Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
60V	10mΩ @ V_{GS} = 10V	128A

Features and Benefits

- 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)**
- **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 refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

Description and Applications

This new generation MOSFET has been 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 Controls
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

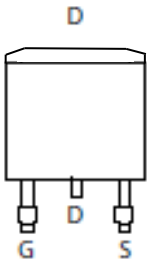
Mechanical Data

- 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 e3
- Terminal Connections: See Diagram Below
- Weight: 1.7 grams (Approximate)

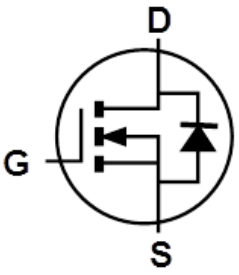
TO263AB (D2PAK)



Top View



Pin Out
Top View



Internal Schematic

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN6010SCTB-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/.

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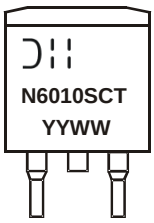
Marking Information



= Manufacturer's Marking
N6010SCT = 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	T_C = +25°C	I_D	128	A
	T_C = +70°C		102	
Maximum Continuous Body Diode Forward Current (Note 6)	T_C = +25°C	I_S	128	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	512	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)	T_A = +25°C	P_D	5	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	30	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	312	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	0.4	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6. Thermal resistance from junction to soldering point (on the exposed drain pad).

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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, V_R = 30V
Reverse Recovery Charge	Q_{RR}	—	92	—	nC	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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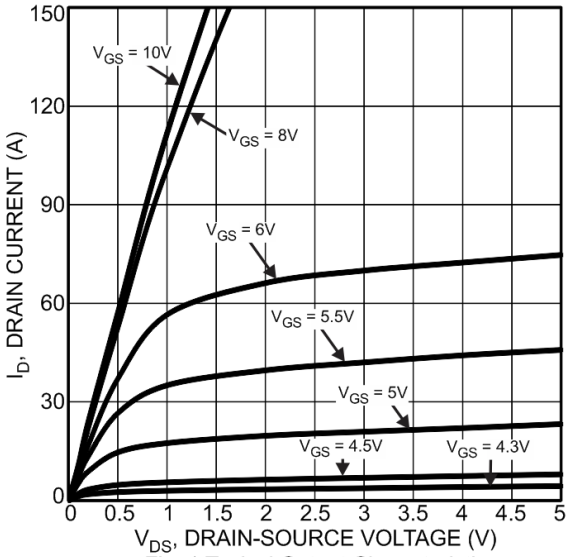

