

Product Summary

BV_{DSS}	$R_{DS(ON)} \text{ Max}$	$Q_g \text{ Typ}$	I_D $T_C = +25^\circ\text{C}$ (Note 10)
40V	3mΩ @ $V_{GS} = 10\text{V}$	68.6nC	100A

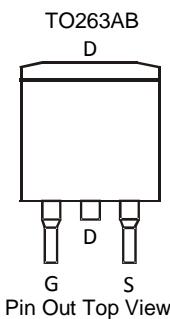
Description and Applications

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:

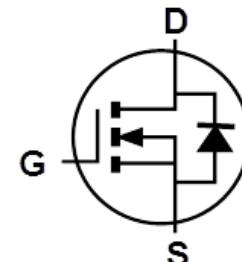
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters



Top View



Pin Out Top View



Internal Schematic

Ordering Information (Note 5)

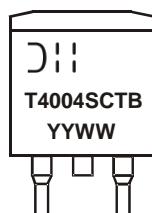
Part Number	Case	Packaging
DMTH4004SCTBQ-13	TO263AB	800/Tape & Reel

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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. For more information, please refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

TO263AB



T4004SCTB = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 14 = 2014)
 WW = Week (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units	
Drain-Source Voltage	V_{DSS}	40	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Continuous Drain Current (Note 7)	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	I_D	100 100	A
Maximum Continuous Body Diode Forward Current	I_S	100	A	
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	200	A	
Avalanche Current, $L=0.2\text{mH}$	I_{AS}	45	A	
Avalanche Energy, $L=0.2\text{mH}$	E_{AS}	200	mJ	

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P_D	4.7	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	32	°C/W
Total Power Dissipation (Note 7)	P_D	136	W
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	1.1	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	°C

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	40	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 32\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	2.5	3	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 100\text{A}$
Diode Forward Voltage	V_{SD}	—	—	1.3	V	$V_{GS} = 0\text{V}, I_S = 100\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	4,305	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	1,441	—		
Reverse Transfer Capacitance	C_{rss}	—	102	—	nC	$V_{DD} = 20\text{V}, I_D = 90\text{A},$ $V_{GS} = 10\text{V}$
Gate Resistance	R_G	—	0.77	—		
Total Gate Charge	Q_g	—	68.6	—	ns	$V_{DD} = 20\text{V}, V_{GS} = 10\text{V},$ $I_D = 90\text{A}, R_G = 3.5\Omega$
Gate-Source Charge	Q_{gs}	—	16.8	—		
Gate-Drain Charge	Q_{gd}	—	14.2	—	ns	$I_F = 50\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Turn-On Delay Time	$t_{D(ON)}$	—	9.5	—		
Turn-On Rise Time	t_R	—	6.7	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	26.4	—		
Turn-Off Fall Time	t_F	—	8.1	—	nC	
Reverse Recovery Time	t_{RR}	—	52.4	—		
Reverse Recovery Charge	Q_{RR}	—	78.2	—	nC	

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.

