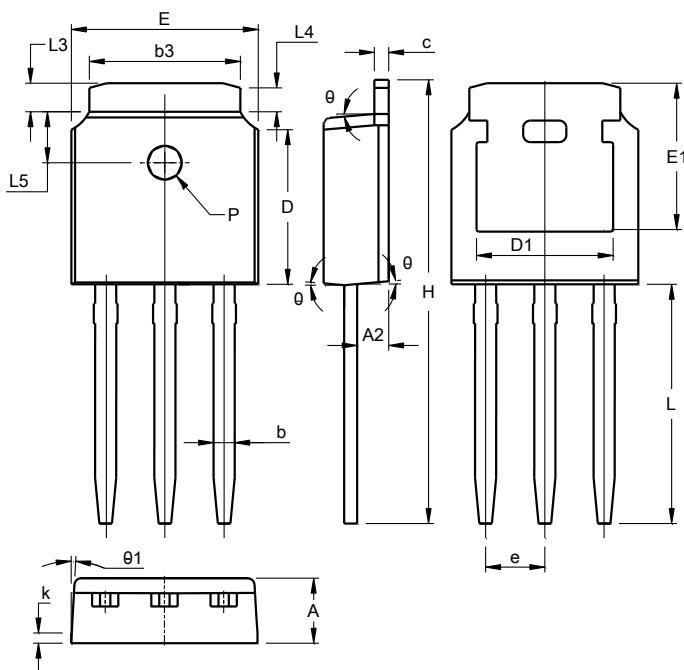


Figure 13 Transient Thermal Resistance

## 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
<b>A</b>	2.20	2.40	2.30
<b>A2</b>	0.97	1.17	1.07
<b>b</b>	0.68	0.90	0.78
<b>b3</b>	5.20	5.50	5.33
<b>c</b>	0.43	0.63	0.53
<b>D</b>	5.98	6.22	6.10
<b>D1</b>	5.30	REF	
<b>e</b>	2.286	BSC	
<b>E</b>	6.40	6.80	6.60
<b>E1</b>	4.63	5.03	4.83
<b>H</b>	16.22	16.82	16.52
<b>k</b>	0.40	REF	
<b>L</b>	9.15	9.65	9.40
<b>L3</b>	0.88	1.28	1.02
<b>L4</b>	0.75	REF	
<b>L5</b>	1.65	1.95	1.80
<b>PØ</b>	1.20		
<b>θ</b>	5°	9°	7°
<b>θ1</b>	5°	9°	7°

All Dimensions in mm

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