

Product Summary

BV _{DSS}	R _{D(on)} Max	I _D T _C = +25°C
100V	1.85mΩ @ V _{GS} = 10V	250A

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
- DC-DC converters
- Power management

Features

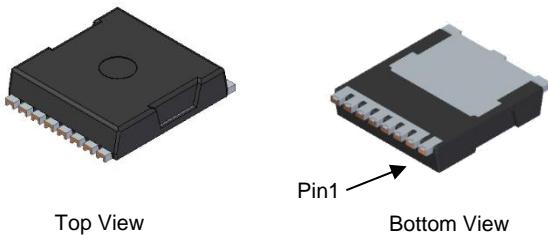
- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R_{D(on)} – Minimizes On State Losses
- Wettable Flank for Improved Optical Inspection
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The DMTH10H1M7STLWQ 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

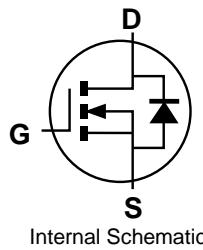
- Package: POWERDI®1012-8 (TOLL)
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ④
- Weight: 0.388 grams (Approximate)

POWERDI1012-8

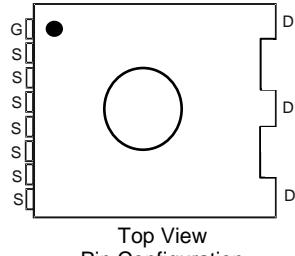


Top View

Bottom View



Internal Schematic



Top View
Pin Configuration

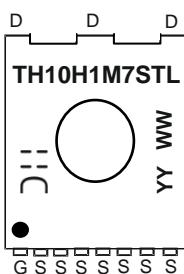
Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMTH10H1M7STLWQ-13	POWERDI1012-8	1,500	Tape & 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



POWERDI1012-8

|| = Manufacturer's Marking
 TH10H1M7STL = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 25 = 2025)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	I_D 250 176	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	1000	A
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	250	A
Pulsed Body Diode Forward Current (10 μs Pulse, Duty Cycle = 1%)	I_{SM}	1000	A
Avalanche Current, $L = 0.3\text{mH}$	I_{AS}	73	A
Avalanche Energy, $L = 0.3\text{mH}$	E_{AS}	799.4	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	6 W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	24	°C/W
Total Power Dissipation (Note 6)	$T_C = +25^\circ\text{C}$	P_D	250 W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	0.6	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	$V_{GS} = 0, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 80\text{V}, V_{GS} = 0$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	1.4	1.85	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 30\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0, I_S = 30\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	9871	—	pF	$V_{DS} = 50\text{V}, V_{GS} = 0, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	3019	—		
Reverse Transfer Capacitance	C_{rss}	—	58	—		
Gate Resistance	R_g	—	2.5	—	Ω	$V_{DS} = 0, V_{GS} = 0, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	147	—	nC	$V_{DD} = 50\text{V}, I_D = 30\text{A}, V_{GS} = 10\text{V}$
Gate-Source Charge	Q_{gs}	—	43	—		
Gate-Drain Charge	Q_{gd}	—	32	—		
Turn-On Delay Time	$t_{D(\text{ON})}$	—	29	—	ns	$V_{DD} = 50\text{V}, V_{GS} = 10\text{V}, I_D = 30\text{A}, R_G = 4.7\Omega$
Turn-On Rise Time	t_R	—	64	—		
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	108	—		
Turn-Off Fall Time	t_F	—	69	—	ns	$I_F = 25\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse-Recovery Time	t_{RR}	—	91	—		
Reverse-Recovery Charge	Q_{RR}	—	270	—	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

