

Product Summary

BV_{DSS}	R_{DS(ON)} Max	I_D Max T_C = +25°C
60V	10mΩ @ V _{GS} = 10V	133A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Minimizes Power Losses
- Low Q_g – Minimizes Switching Losses
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DMNH6010SCTBQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

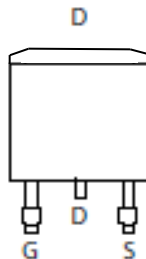
Mechanical Data

- Package: TO263AB
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram Below
- Weight: 1.7 grams (Approximate)

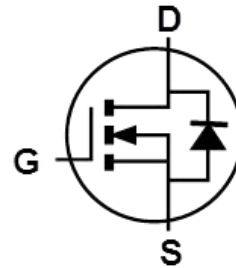
TO263AB (D2PAK)



Top View



Pin Out
Top View



Internal Schematic

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMNH6010SCTBQ-13	TO263AB (D2PAK)	800	Reel

- 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
 NH6010SCT = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 21 = 2021)
 WW = Week (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	I _D	T _C = +25°C	133
		T _C = +100°C	94
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	133	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	532	A
Avalanche Current, L = 0.1mH	I _{AS}	71	A
Avalanche Energy, L = 0.1mH	E _{AS}	252	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	5	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	30	°C/W
Total Power Dissipation (Note 6)	P _D	375	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	0.4	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°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}	60	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	10	µA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	2	—	4	V	V _{DS} = V _{GS} , I _D = 1mA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	7.7	10	mΩ	V _{GS} = 10V, I _D = 25A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 25A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	2692	—	pF	V _{DS} = 25V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	909	—		
Reverse Transfer Capacitance	C _{rss}	—	65	—		
Gate Resistance	R _g	—	3.6	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	46	—	nC	V _{DS} = 44V, I _D = 25A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	12	—		
Gate-Drain Charge	Q _{gd}	—	13	—		
Turn-On Delay Time	t _{D(ON)}	—	13.5	—	ns	V _{DS} = 30V, V _{GEN} = 10V, R _L = 1.2Ω
Turn-On Rise Time	t _r	—	44	—		
Turn-Off Delay Time	t _{D(OFF)}	—	45	—		
Turn-Off Fall Time	t _f	—	29	—		
Reverse Recovery Time	t _{RR}	—	51.5	—	ns	I _F = 20A, di/dt = 100A/µs,
Reverse Recovery Charge	Q _{RR}	—	92	—	nC	V _R = 30V

