N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_C = +25°C
600V	0.75Ω@V_{GS} = 10V	12A

Features and Benefits

- 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-Q100/101/200, 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

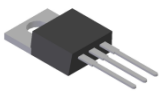
This new generation MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

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

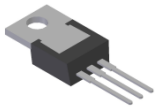
Mechanical Data

- Case: TO220AB
- 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 e3
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

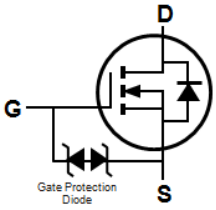
TO220AB (Type TH)



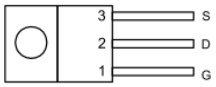
Top View



Bottom View



Equivalent Circuit



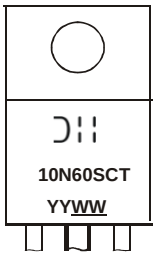
Top View
Pin Out Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMG10N60SCT	TO220AB (Type TH)	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
10N60SCT = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 20 = 2020)
WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	600	V
Gate-Source Voltage			V_{GSS}	±30	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_C = +25°C T_C = +100°C	I_D	12 7.9	A
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C	I_D	1.5	A
Maximum Body Diode Forward Current (Note 5)			I_S	12	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	15	A
Avalanche Current, L = 60mH (Note 6)			I_{AS}	4.3	A
Avalanche Energy, L = 60mH (Note 6)			E_{AS}	550	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_C = +25°C	P_D	178	W
	T_C = +100°C		71	
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	49	°C/W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	0.7	
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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	600	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 600V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	10	µA	V_{GS} = ±24V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	3.2	4	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.6	0.75	Ω	V_{GS} = 10V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	—	1	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 6)						
Input Capacitance	C_{iss}	—	1587	—	pF	V_{DS} = 25V, f = 1.0MHz, V_{GS} = 0
Output Capacitance	C_{oss}	—	149	—		
Reverse Transfer Capacitance	C_{rss}	—	10	—		
Gate Resistance	R_G	—	1.5	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	35	—	nC	V_{DS} = 480V, I_D = 10A, V_{GS} = 10V
Gate-Source Charge	Q_{gs}	—	6	—		
Gate-Drain Charge	Q_{gd}	—	13	—		
Turn-On Delay Time	$t_{D(ON)}$	—	25	—	ns	V_{DS} = 300V, R_G = 25Ω, I_D = 10A, V_{GS} = 10V
Turn-On Rise Time	t_R	—	45	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	97	—		
Turn-Off Fall Time	t_F	—	48	—		
Body Diode Reverse Recovery Time	t_{RR}	—	319	—	ns	V_{DS} = 100V, I_F = 10A ,dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	3.5	—	µC	

Notes: 5. Device mounted on an infinite heatsink.
6. Guaranteed by design. Not subject to production testing.
7. Short duration pulse test used to minimize self-heating effect.