7. Thermal resistance from junction to soldering point (on the exposed drain pad).

8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

10. Package limited.

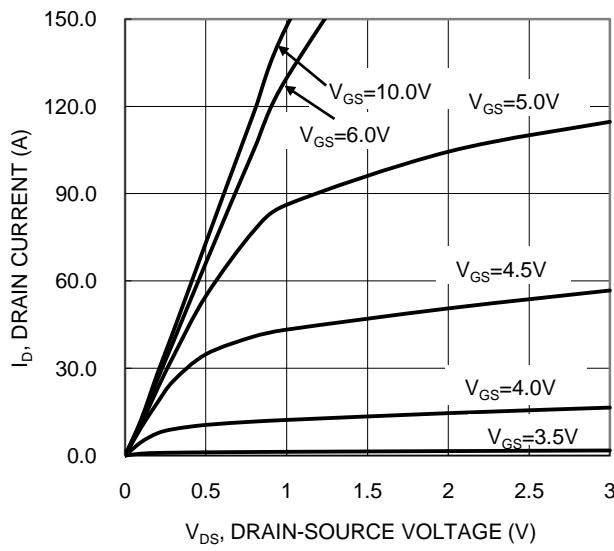


Figure 1 Typical Output Characteristic

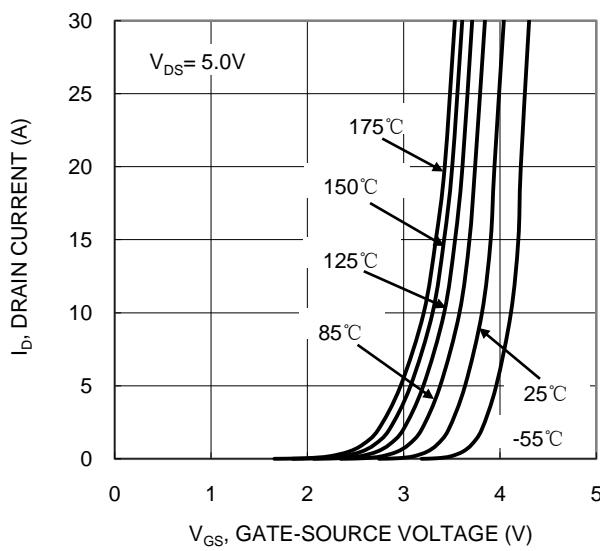