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

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

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

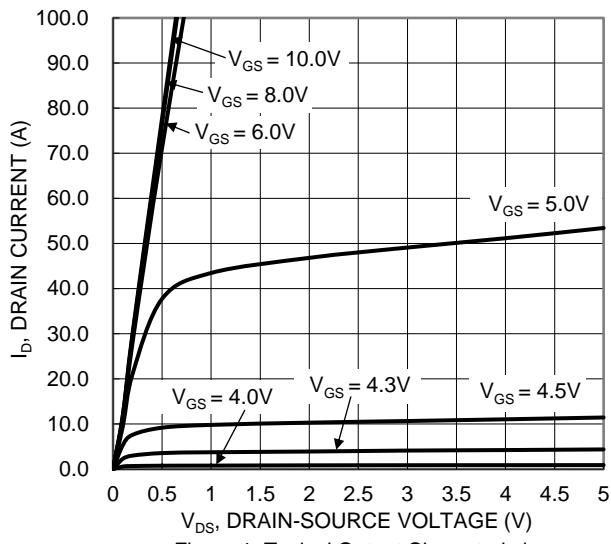


Figure 1. Typical Output Characteristic

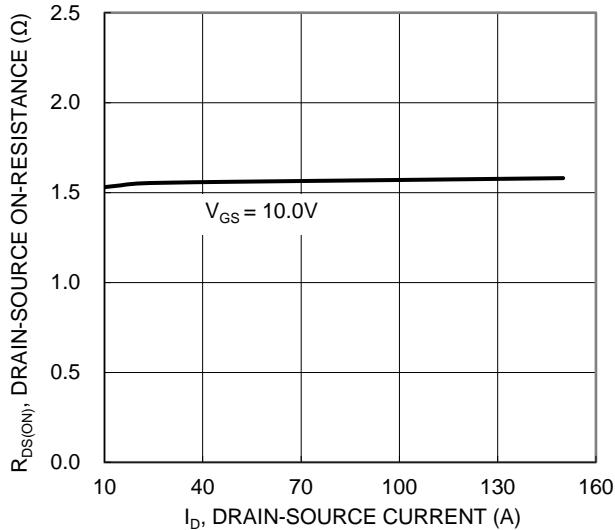


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

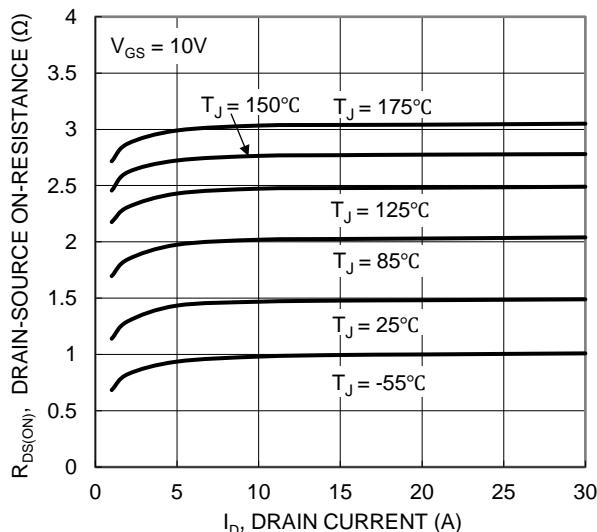


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