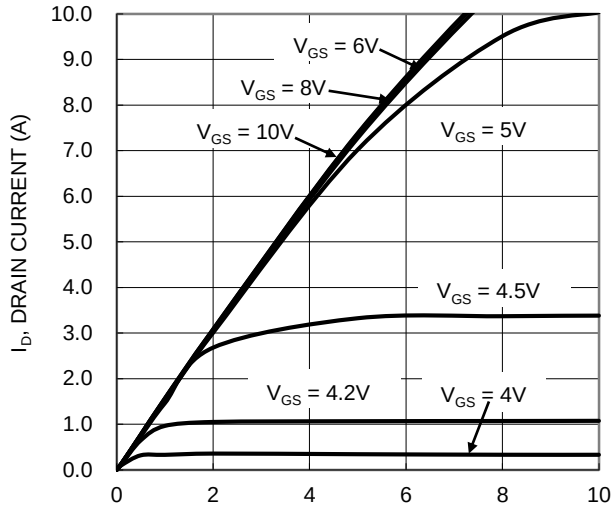


Figure 1. Typical Output Characteristic

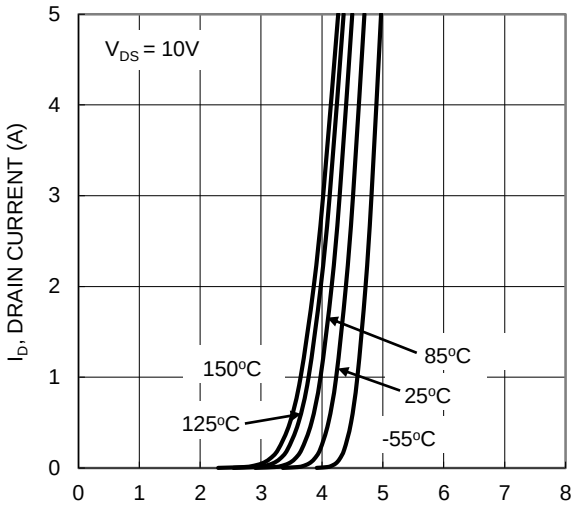


Figure 2. Typical Transfer Characteristic

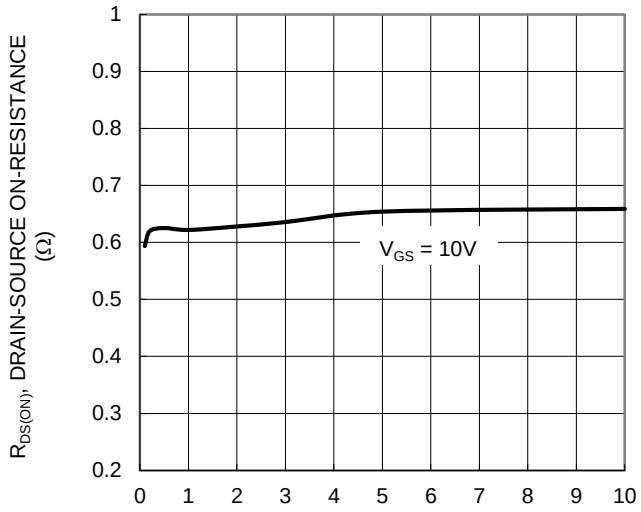


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

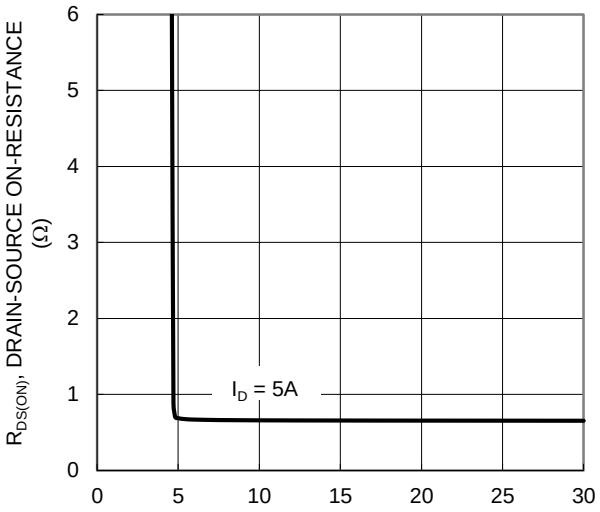