Fig. 1 Typical Output Characteristic

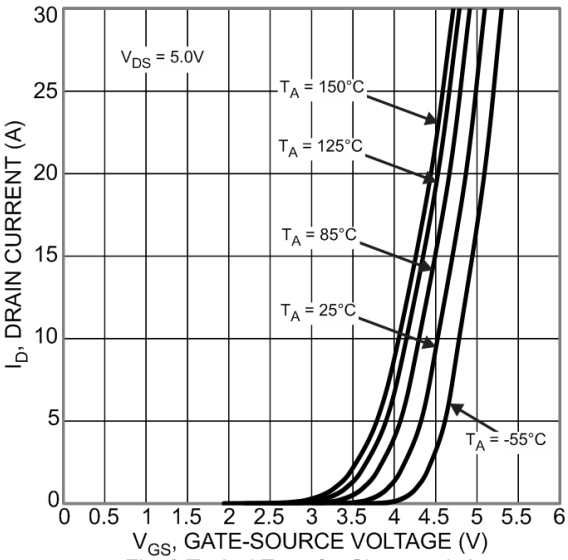

Fig. 2 Typical Transfer Characteristics

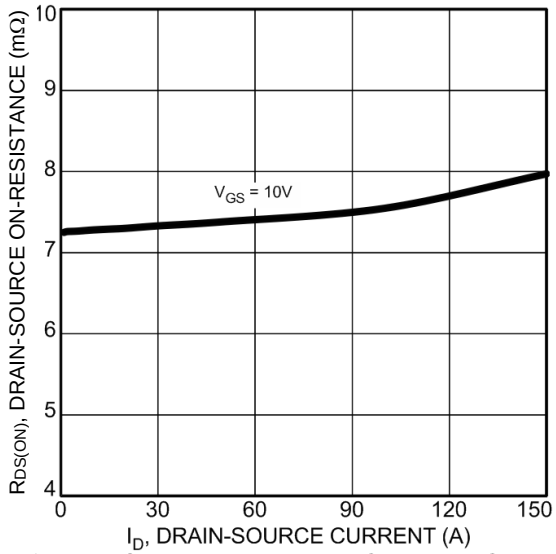

Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

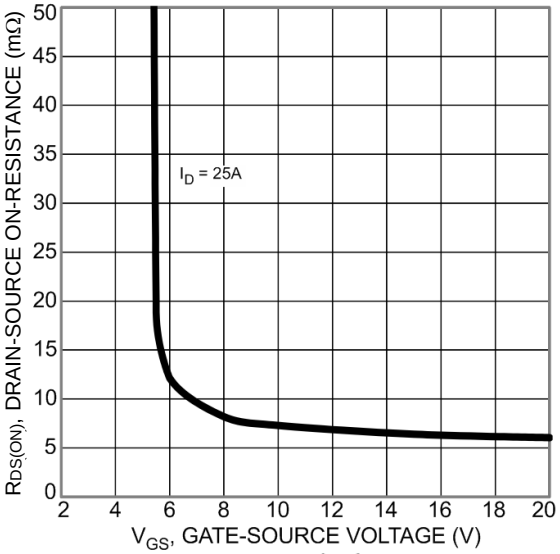

Fig. 4 Typical Transfer Characteristic

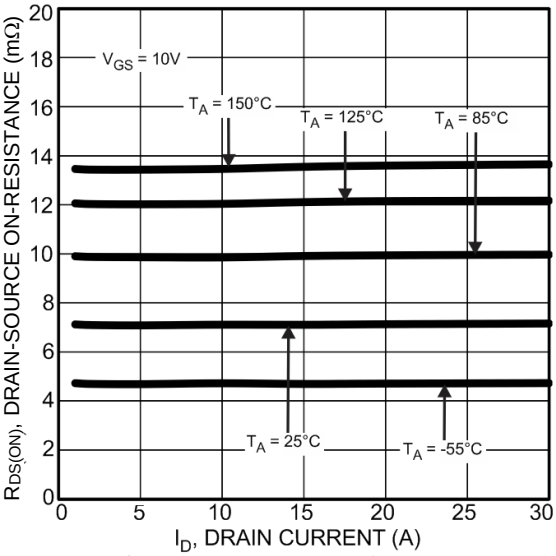

Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

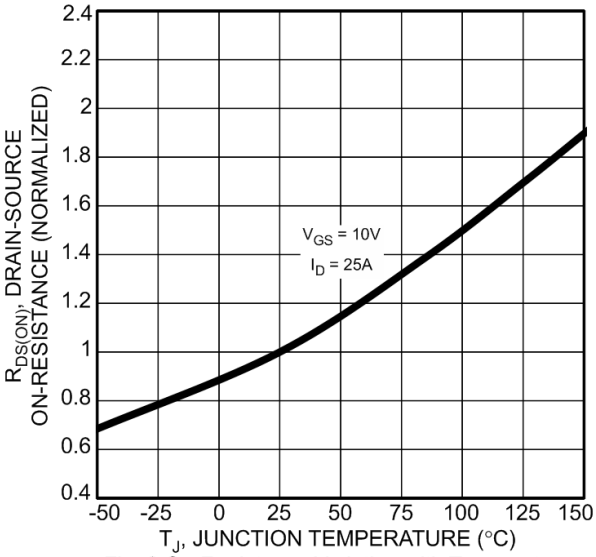

Fig. 6 On-Resistance Variation with Temperature

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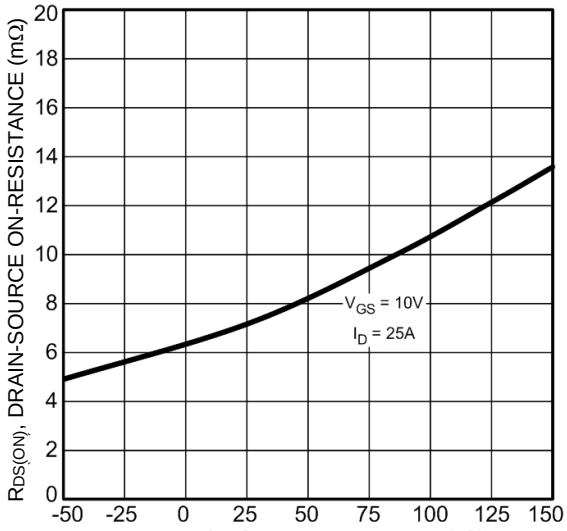