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

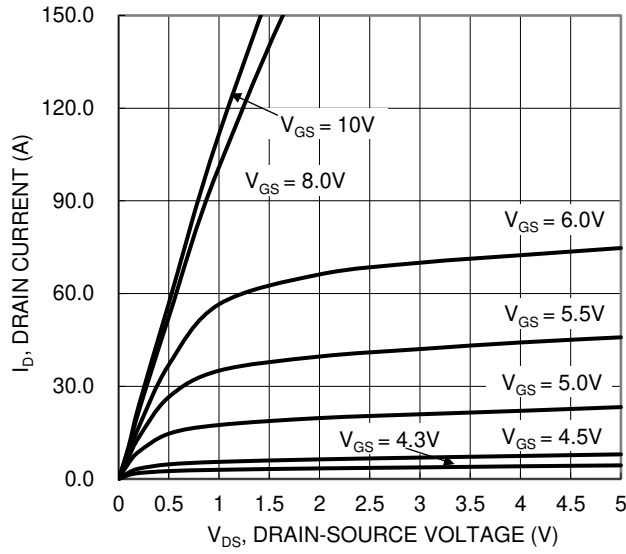


Figure 1. Typical Output Characteristic

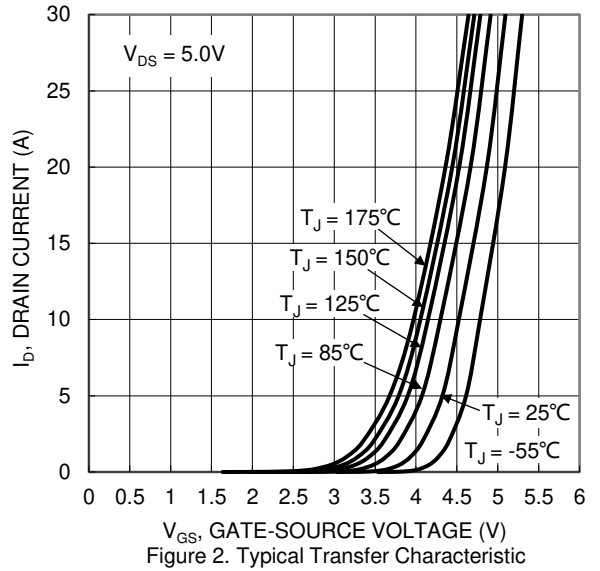


Figure 2. Typical Transfer Characteristic

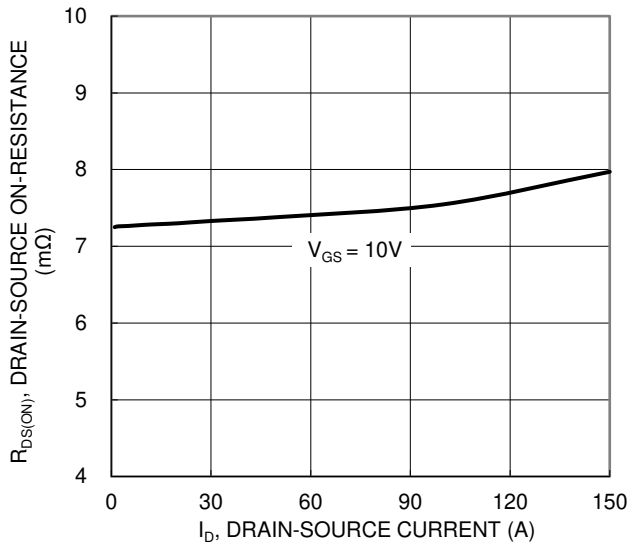


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

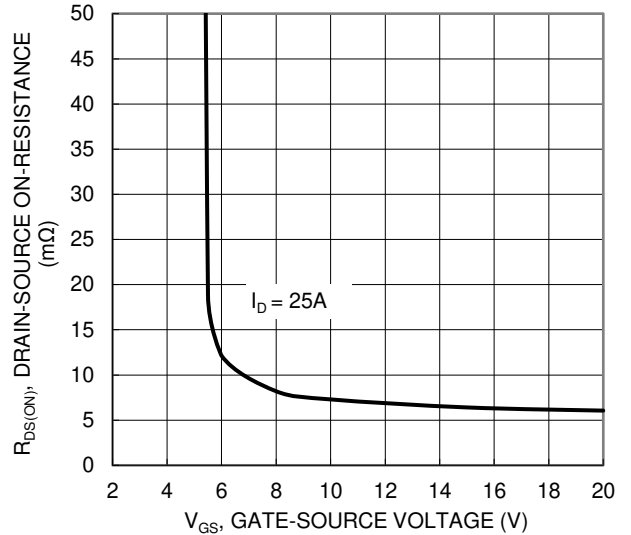


Figure 4. Typical Transfer Characteristic

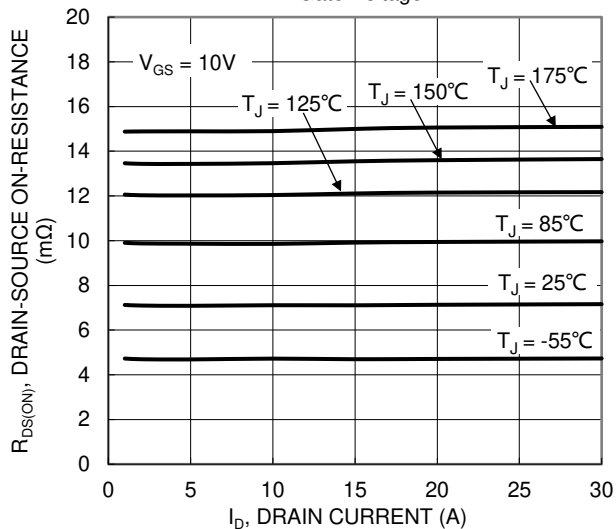


