100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	Package	I_D T_C = +25°C
100V	8.8mΩ @V_{GS} = 10V	TO220AB	99A
	16mΩ @V_{GS} = 6V		73A

Features

- Low Input Capacitance
- High BV_{DSS} Rating for Power Application
- Low Input/Output Leakage
- **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-Q100/101/104/200, 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

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power-management applications.

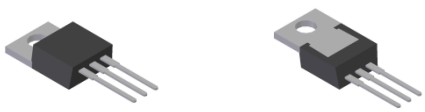
Applications

- Motor control
- Backlighting
- DC-DC converters
- Power-management functions

Mechanical Data

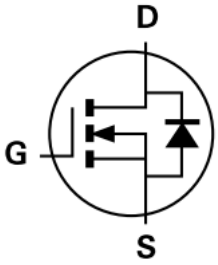
- Package: TO220AB
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

TO220AB

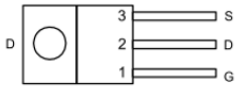


Top View

Bottom View



Equivalent Circuit



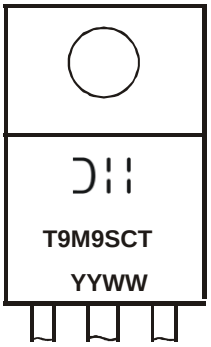
Top View
Pin Out Configuration

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT10H9M9SCT	TO220AB	50 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



= Manufacturer's Marking
T9M9SCT = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Last Two Digits of Year (ex: 25 = 2025)
WW or WW = Week Code (01 to 53)

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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 6) V_{GS} = 10V	T_C = +25°C T_C = +70°C	I_D	99 79	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	99	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	396	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)		I_{SM}	396	A
Avalanche Current, L = 3mH (Note 7)		I_{AS}	11	A
Avalanche Energy, L = 3mH (Note 7)		E_{AS}	181.5	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2.3	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	54	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	156	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	0.8	°C/W
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} = 0, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 80V, V_{GS} = 0
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	2.1	—	3.9	V	V_{DS} = V_{GS}, I_D = 250uA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.2	8.8	mΩ	V_{GS} = 10V, I_D = 20A
		—	10.5	16		V_{GS} = 6V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	V_{GS} = 0, I_S = 13A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2085	—	pF	V_{DS} = 50V, V_{GS} = 0 f = 1MHz
Output Capacitance	C_{oss}	—	609	—		
Reverse Transfer Capacitance	C_{rss}	—	13	—		
Gate Resistance	R_g	—	1.7	—	Ω	V_{DS} = 0, V_{GS} = 0, 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 FR-4 PC board, with minimum recommended pad layout, single sided.
6. Thermal resistance from junction to soldering point (on the exposed drain pad).
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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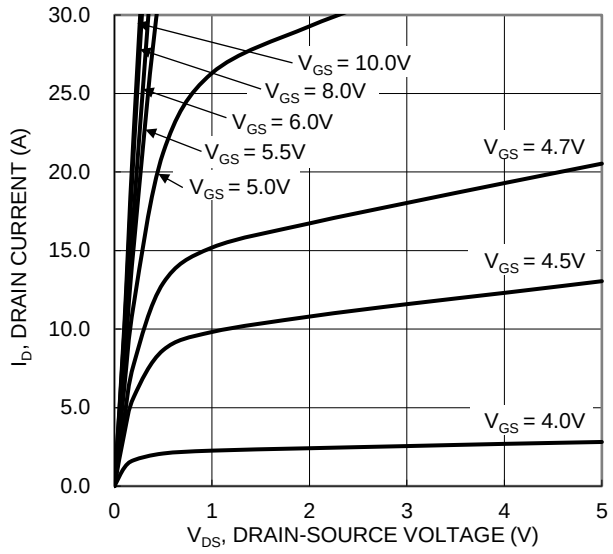