Figure 4. Typical Transfer Characteristic

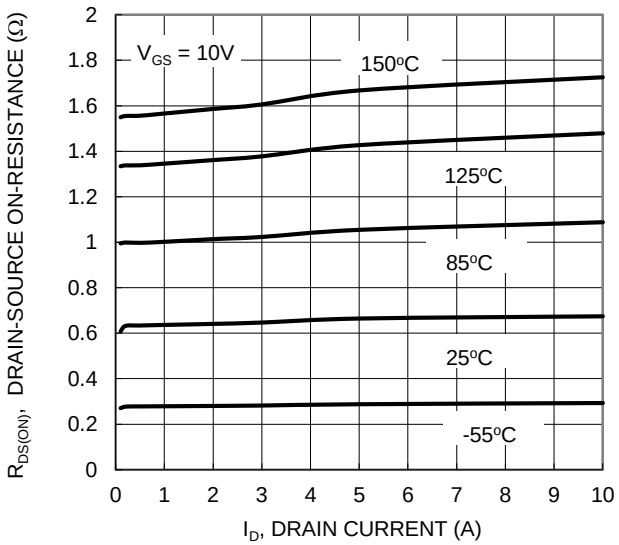


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

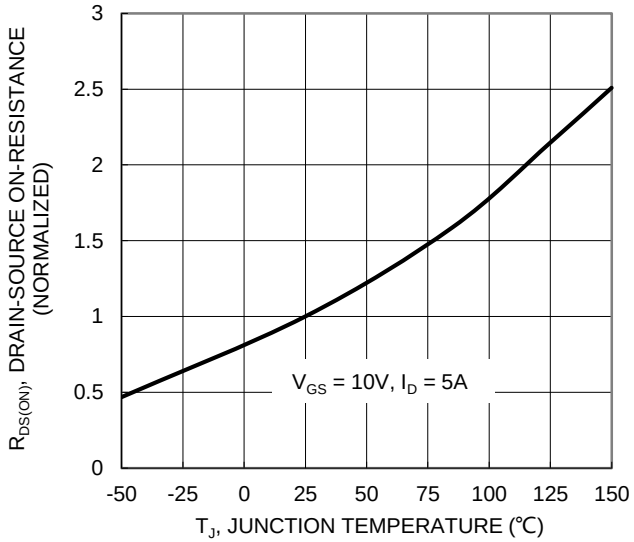


Figure 6. On-Resistance Variation with Junction Temperature

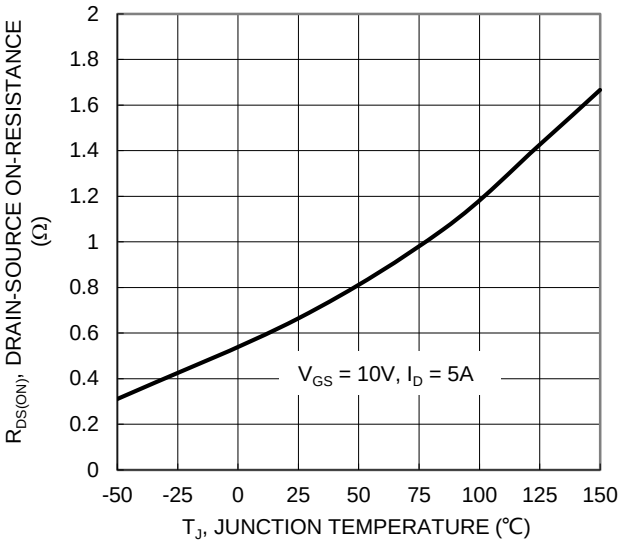


Figure 7. On-Resistance Variation with Junction Temperature