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

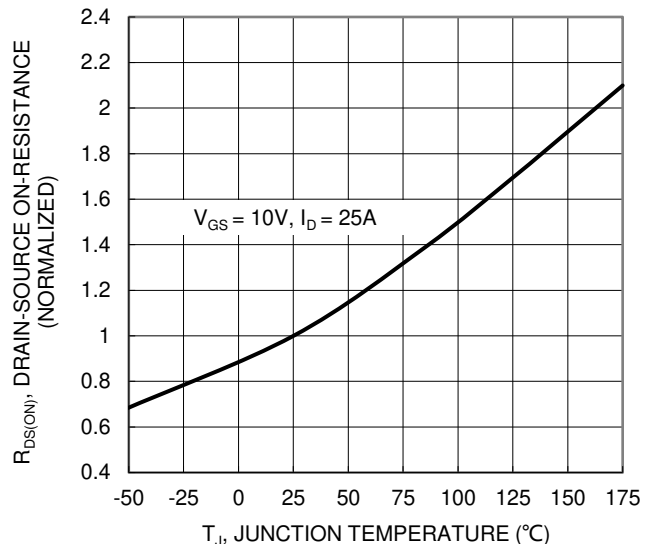


Figure 6. On-Resistance Variation with Temperature

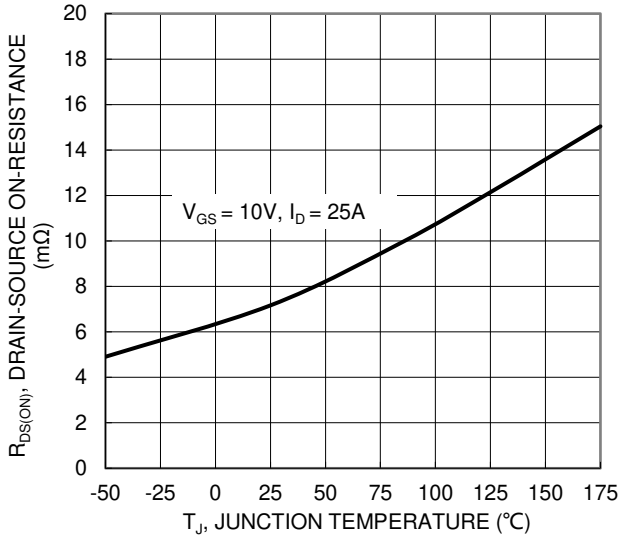


Figure 7. On-Resistance Variation with Temperature

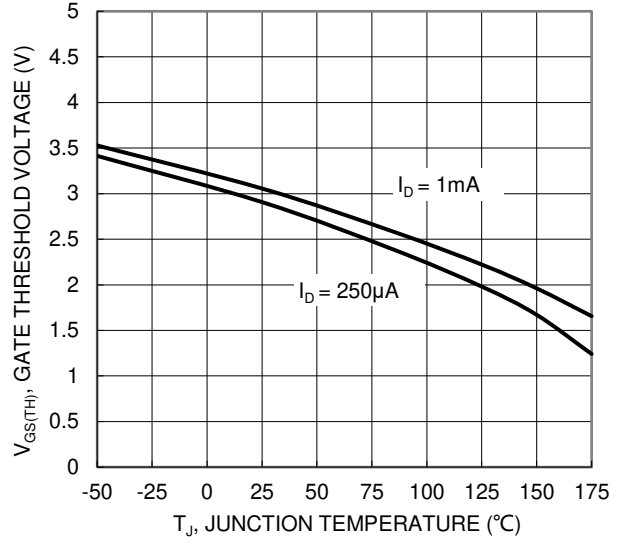


Figure 8. Gate Threshold Variation vs. Junction Temperature

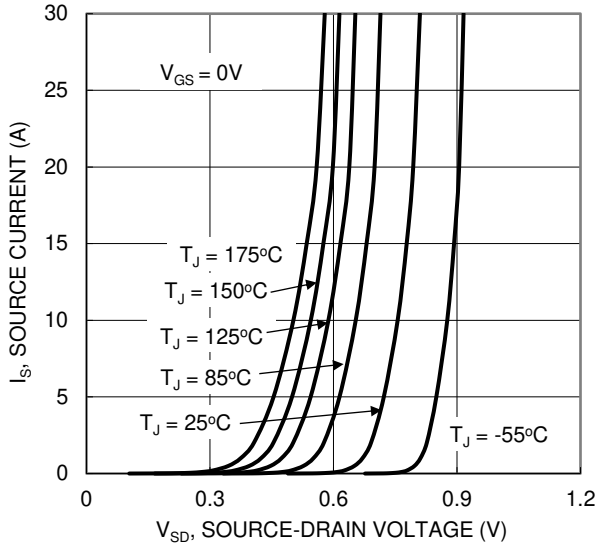


Figure 9. Diode Forward Voltage vs. Current

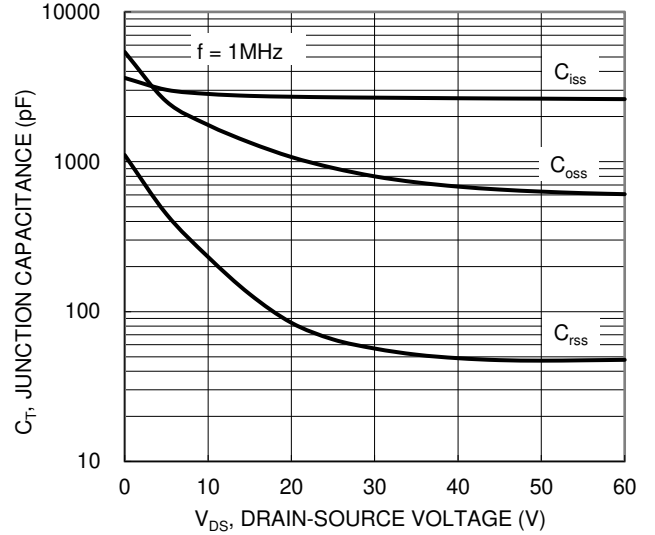