Figure 1. Typical Output Characteristic

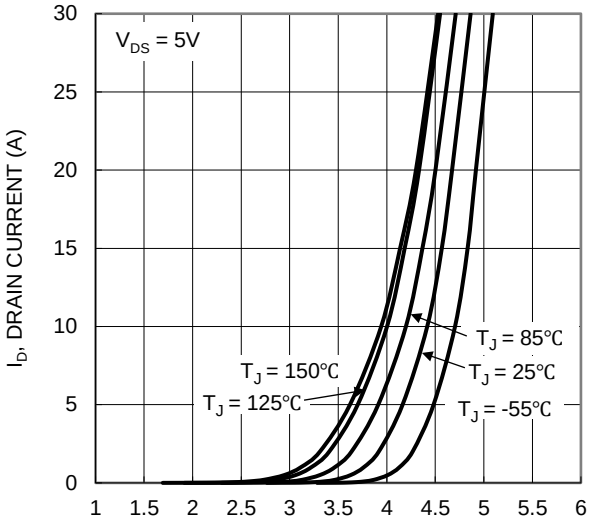


Figure 2. Typical Transfer Characteristic

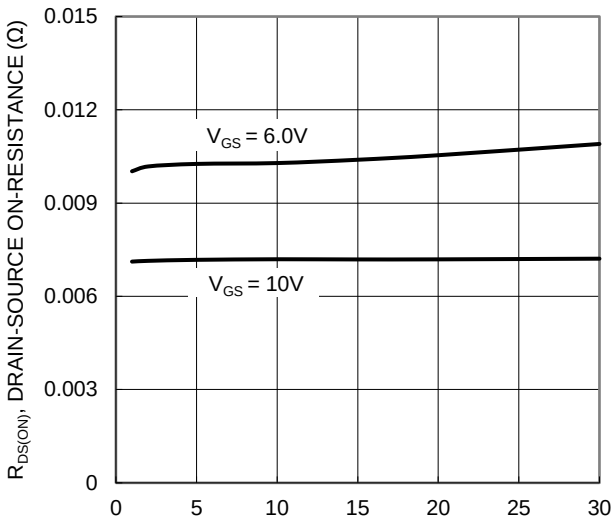


Figure 3. Typical On-Resistance vs. Drain Current

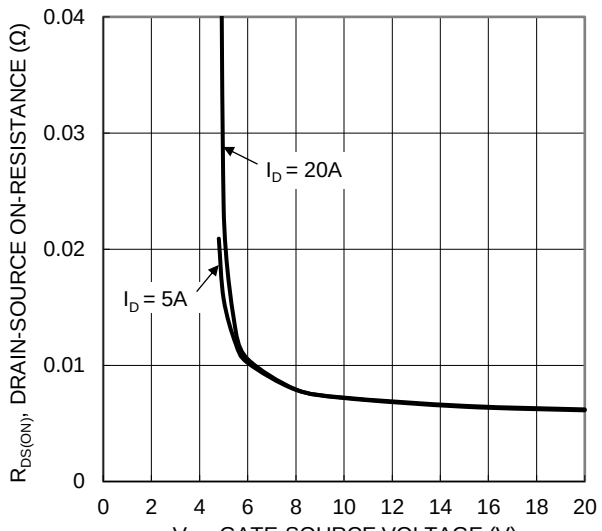


Figure 4. Typical Transfer Characteristic

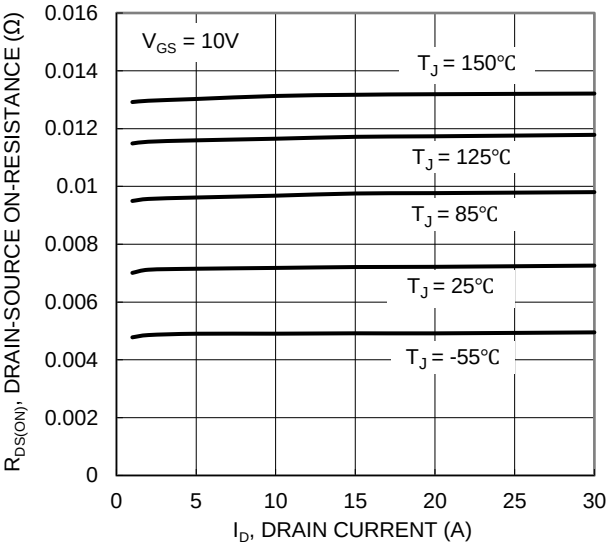


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

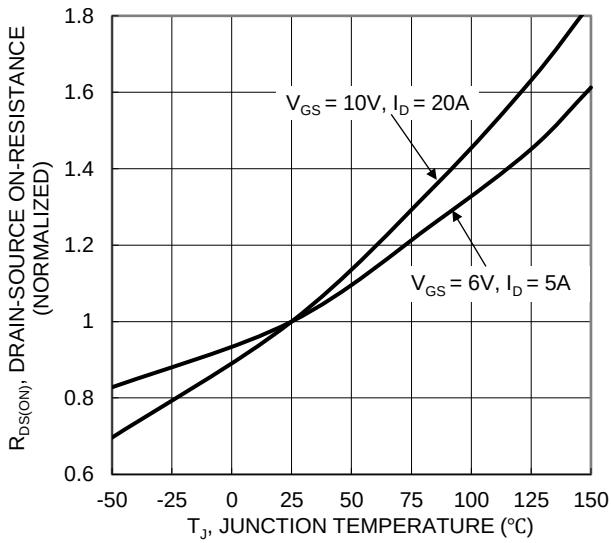


Figure 6. On-Resistance Variation with Junction Temperature

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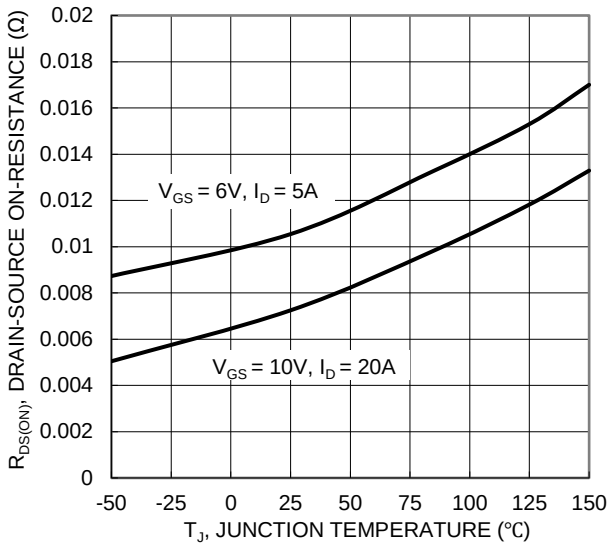


