100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_C = +25°C
100V	9mΩ @ V_{GS} = 10V	84A
	14mΩ @ V_{GS} = 6V	66A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

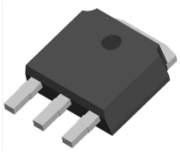
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Motor Control
- Backlighting

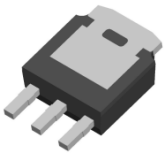
Mechanical Data

- 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)

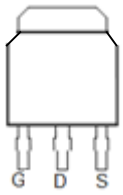
TO251 (Type TH3)



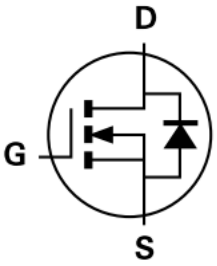
Top View



Bottom View



Top View
Pin Configuration



Internal Schematic

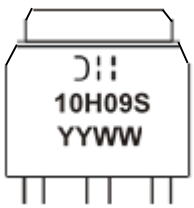
Ordering Information (Note 4)

Part Number	Case	Packaging
DMT10H9M9SH3	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 https://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)



= Manufacturer's Marking
10H09S = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Last Two Digits of Year (ex: 21 = 2021)
WW or WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	T_C = +25°C T_C = +70°C	I_D	84 67	A
Maximum Body Diode Forward Current (Note 6)		I_S	84	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	336	A
Pulsed Body Diode Forward Current (10µs Pulse, T_C = +25°C, Package Limited)		I_{SM}	336	A
Avalanche Current, L = 3mH (Note 9)		I_{AS}	11	A
Avalanche Energy, L = 3mH (Note 9)		E_{AS}	181.5	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_C = +25°C	P_D	114	W
	T_C = +70°C		73	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	41	°C/W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	1.1	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 80V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.4	9	mΩ	V_{GS} = 10V, I_D = 20A
		—	10.9	14	mΩ	V_{GS} = 6V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	V_{GS} = 0V, I_S = 13A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	2085	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	609	—		
Reverse Transfer Capacitance	C_{rss}	—	13	—		
Gate Resistance	R_G	—	1.7	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	30	—	nC	V_{DD} = 50V, I_D = 13A, V_{GS} = 10V
Gate-Source Charge	Q_{gs}	—	9.5	—		
Gate-Drain Charge	Q_{gd}	—	7.3	—		
Turn-On Delay Time	$t_{D(ON)}$	—	9.7	—	ns	V_{DD} = 50V, V_{GS} = 10V, I_D = 13A, R_G = 6Ω
Turn-On Rise Time	t_R	—	13.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	25.1	—		
Turn-Off Fall Time	t_F	—	17.3	—		
Reverse Recovery Time	t_{RR}	—	45	—	ns	I_F = 13A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	68	—	nC	

Notes:
5. Device mounted on infinite heatsink.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Guaranteed by design. Not subject to production testing.
8. Short duration pulse test used to minimize self-heating effect.
9. It depends on limited duration repetitive pulse and duty cycle, and limited by junction temperature $T_{J(MAX)}$ = +125°C.