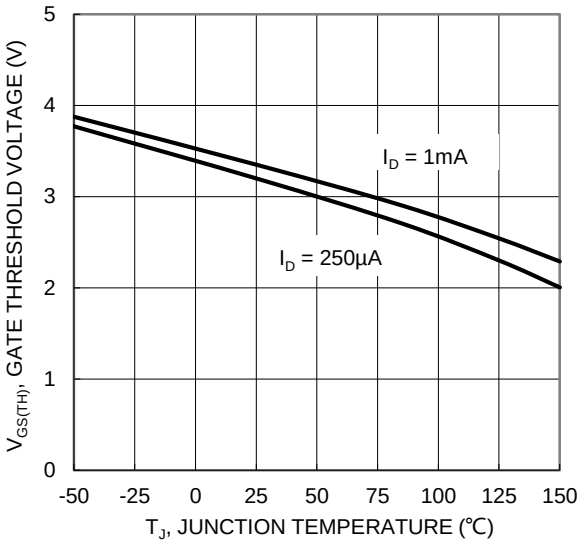


Figure 8. Gate Threshold Variation vs. Junction Temperature

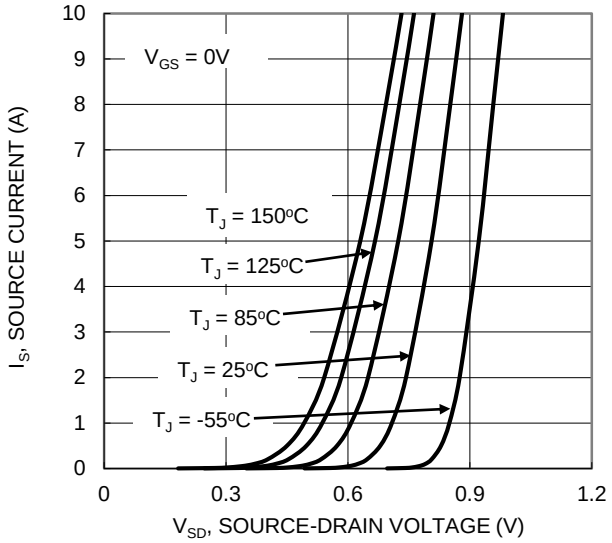


Figure 9. Diode Forward Voltage vs. Current

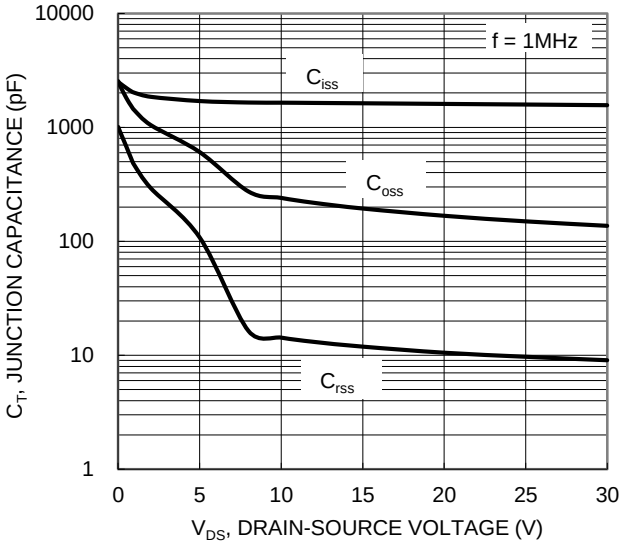


Figure 10. Typical Junction Capacitance

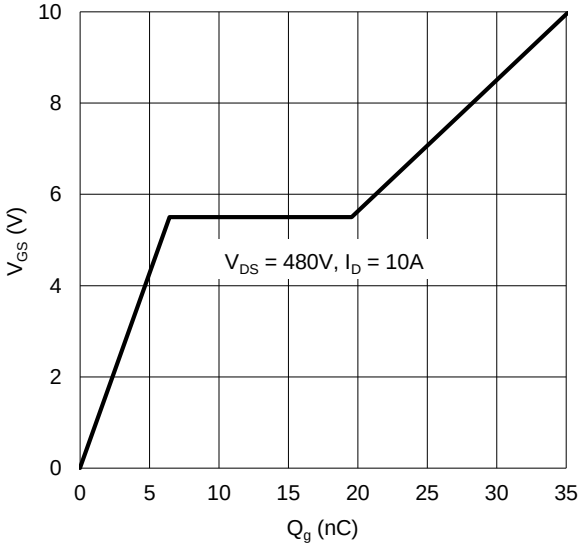