Figure 2 Typical Transfer Characteristic

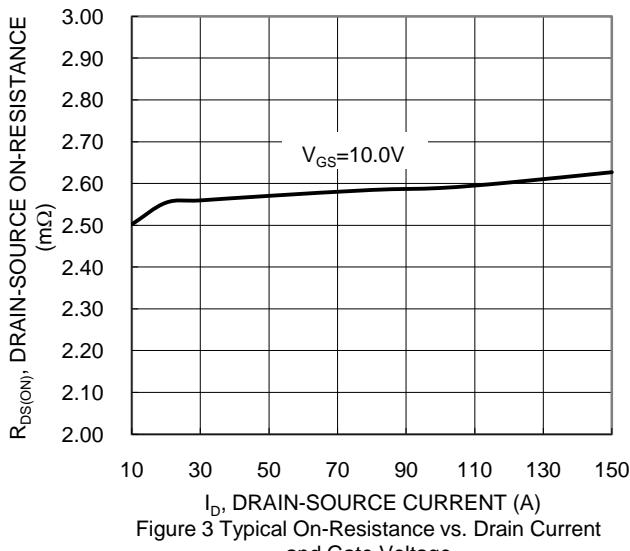


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

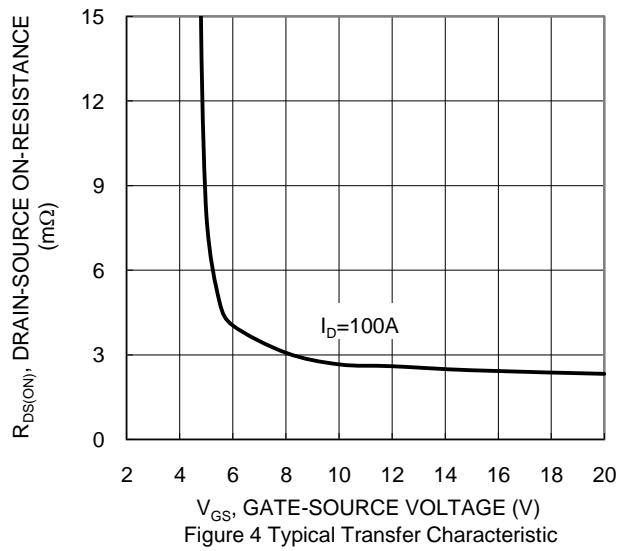


Figure 4 Typical Transfer Characteristic

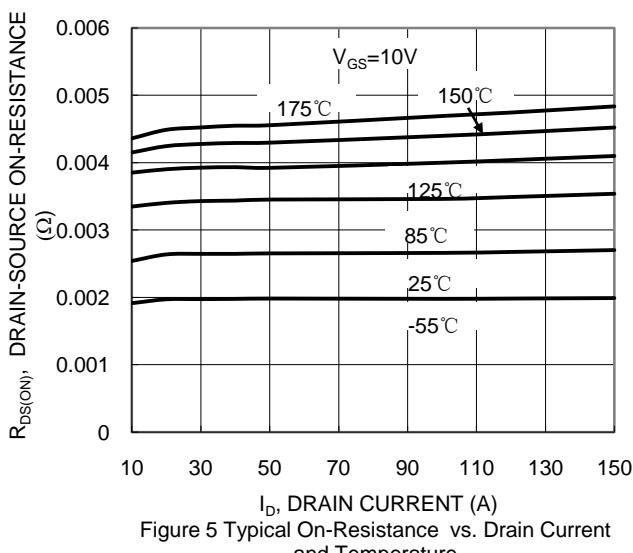


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