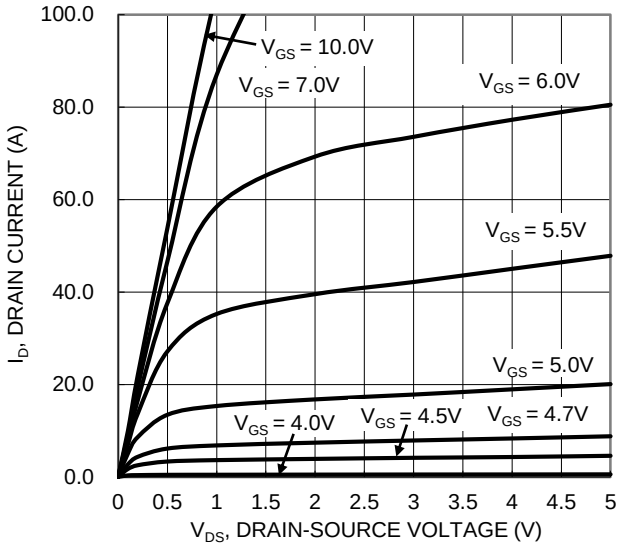


Figure 1. Typical Output Characteristic

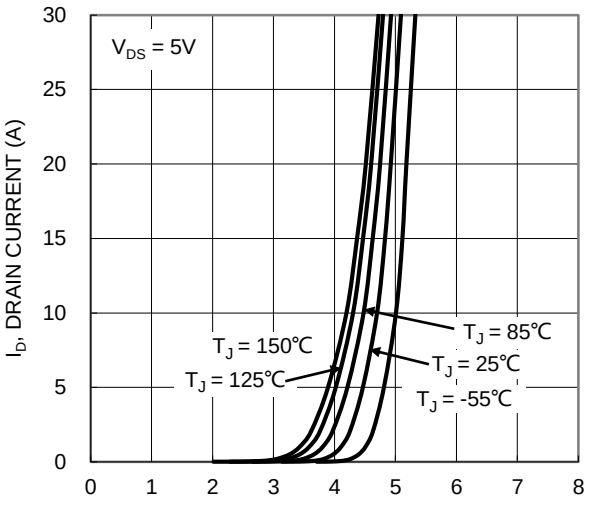


Figure 2. Typical Transfer Characteristic

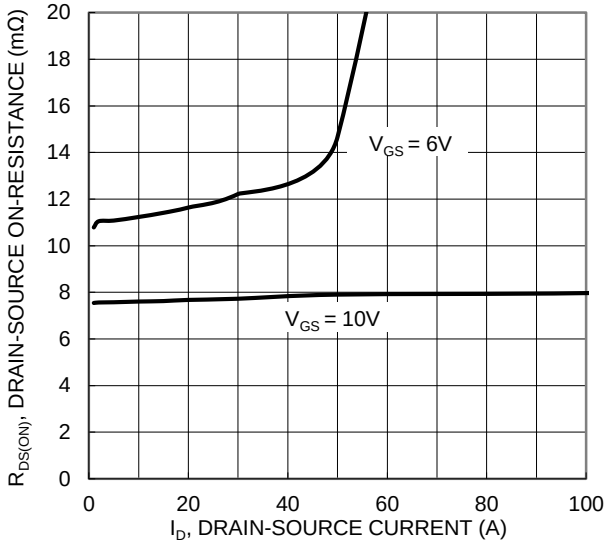


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

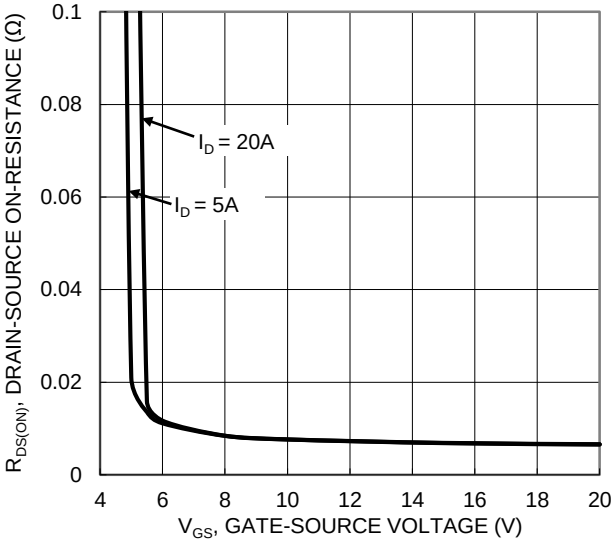


Figure 4. Typical Transfer Characteristic