Fig. 7 On-Resistance Variation with Temperature

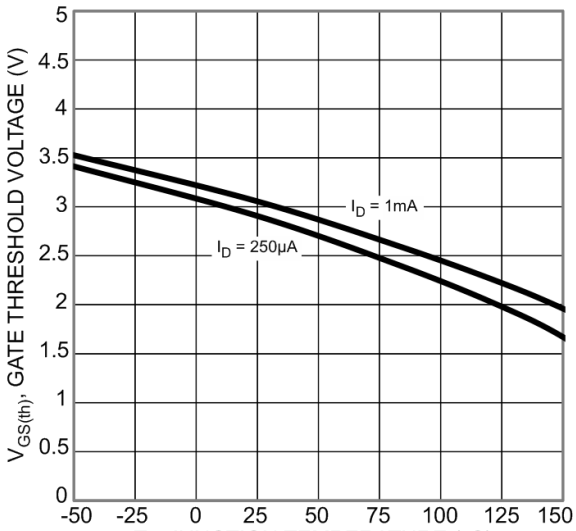

Fig. 8 Gate Threshold Variation vs. Junction Temperature

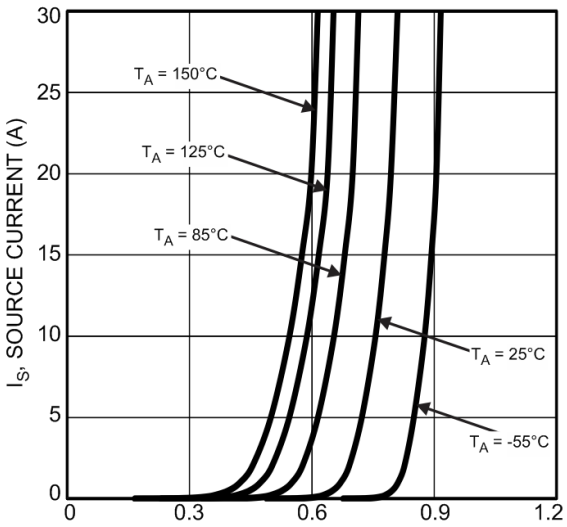

Fig. 9 Diode Forward Voltage vs. Current

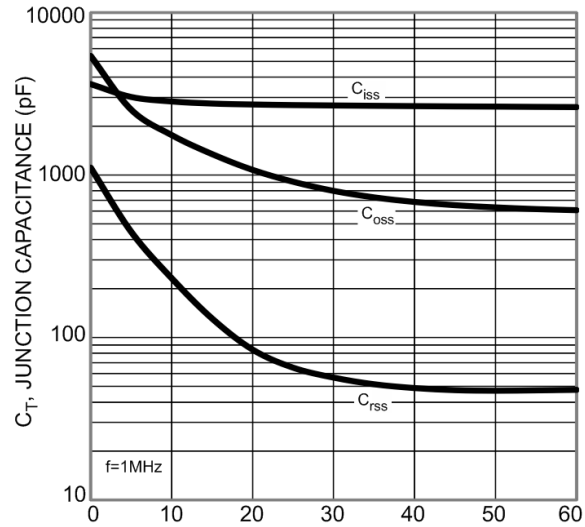

Fig. 10 Typical Junction Capacitance

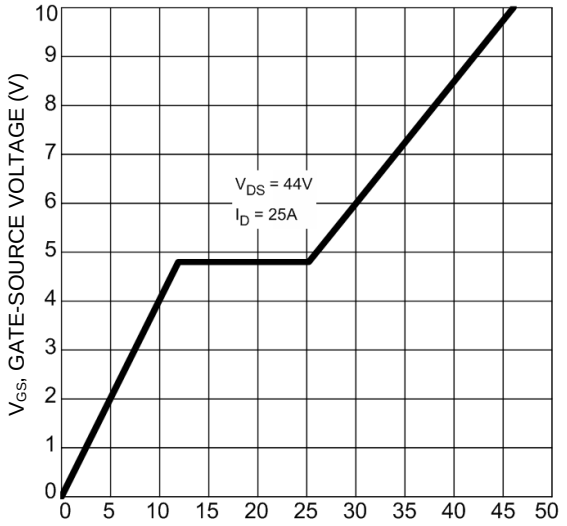

Fig. 11 Gate Charge

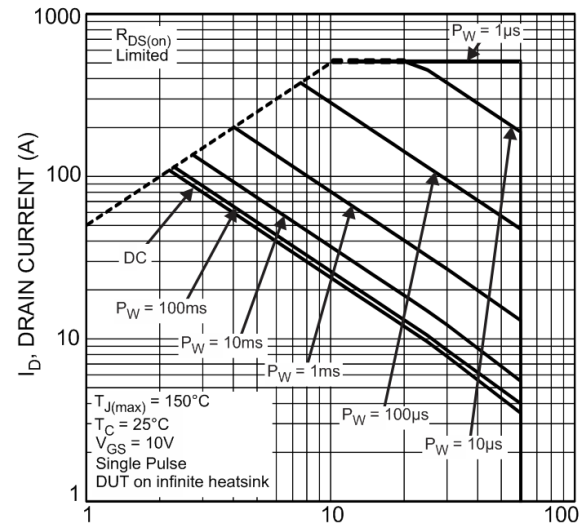

Fig. 12 SOA, Safe Operation Area

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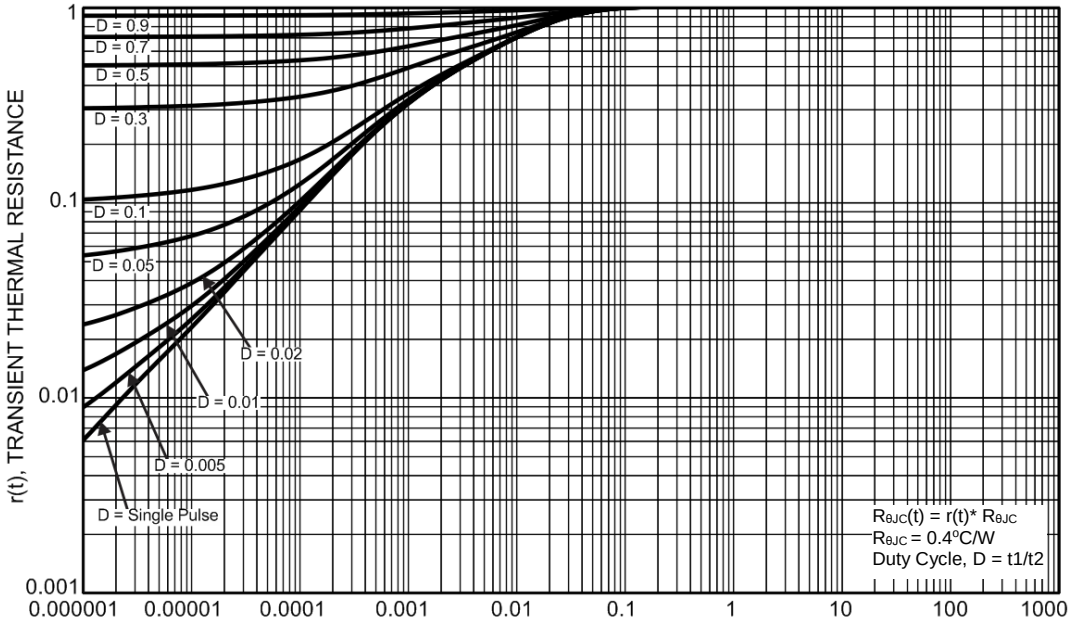

Fig. 13 Transient Thermal Resistance