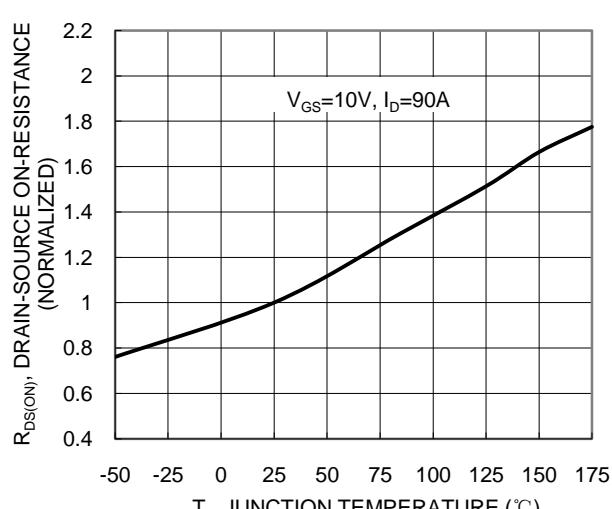
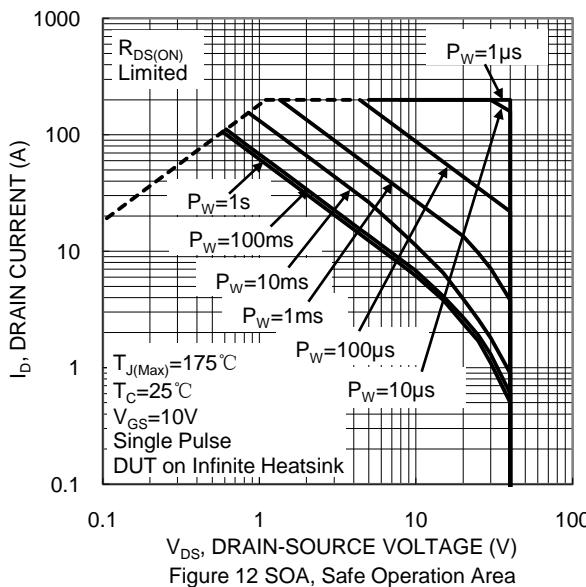
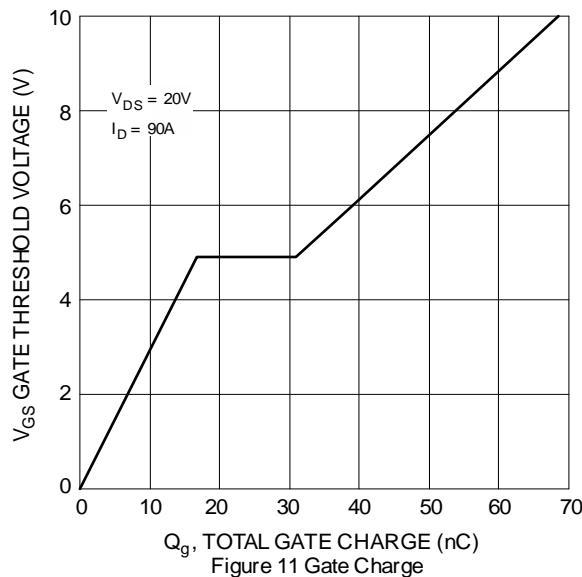
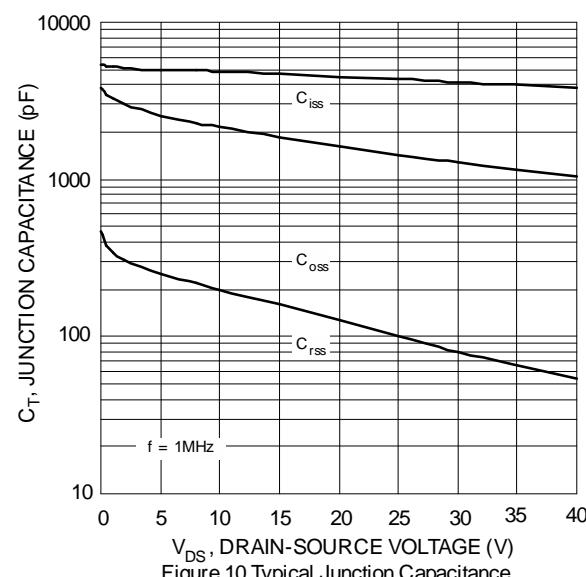
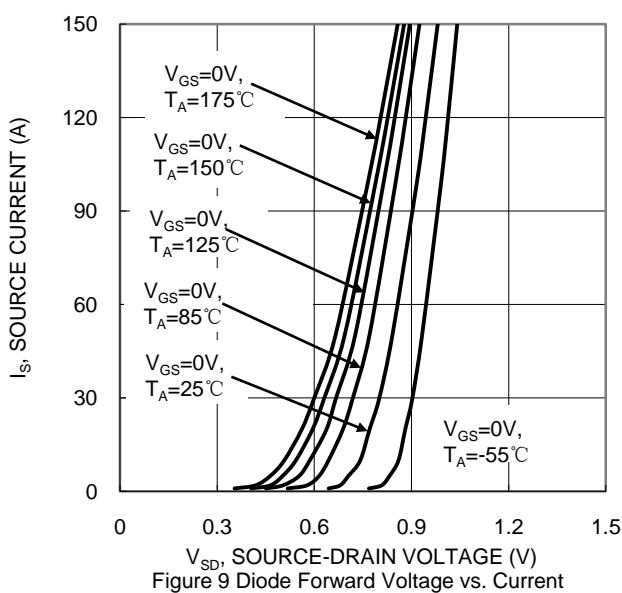
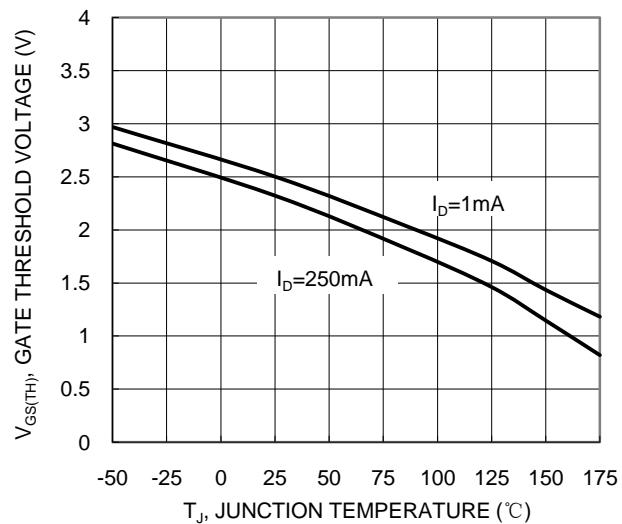
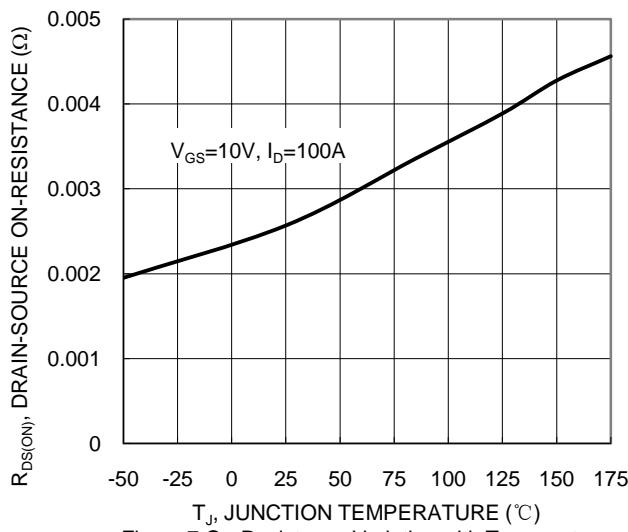