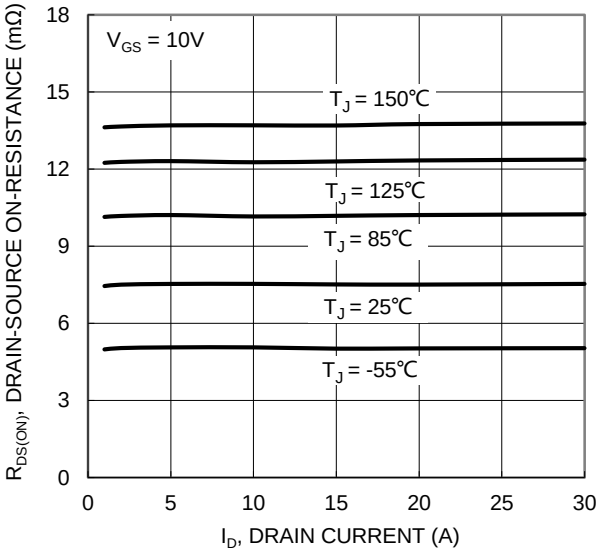


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

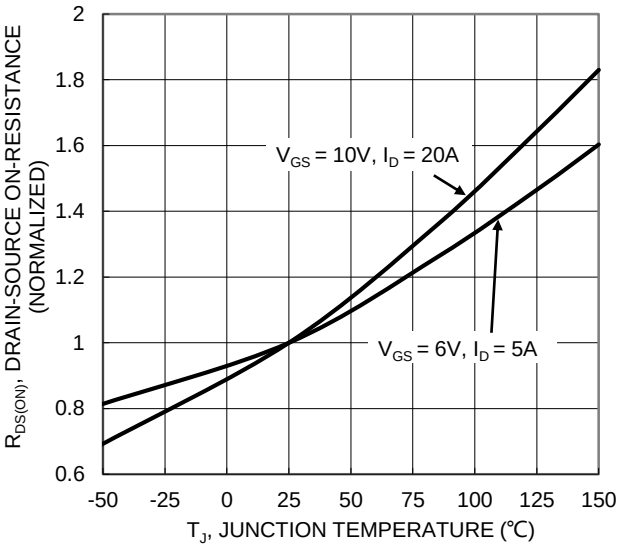


Figure 6. On-Resistance Variation with Junction Temperature

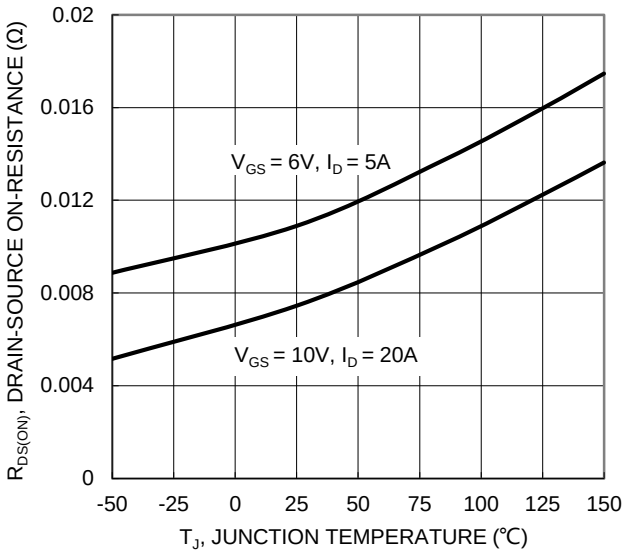


Figure 7. On-Resistance Variation with Junction Temperature

