

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_{D Max}$ $T_C = +25^\circ C$
100V	9m $\Omega$ @ $V_{GS} = 10V$	84A
	13m $\Omega$ @ $V_{GS} = 4.5V$	70A

## Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Low On-Resistance
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Description and Applications

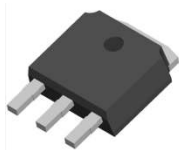
This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Motor Control
- Backlighting

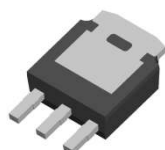
## Mechanical Data

- Case: TO251
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- 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)

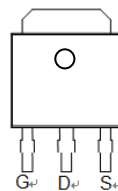
TO251 (Type TH3)



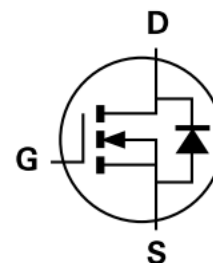
Top View



Bottom View



Top View  
Pin Configuration



Internal Schematic

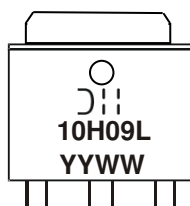
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT10H009LH3	TO251 (Type TH3)	75 Pieces / Tube

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free/](http://www.diodes.com/quality/lead_free/) 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

TO251 (Type TH3)



- $\bigcirc$  = Manufacturer's Marking
- 10H09L = Product Type Marking Code
- YYWW = Date Code Marking
- YY or YY = Last Two Digits of Year (ex: 19 = 2019)
- WW or WW = Week (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>	100	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>C</sub> = +25°C	84
		T <sub>C</sub> = +70°C	67
Maximum Body Diode Forward Current (Note 6)	I <sub>S</sub>	84	A
Pulsed Drain Current (10µs Pulse, T <sub>C</sub> =+25°C, Package Limited)	I <sub>DM</sub>	336	A
Pulsed Body Diode Current (10µs Pulse, T <sub>C</sub> =+25°C, Package Limited)	I <sub>SM</sub>	336	A
Avalanche Current, L = 0.3mH (Note 9)	I <sub>AS</sub>	21	A
Avalanche Energy, L = 0.3mH (Note 9)	E <sub>AS</sub>	66	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>C</sub> = +25°C	96
		T <sub>C</sub> = +70°C	61
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	44	°C/W
Thermal Resistance, Junction to Case (Note 5)	R <sub>θJC</sub>	1.3	
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 (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.3	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	7	9	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		—	9	13	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>ISS</sub>	—	2309	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>OSS</sub>	—	536	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	13.7	—		
Gate Resistance	R <sub>g</sub>	—	1.9	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	20.2	—	nC	V <sub>DD</sub> = 50V, I <sub>D</sub> = 20A, V <sub>GS</sub> = 4.5V
Gate-Source Charge	Q <sub>gs</sub>	—	7.0	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	8.5	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	5.4	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A, R <sub>g</sub> = 3Ω
Turn-On Rise Time	t <sub>R</sub>	—	10.6	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	28.3	—		
Turn-Off Fall Time	t <sub>F</sub>	—	14.9	—		
Reverse Recovery Time	t <sub>RR</sub>	—	44.3	—	ns	I <sub>F</sub> = 20A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	65.5	—	nC	

- Notes:
- Device mounted on infinite heatsink.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Guaranteed by design. Not subject to production testing.
  - Short duration pulse test used to minimize self-heating effect.
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