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Package Outline Dimensions

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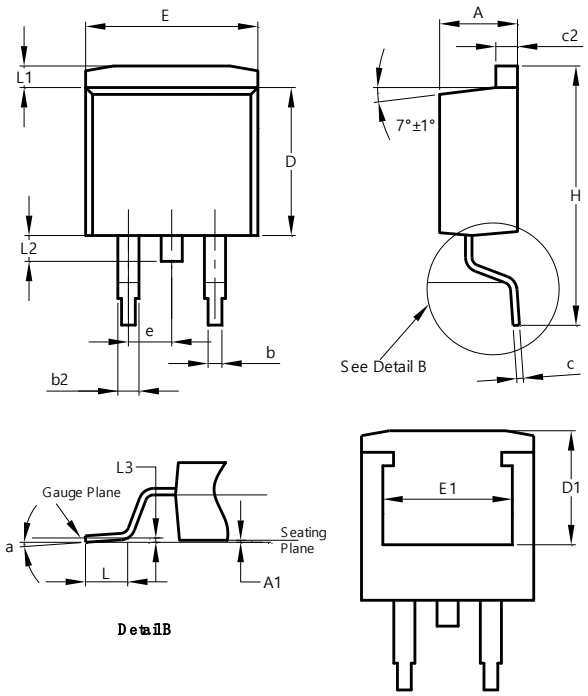
TO263AB (D2PAK)

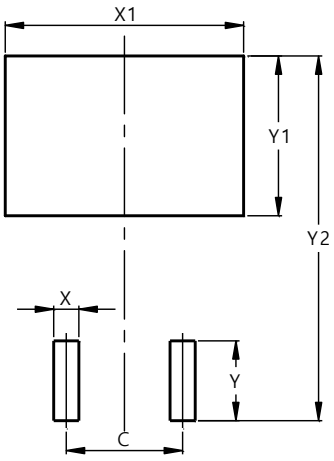


TO263AB (D2PAK)			
Dim	**Min**	**Max**	**Typ**
A	4.07	4.82	-
A1	0.00	0.25	-
b	0.51	0.99	-
b2	1.15	1.77	-
c	0.356	0.73	-
c2	1.143	1.65	-
D	8.39	9.65	-
D1	6.55	6.95	-
e	2.54 TYP		
E	9.66	10.66	-
E1	6.23	8.23	-
H	14.61	15.87	-
L	1.78	2.79	-
L1	-	1.67	-
L2	-	1.77	-
L3	-	-	0.254
a	0°	8°	-
All Dimensions in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