

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	Package	I <sub>D</sub> T <sub>C</sub> = +25°C
650V	1.3Ω @ V <sub>GS</sub> = 10V	TO220AB (Type TH)	8A

## Description

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


## Applications

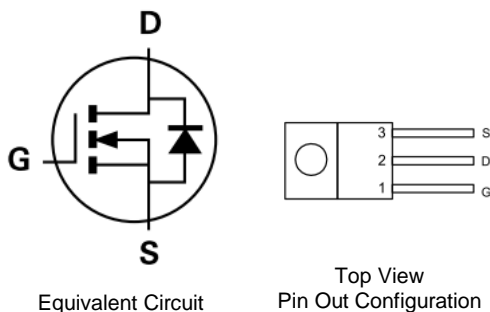
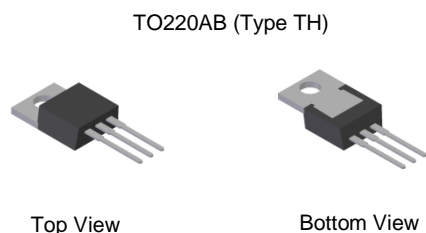
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features

- Low Input Capacitance
- High BV<sub>DSS</sub> Rating for Power Application
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: TO220AB (Type TH)
- Case 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 
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)




## Ordering Information (Note 4)

Part Number	Case	Packaging
DMG8N65SCT	TO220AB (Type TH)	50 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  
 8N65SCT = 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>	650	V
Gate-Source Voltage	V <sub>GSS</sub>	±30	V
Continuous Drain Current V <sub>GS</sub> = 10V	I <sub>D</sub>	8.0 3.8	A
Maximum Body Diode Forward Current (Note 5)	I <sub>S</sub>	12	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	12	A
Avalanche Current, L = 60mH (Note 7)	I <sub>AS</sub>	3.6	A
Avalanche Energy, L = 60mH (Note 7)	E <sub>AS</sub>	389	mJ
Peak Diode Recovery dv/dt	dv/dt	5	V/ns

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation	P <sub>D</sub>	125 50	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	54	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1	°C/W
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>	650	—	—	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> = 650V, 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 (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	2	3	4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	0.9	1.3	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A
Diode Forward Voltage	V <sub>SD</sub>	—	0.87	1.5	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 8A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	—	1,217	—	pF	V <sub>DS</sub> = 25V, f = 1.0MHz, V <sub>GS</sub> = 0V
Output Capacitance	C <sub>oss</sub>	—	115	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	12	—		
Gate Resistance	R <sub>G</sub>	—	1.24	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge	Q <sub>g</sub>	—	30	—	nC	V <sub>DD</sub> = 520V, I <sub>D</sub> = 8A, V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>gs</sub>	—	4.8	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	13.3	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	23	—	ns	V <sub>DD</sub> = 450V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 8A, V <sub>GS</sub> = 10V
Turn-On Rise Time	t <sub>R</sub>	—	46	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	115	—		
Turn-Off Fall Time	t <sub>F</sub>	—	52	—	ns	di/dt = 100A/µs, V <sub>DS</sub> = 100V, I <sub>F</sub> = 8A
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	296	—		
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	2.7	—	µC	

- 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.