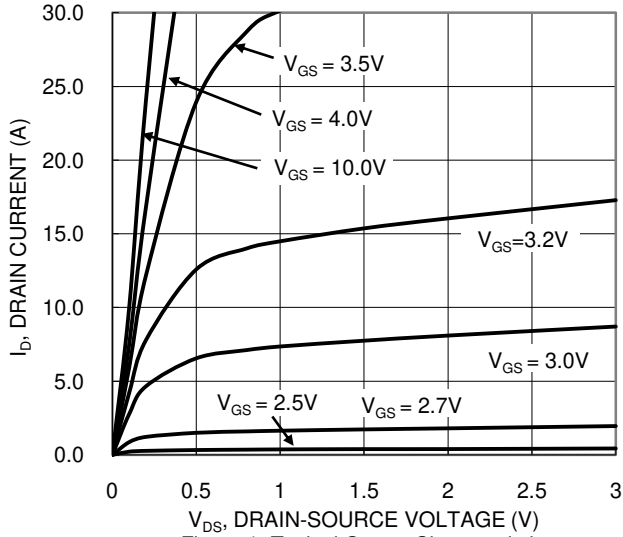


Figure 1. Typical Output Characteristic

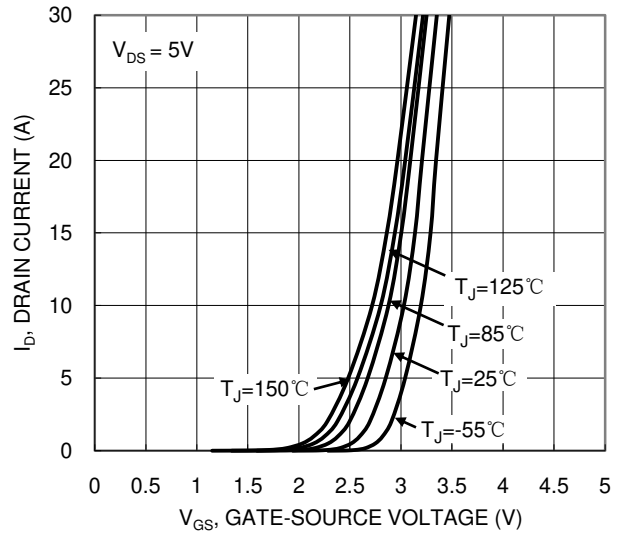


Figure 2. Typical Transfer Characteristic

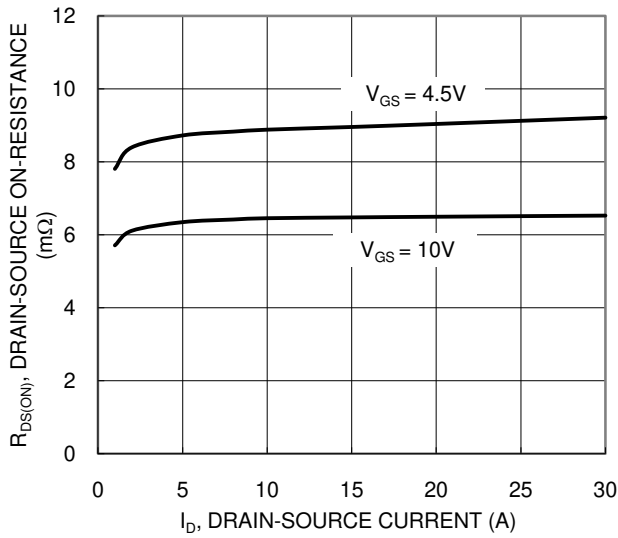


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

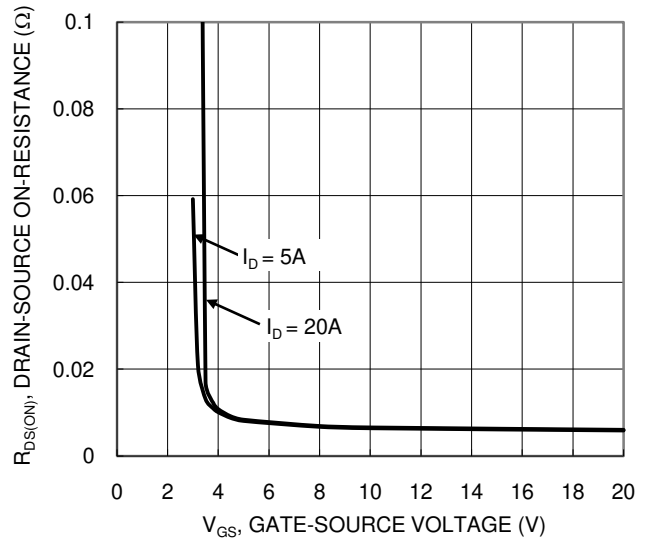


Figure 4. Typical Transfer Characteristic

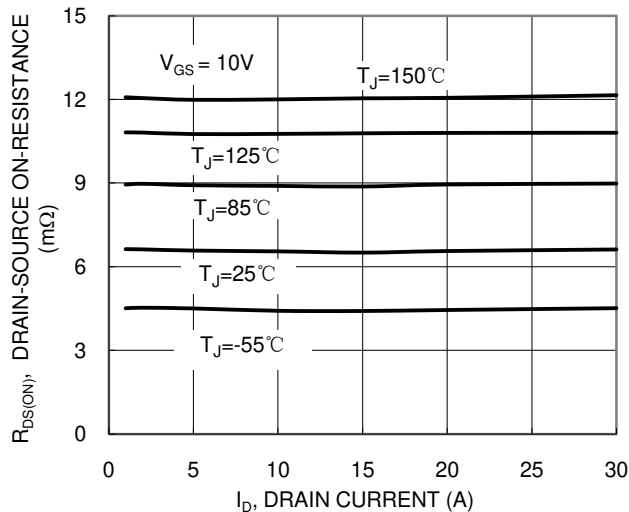