Figure 7. On-Resistance Variation with Junction Temperature

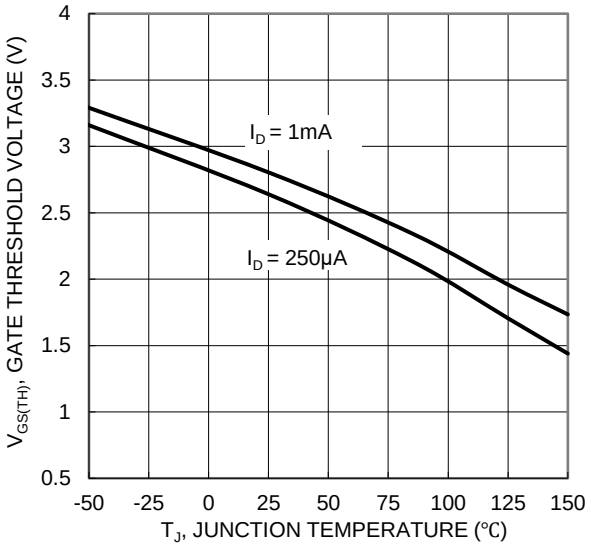


Figure 8. Gate Threshold Variation vs. Junction Temperature

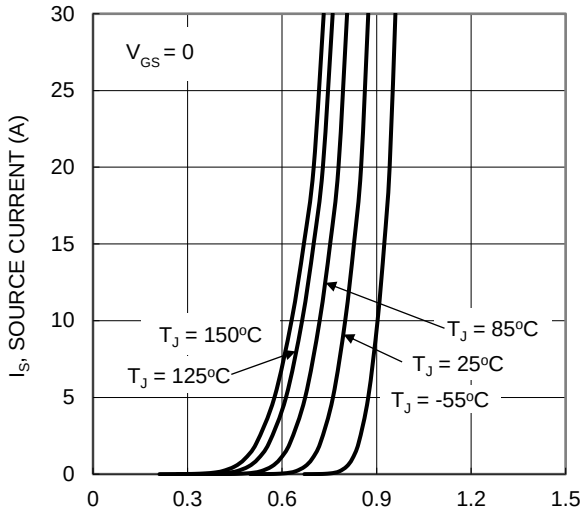


Figure 9. Diode Forward Voltage vs. Current

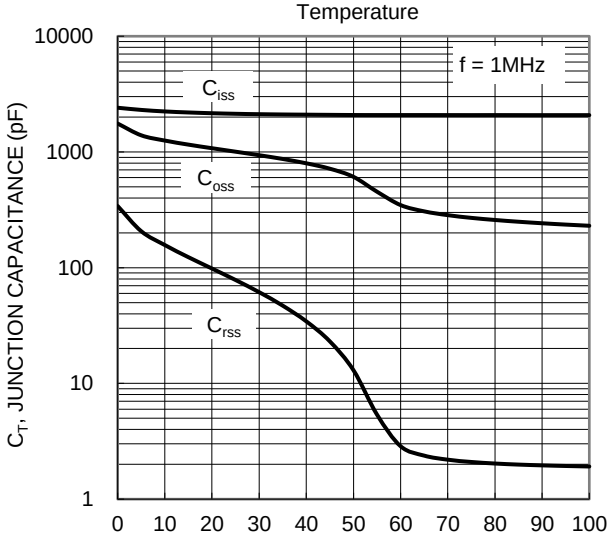


Figure 10. Typical Junction Capacitance

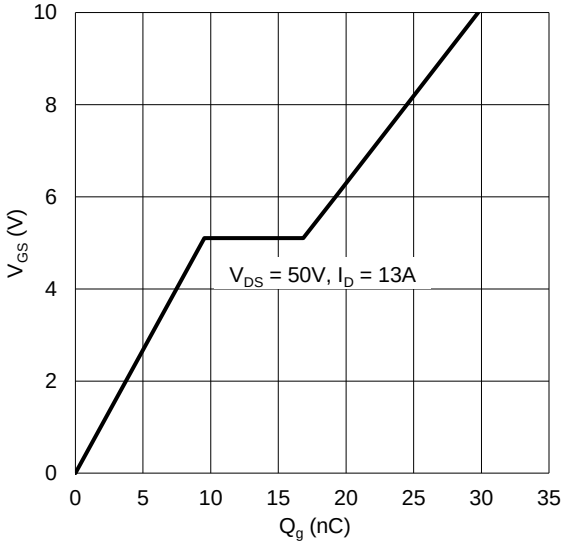