Figure 10. Typical Junction Capacitance

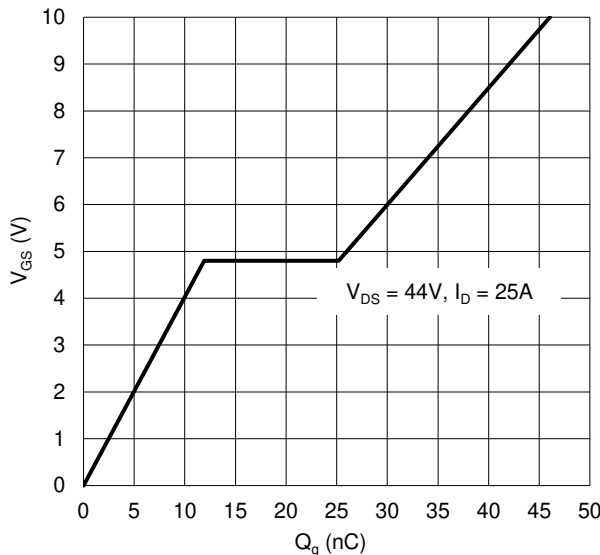


Figure 11. Gate Charge

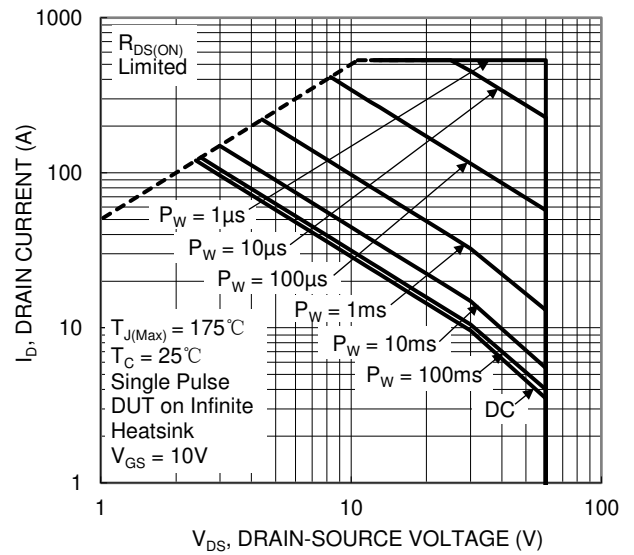


Figure 12. SOA, Safe Operation Area

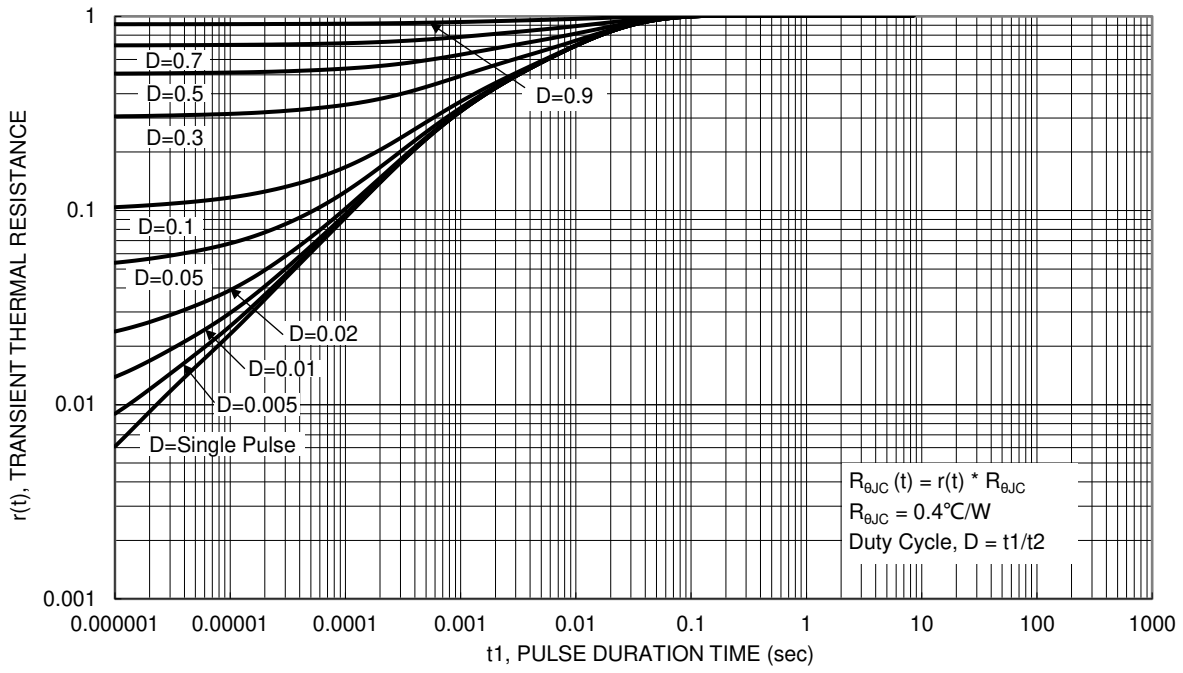
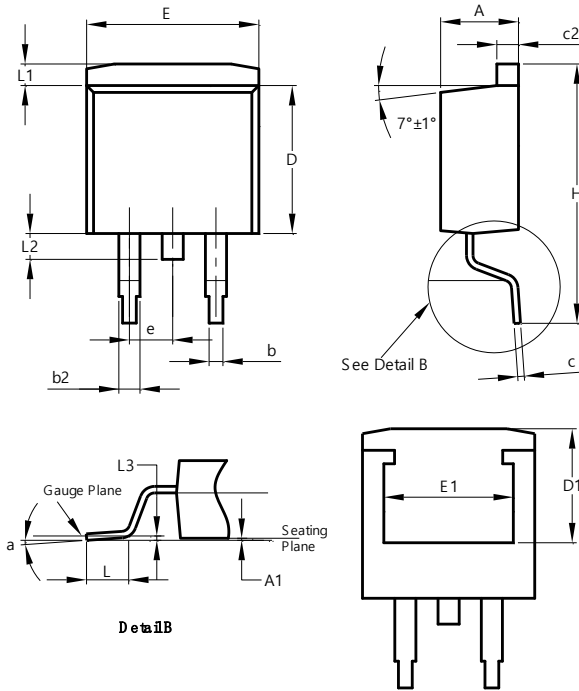


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TO263AB (D2PAK)

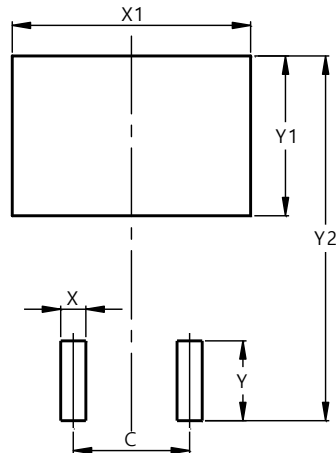


TO263AB (D2PAK)			
Dim	Min	Max	Typ
A	4.07	4.82	-
A1	0.00	0.25	-
b	0.51	0.99	-
b2	1.15	1.77	-
c	0.356	0.73	-
c2	1.143	1.65	-
D	8.39	9.65	-
D1	6.55	6.95	-
e	2.54 TYP		
E	9.66	10.66	-
E1	6.23	8.23	-
H	14.61	15.87	-
L	1.78	2.79	-
L1	-	1.67	-
L2	-	1.77	-
L3	-	-	0.254
a	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

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

TO263AB (D2PAK)



Dimensions	Value (in mm)
C	5.08
X	1.10
X1	10.41
Y	3.50
Y1	7.01
Y2	15.99

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