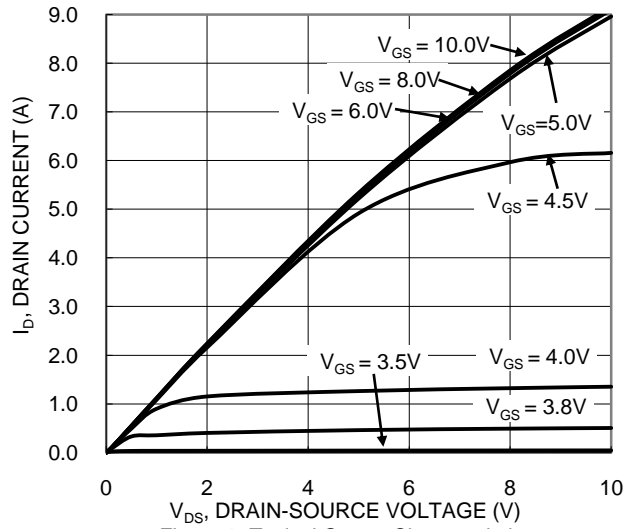


Figure 1. Typical Output Characteristic

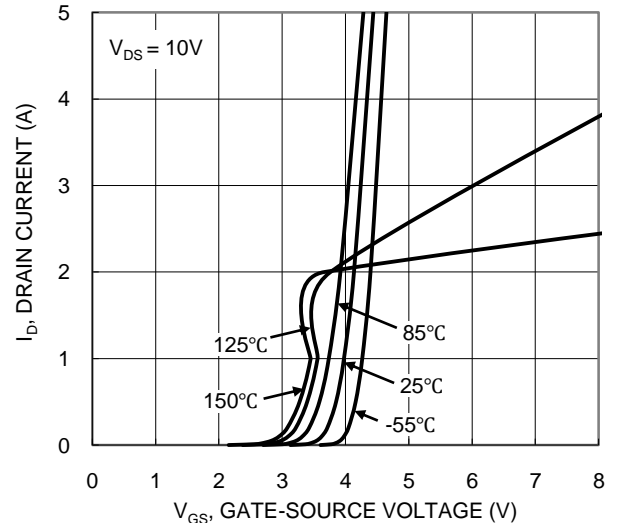


Figure 2. Typical Transfer Characteristic

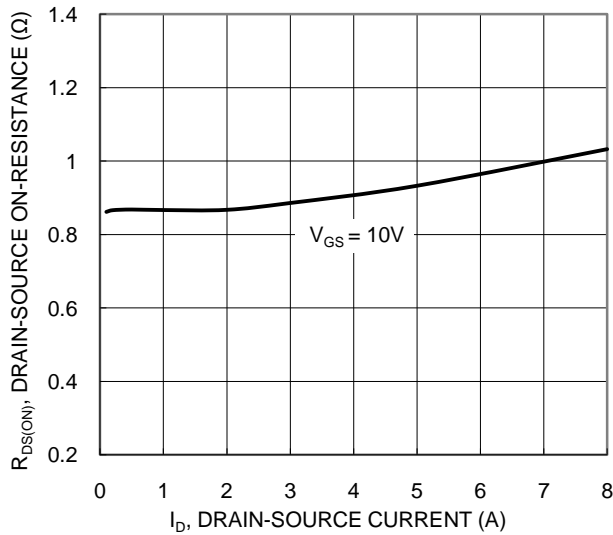


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

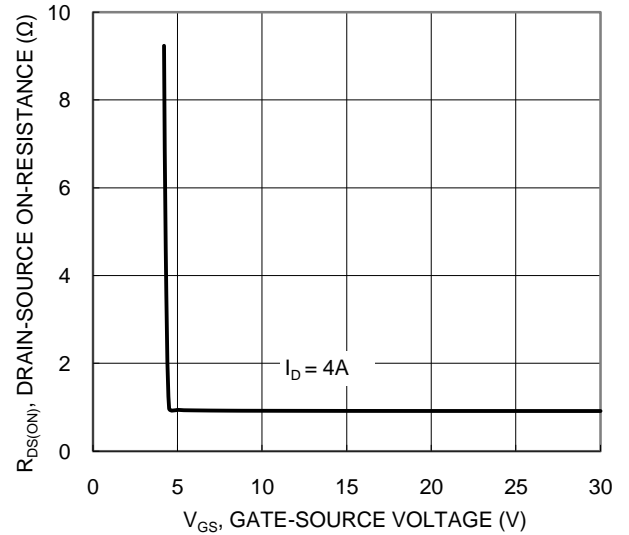


Figure 4. Typical Transfer Characteristic

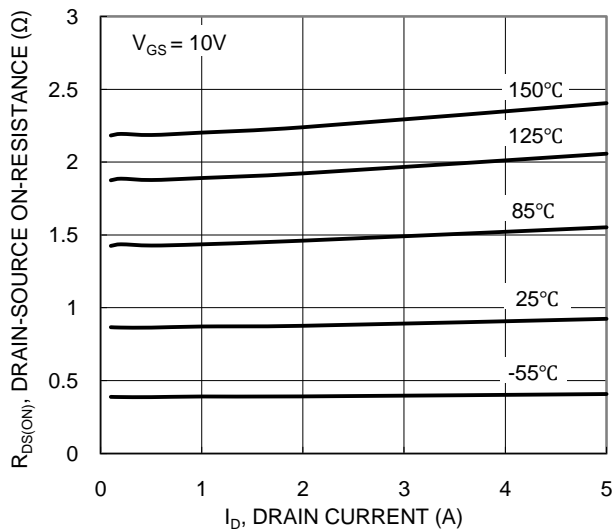


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