Figure 6 On-Resistance Variation with Temperature



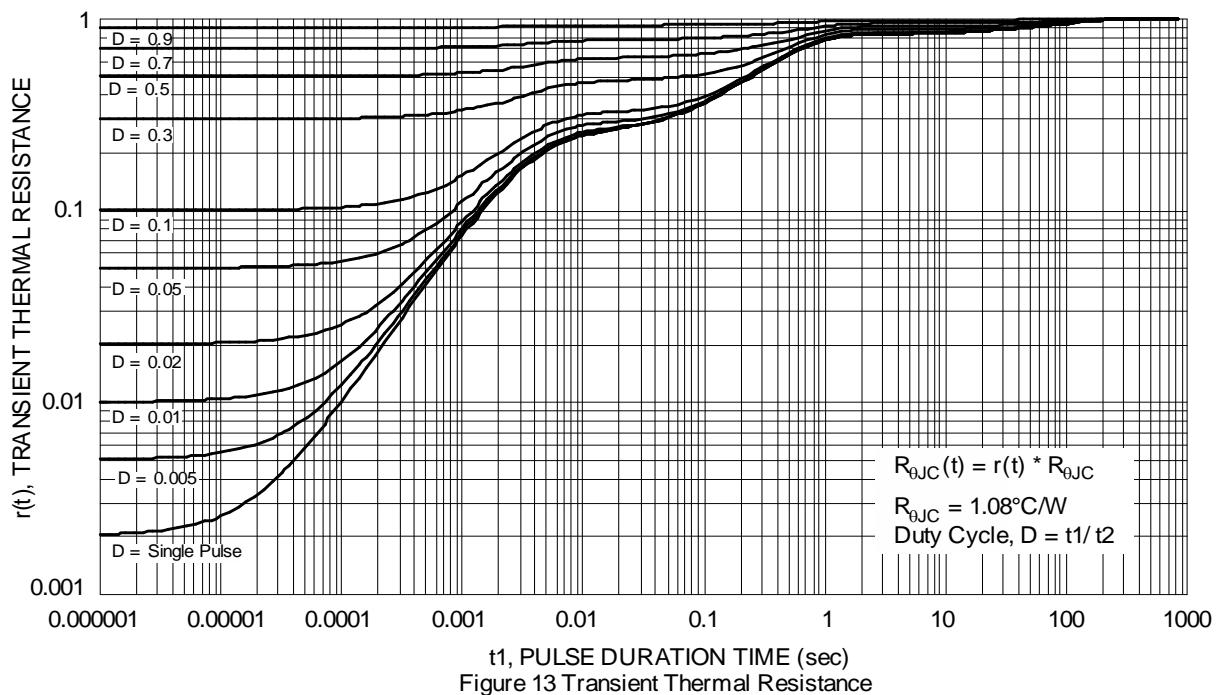
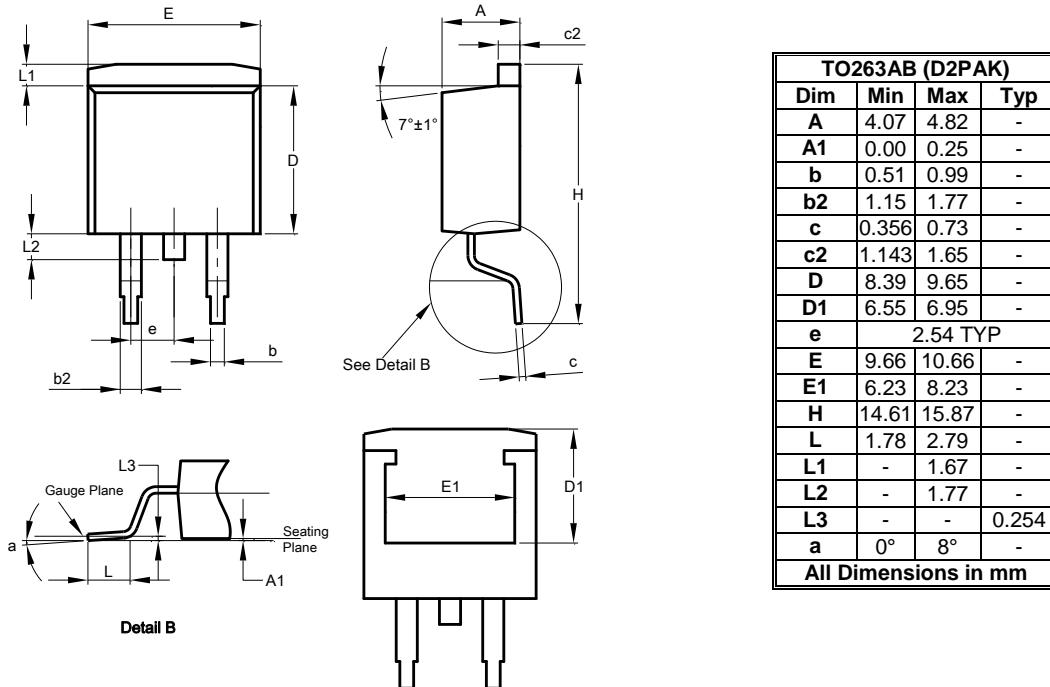