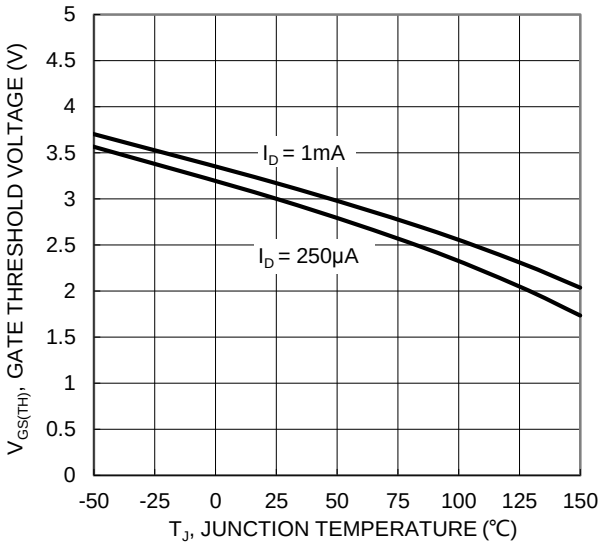


Figure 8. Gate Threshold Variation vs. Junction Temperature

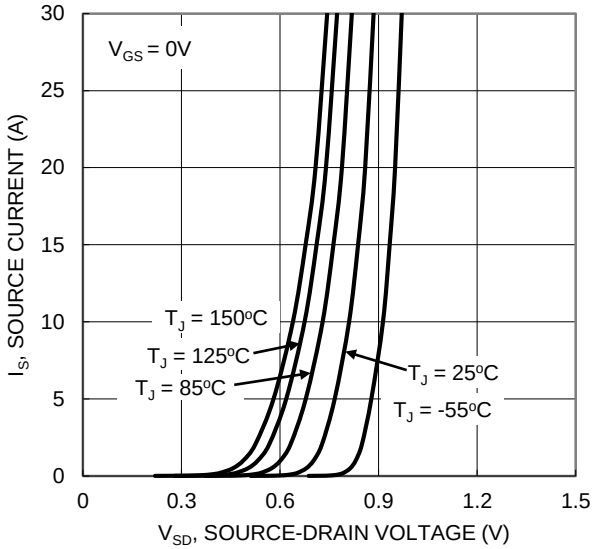


Figure 9. Diode Forward Voltage vs. Current

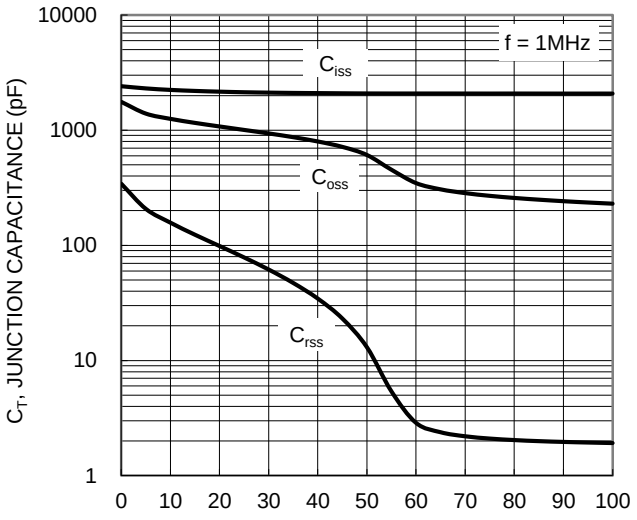


Figure 10. Typical Junction Capacitance

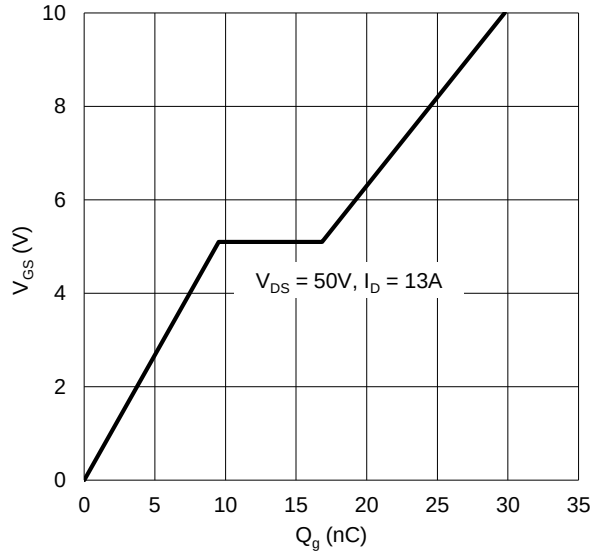


Figure 11. Gate Charge