Figure 11. Gate Charge

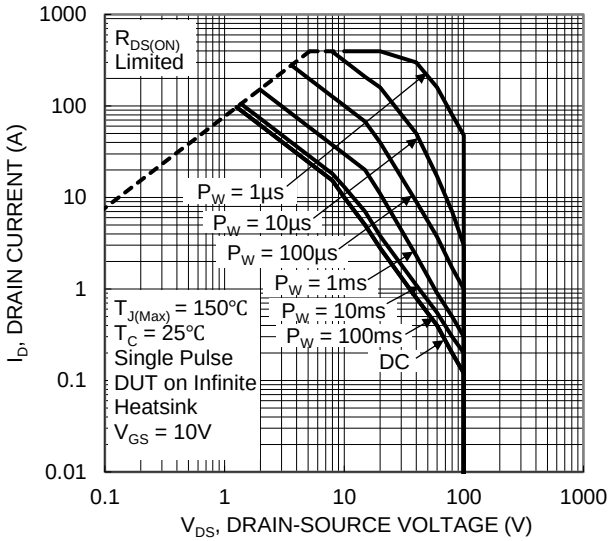


Figure 12. SOA, Safe Operation Area

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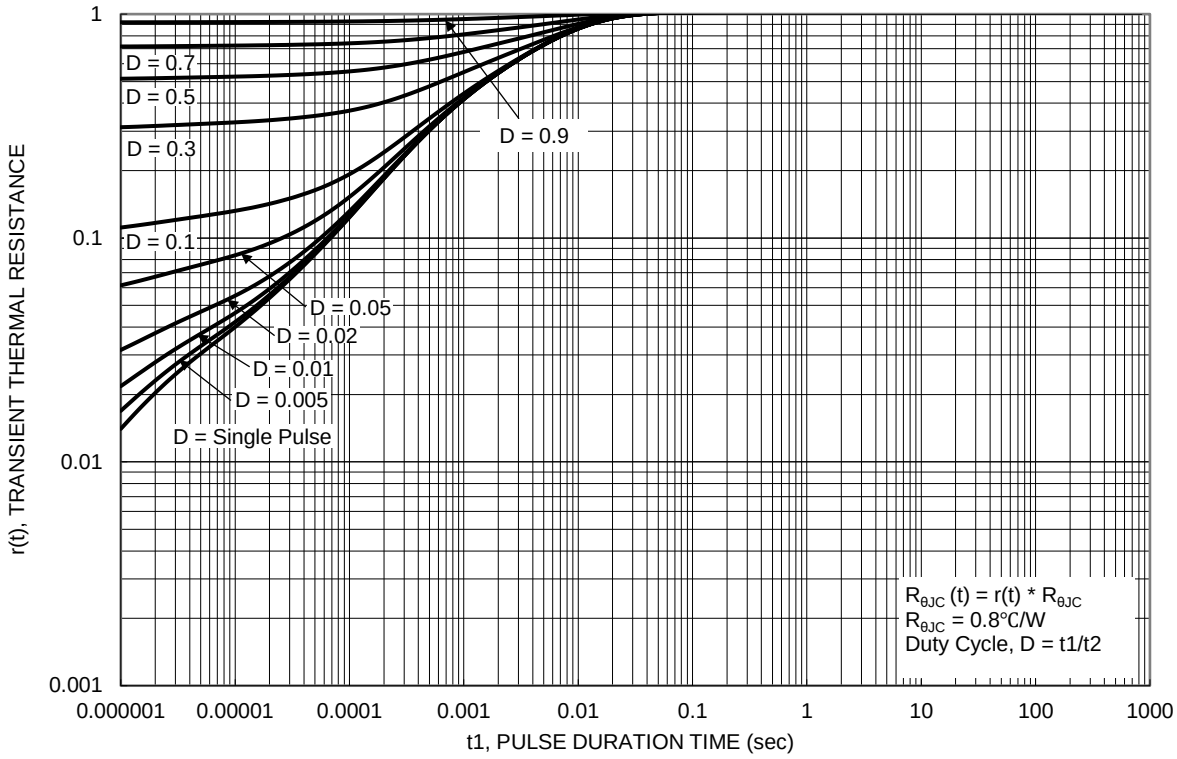


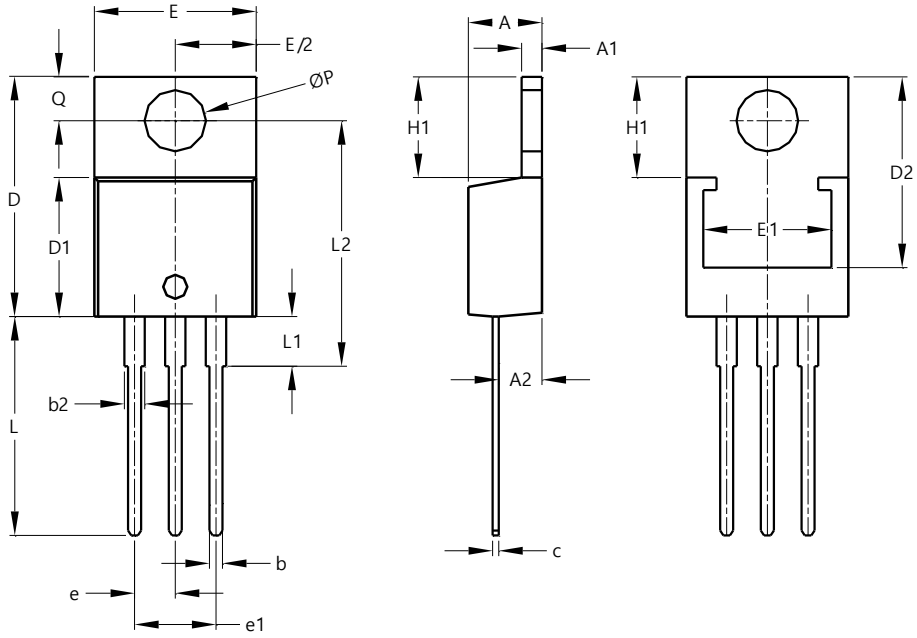
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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

TO220AB



TO220AB			
Dim	**Min**	**Max**	**Typ**
A	3.56	4.82	—
A1	0.51	1.39	—
A2	2.04	2.92	—
b	0.39	1.01	0.81
b2	1.15	1.77	1.24
c	0.356	0.61	—
D	14.22	16.51	—
D1	8.39	9.01	—
D2	11.45	12.87	—
e	—	—	2.54
e1	—	—	5.08
E	9.66	10.66	—
E1	6.86	8.89	—
H1	5.85	6.85	—
L	12.70	14.73	—
L1	—	4.42	—
L2	15.80	17.51	16.00
P	3.54	4.08	—
Q	2.54	3.42	—
All Dimensions in mm			

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