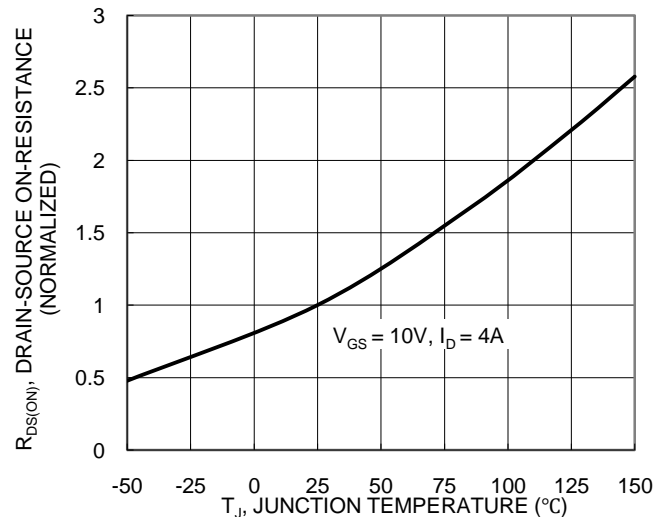


Figure 6. On-Resistance Variation with Junction Temperature

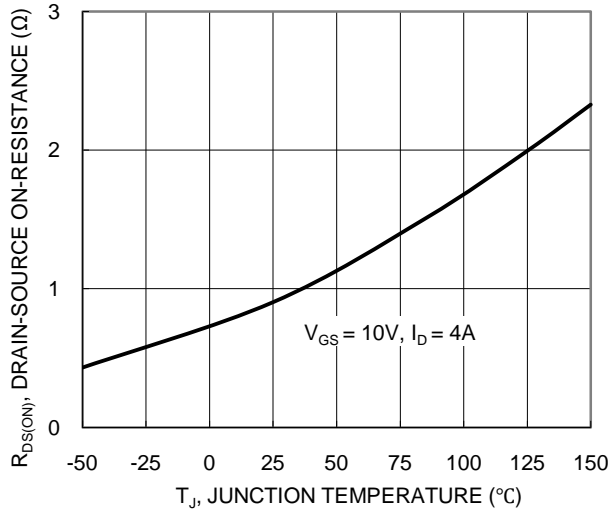


Figure 7. On-Resistance Variation with Junction Temperature

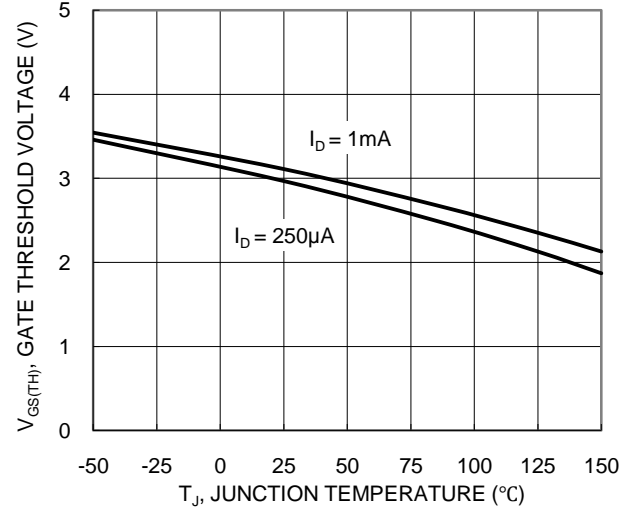


Figure 8. Gate Threshold Variation vs. Junction Temperature

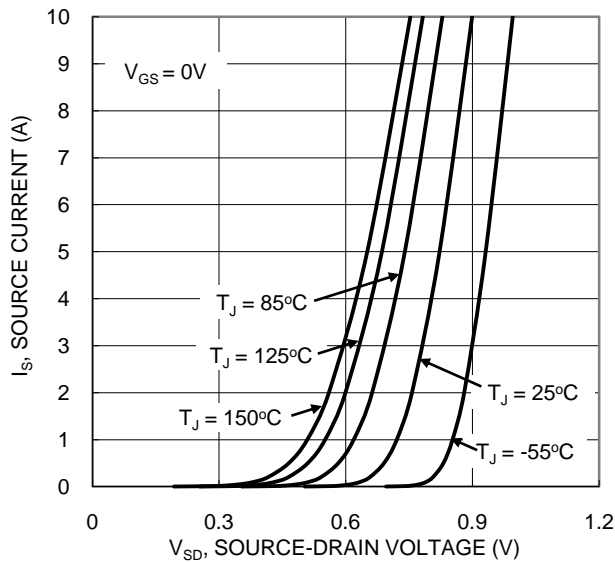


Figure 9. Diode Forward Voltage vs. Current

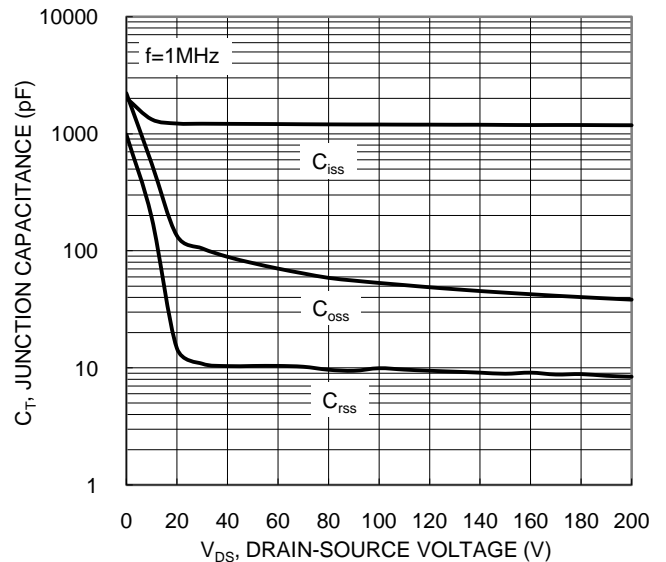