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

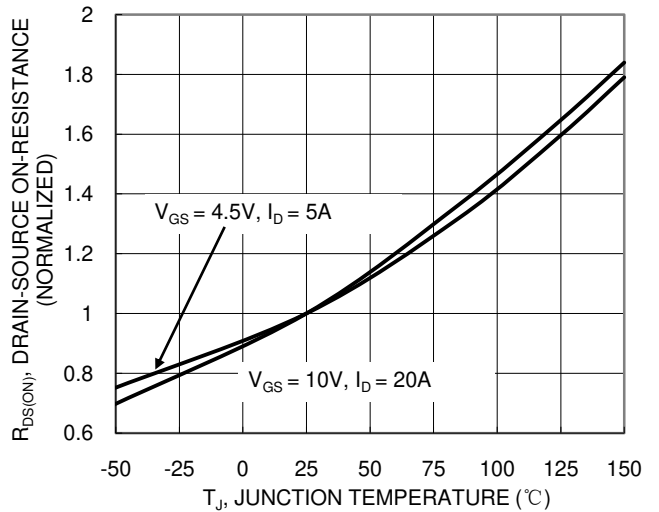


Figure 6. On-Resistance Variation with Junction Temperature

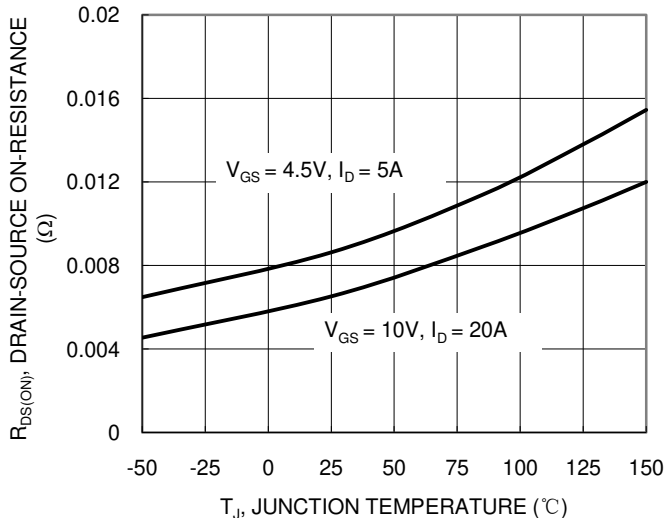


Figure 7. On-Resistance Variation with Junction Temperature

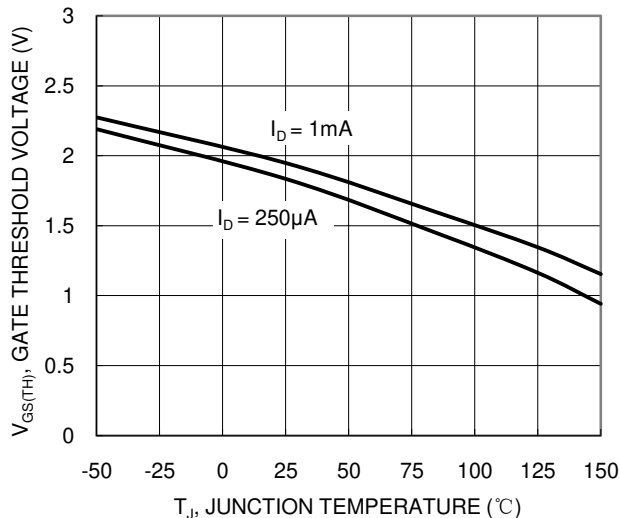


Figure 8. Gate Threshold Variation vs. Junction Temperature

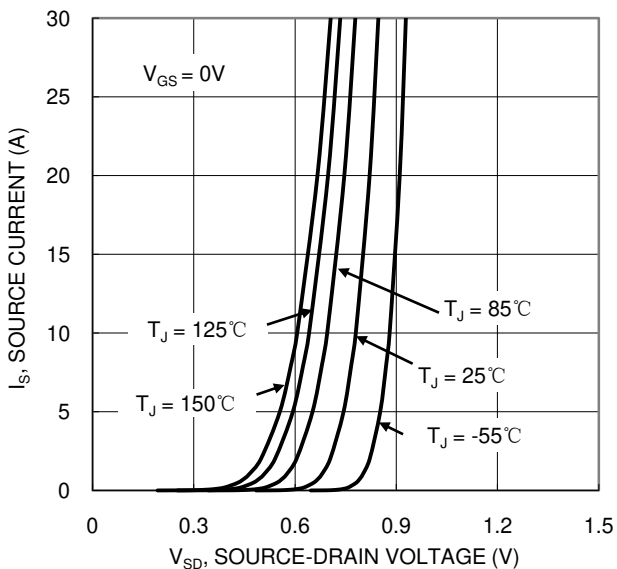


Figure 9. Diode Forward Voltage vs. Current