Figure 11. Gate Charge

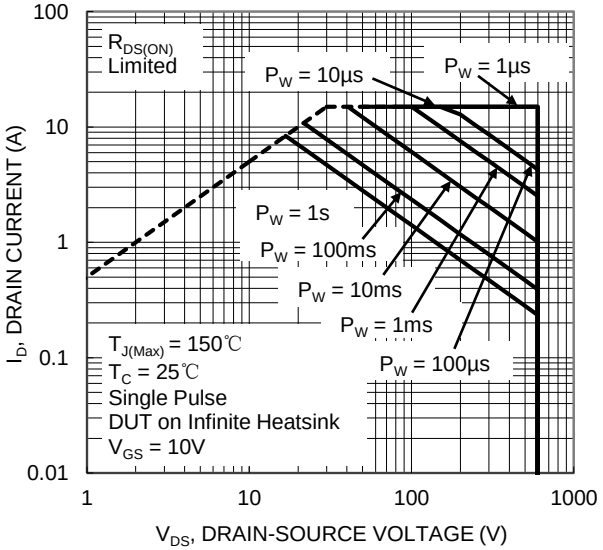


Figure 12. SOA, Safe Operation Area

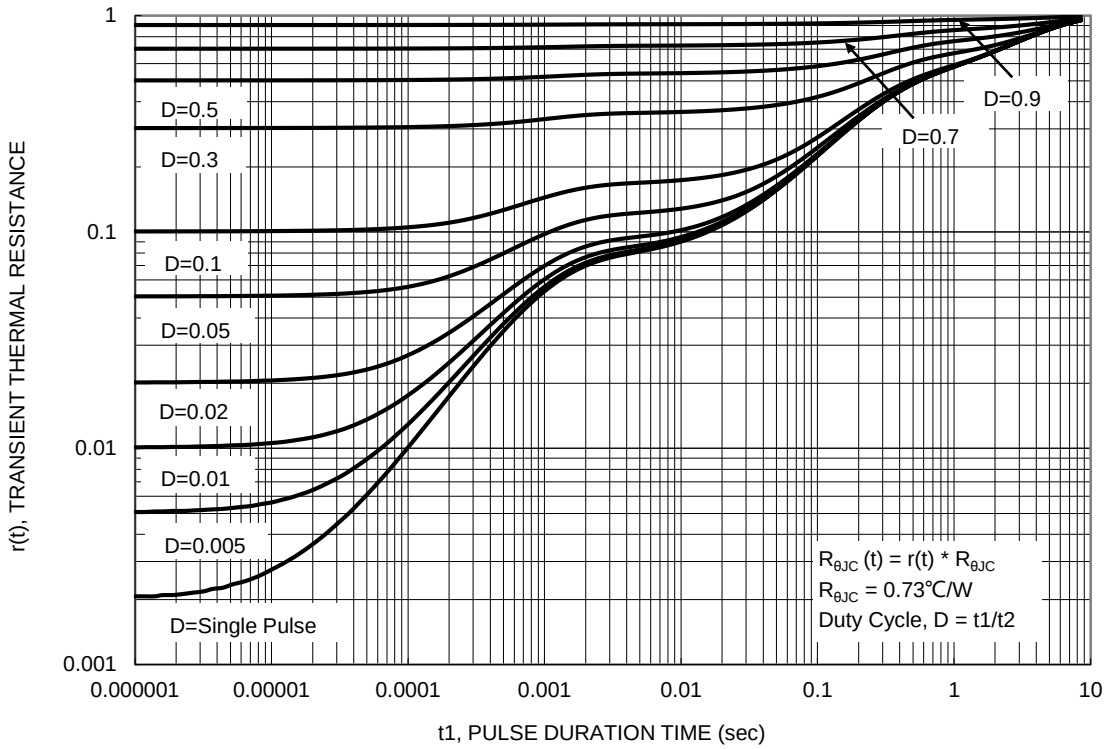
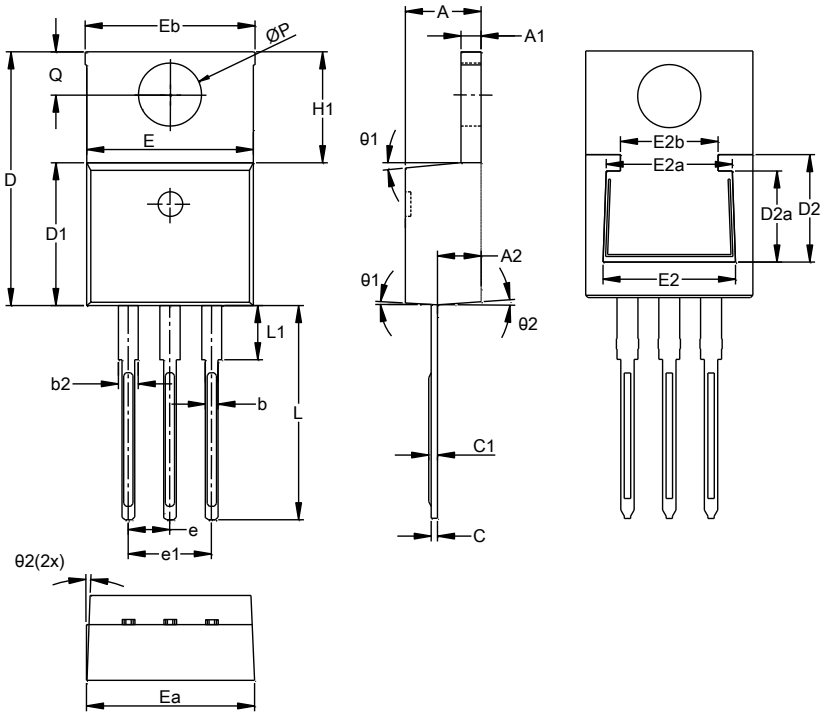


Figure 13. Transient Thermal Resistance

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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