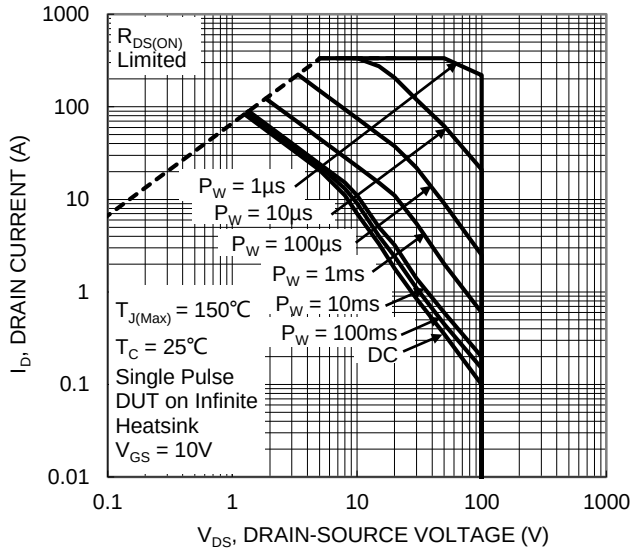


Figure 12. SOA, Safe Operation Area

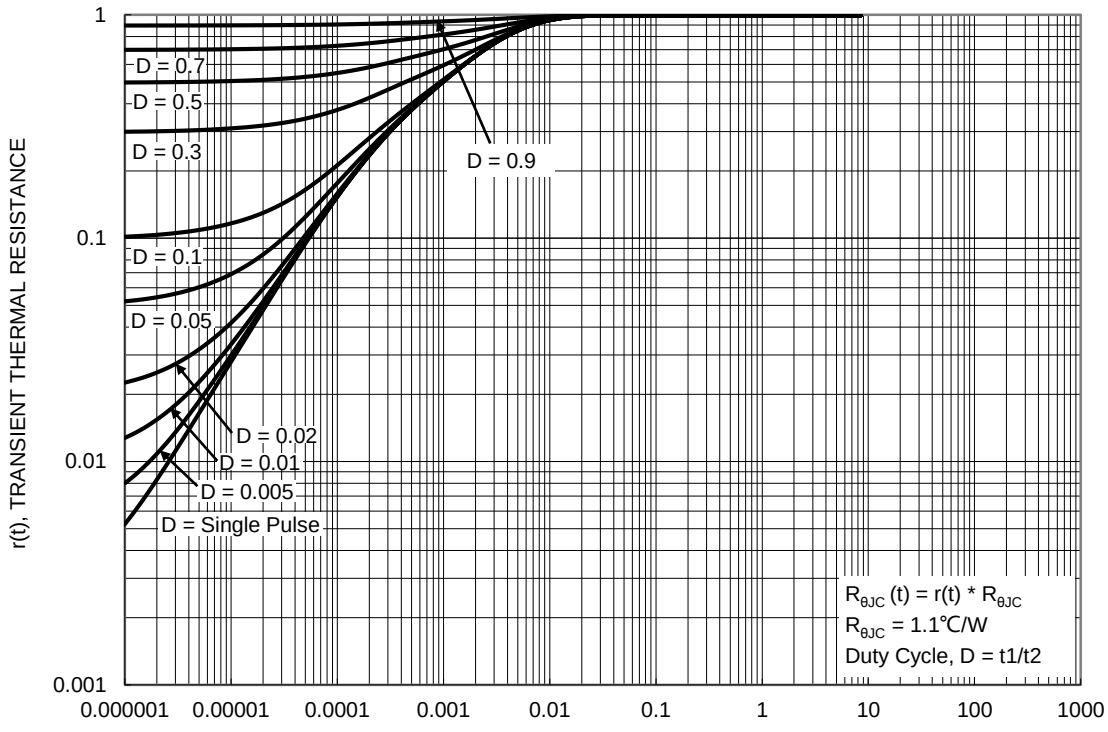
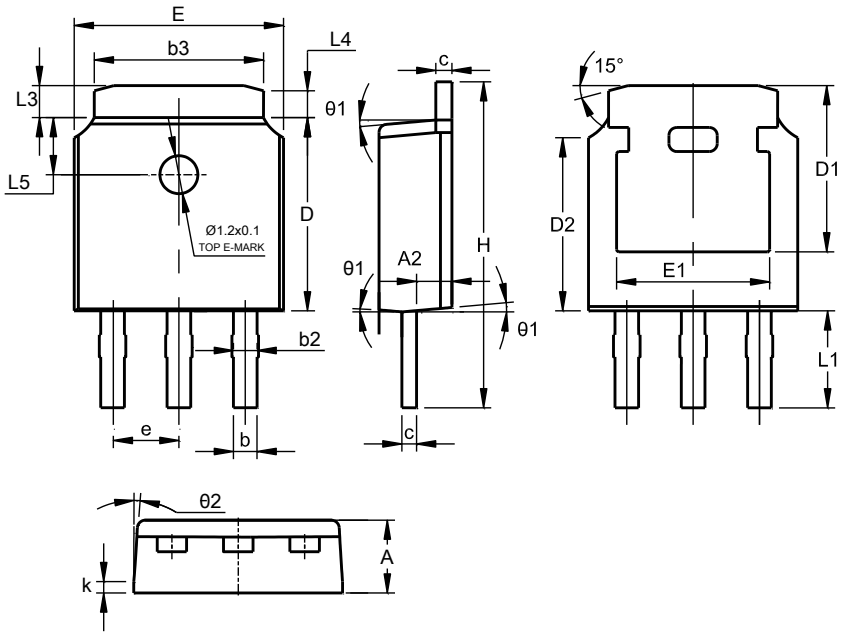


Figure 13. Transient Thermal Resistance

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°
All Dimensions in mm			

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