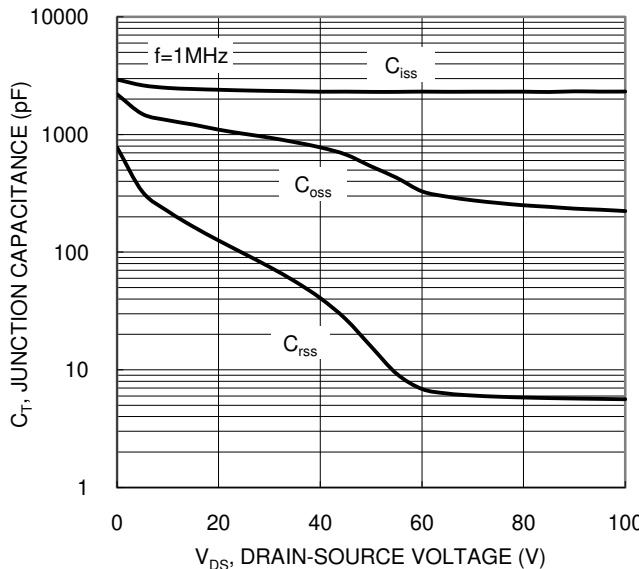


Figure 10. Typical Junction Capacitance

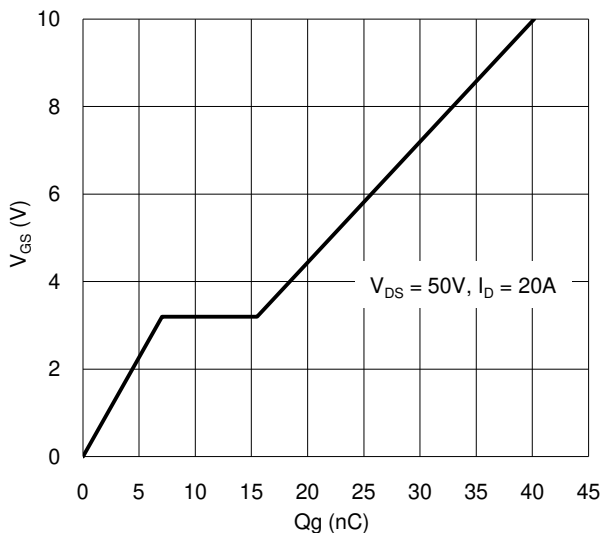


Figure 11. Gate Charge

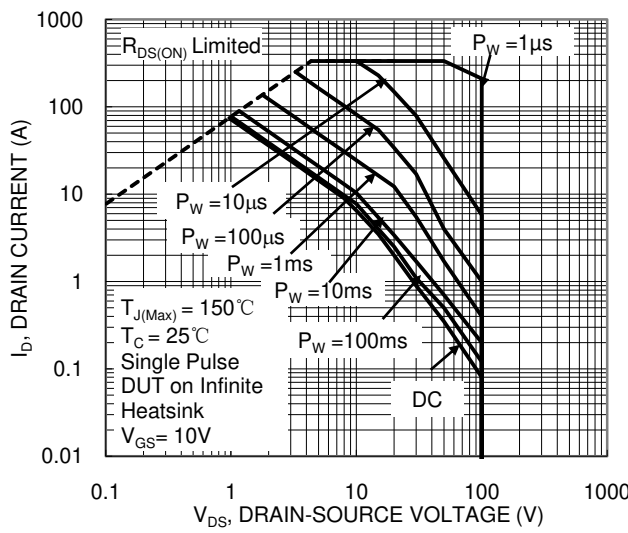


Figure 12. SOA, Safe Operation Area

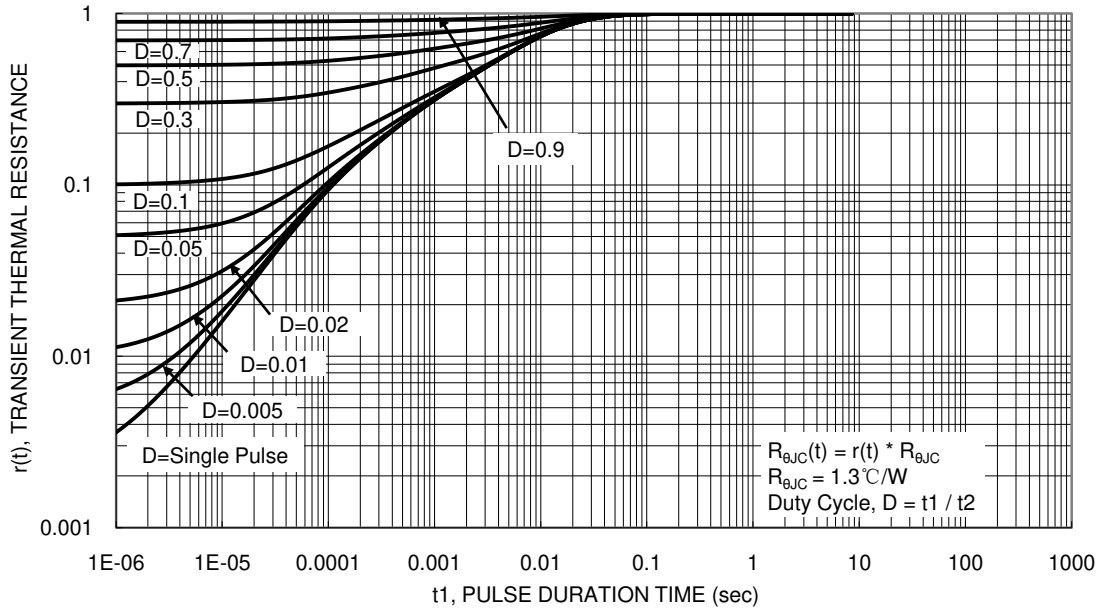
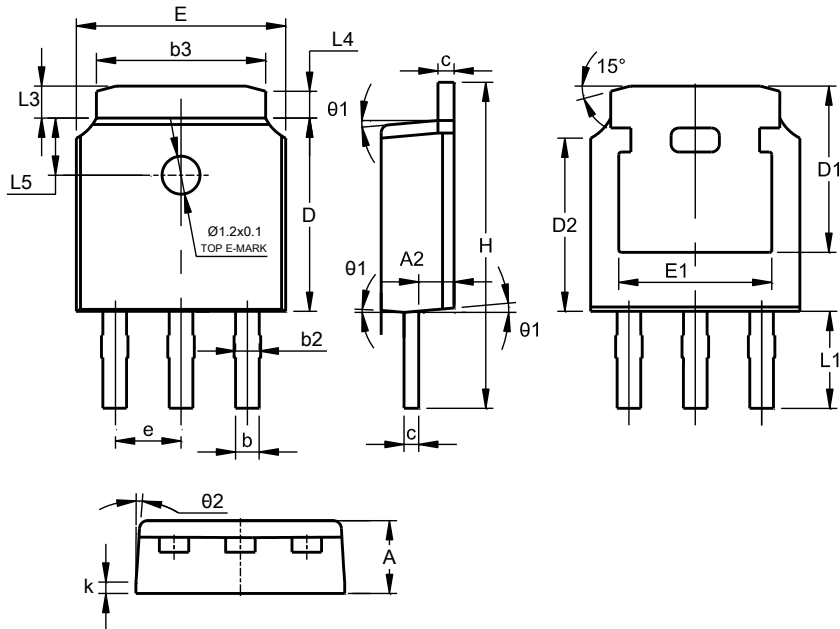


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**TO251  
(Type TH3)**



TO251 (Type TH3)			
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
b2	0.76	0.95	0.84
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		
D2	5.26	5.66	5.46
e	2.286 BSC		
E	6.40	6.80	6.60
E1	4.63	5.03	4.83
H	9.40	9.85	9.62
k	0.40REF		
L1	2.30	2.70	2.50
L3	0.88	1.28	1.02
L4	0.75 REF		
L5	1.65	1.95	1.80
θ1	5°	9°	7°
θ2	5°	9°	7°
<b>All Dimensions in mm</b>			

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