Figure 10. Typical Junction Capacitance

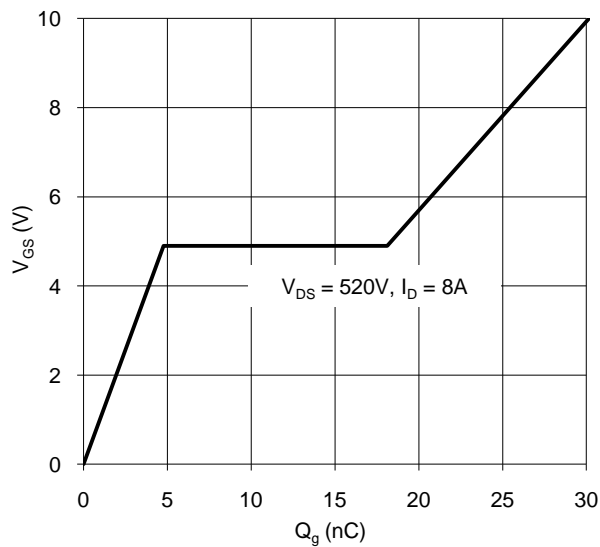


Figure 11. Gate Charge

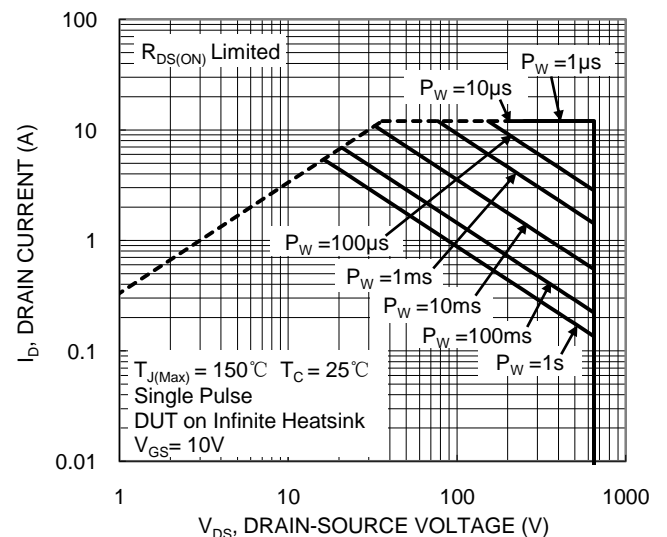


Figure 12. SOA, Safe Operation Area

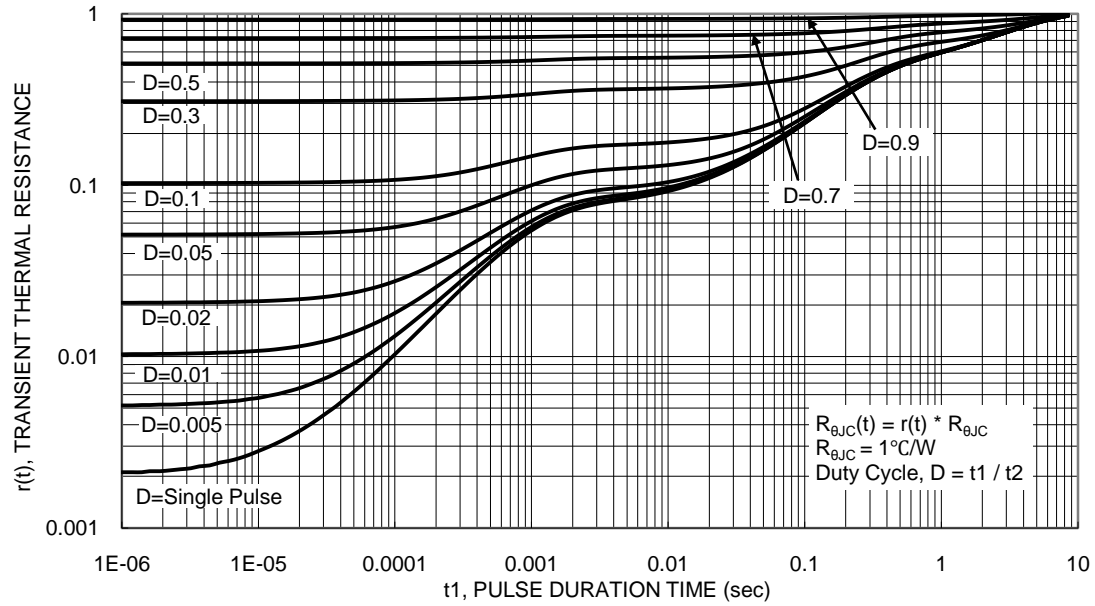
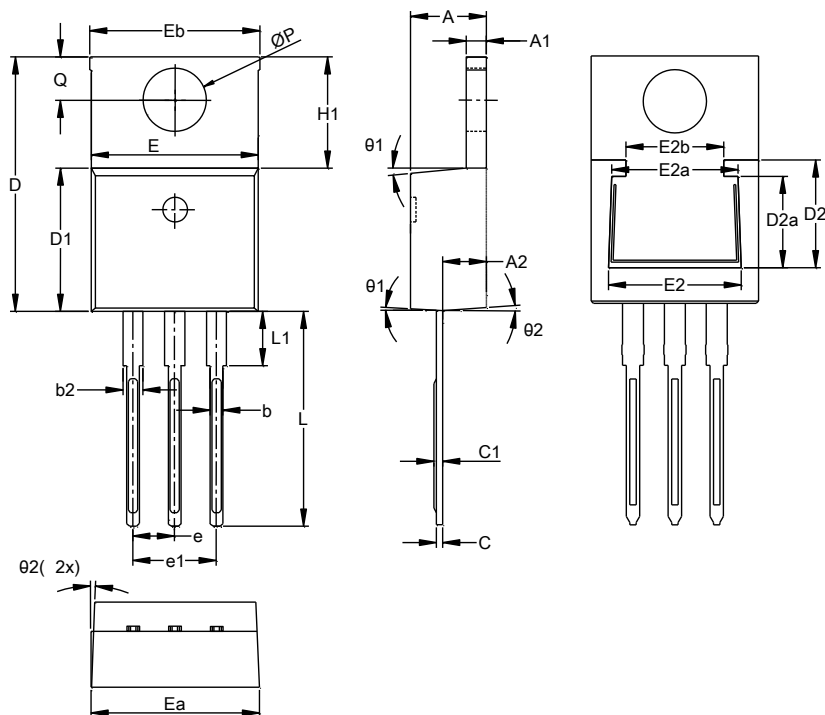


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

TO220AB (Type TH)



TO220AB (Type TH)			
Dim	Min	Max	Typ
A	4.27	4.87	4.57
A1	1.12	1.42	1.27
A2	2.39	2.99	2.69
b	0.70	1.01	0.81
b2	1.17	1.50	1.27
c	0.30	0.53	0.38
c1	0.38	0.72	0.56
D	14.60	15.40	15.00
D1	8.40	9.00	8.70
D2	5.33	6.63	6.33
D2a	4.54	5.84	5.54
e	2.54 BSC		
e1	5.08 BSC		
E	9.88	10.50	10.16
Ea	9.90	10.45	10.10
Eb	9.90	10.65	10.25
E2	7.06	8.36	8.06
E2a	6.67	7.97	7.67
E2b	4.94	6.24	5.94
H1	5.70	6.65	6.30
L	13.00	13.80	13.40
L1	-	4.10	3.75
Q	2.50	2.99	2.74
ØP	3.70	3.99	3.84
θ1	4°	10°	7°
θ2	0°	6°	3°
All Dimensions in mm			

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