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

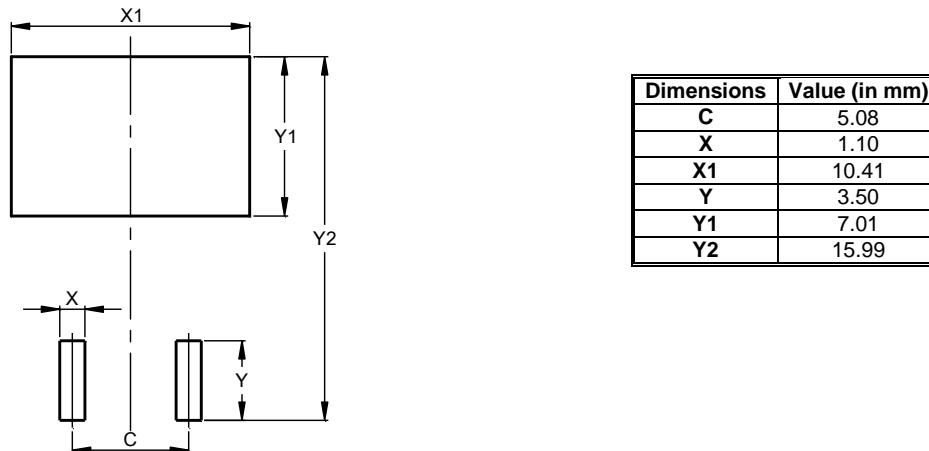
TO263AB (D2PAK)



Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

TO263AB (D2PAK)



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