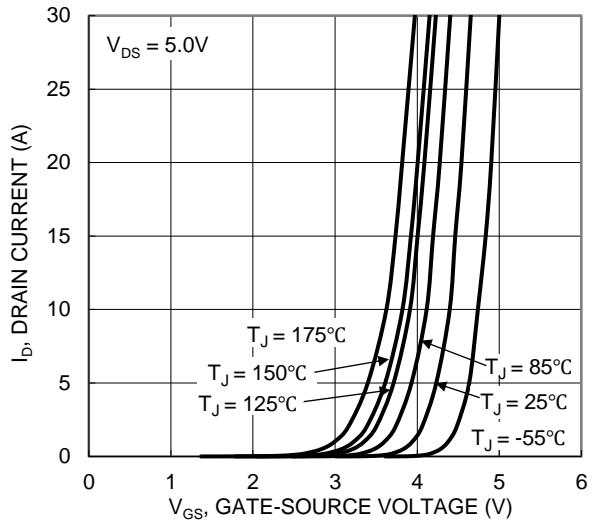


Figure 2. Typical Transfer Characteristic

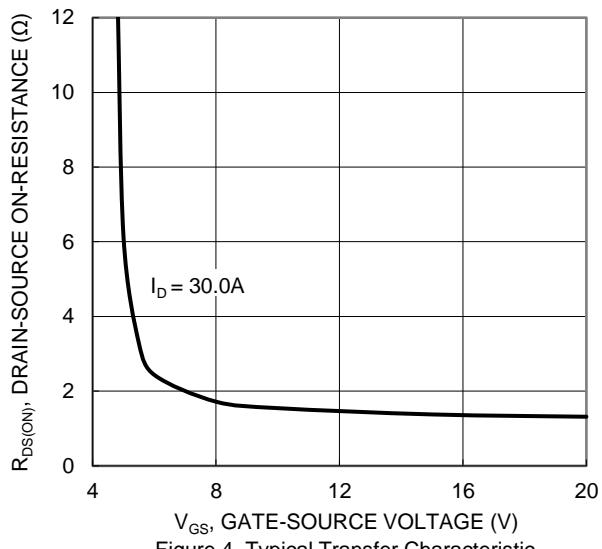


Figure 4. Typical Transfer Characteristic

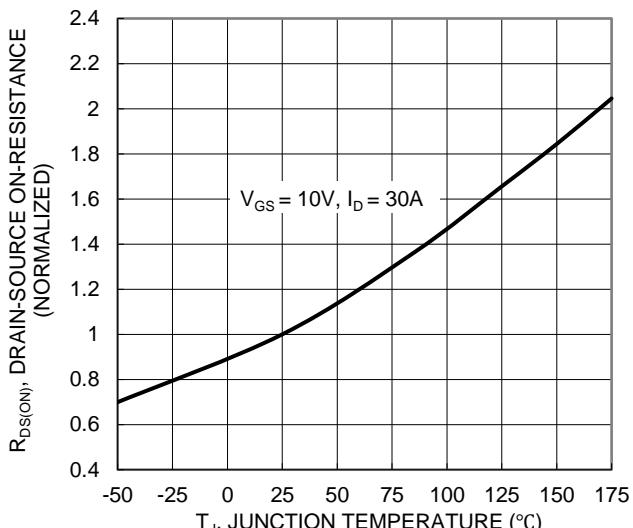


Figure 6. On-Resistance Variation with Temperature

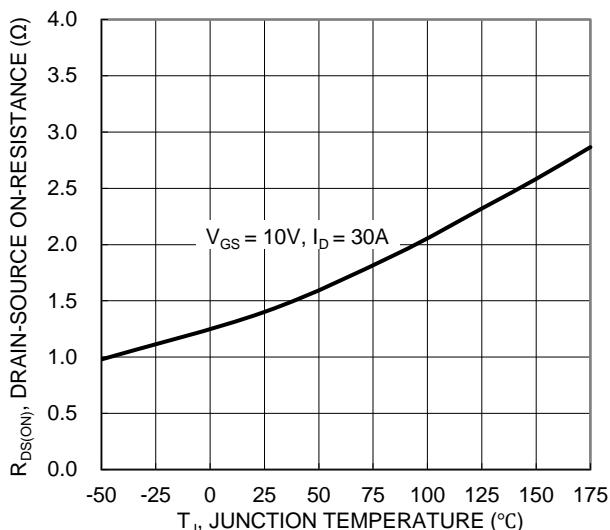


Figure 7. On-Resistance Variation with Temperature

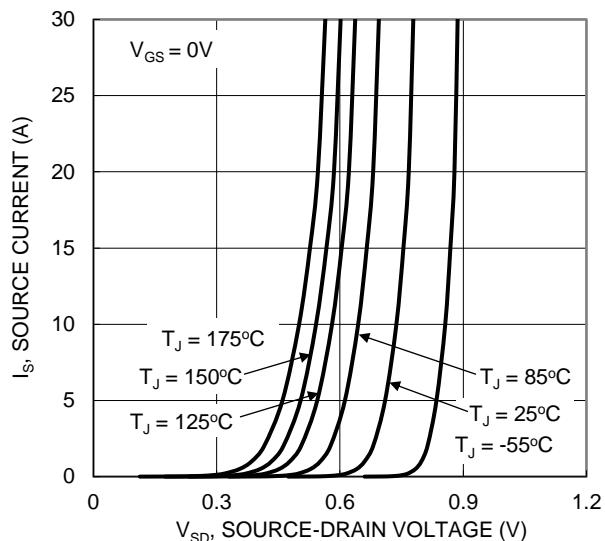


Figure 9. Diode Forward Voltage vs. Current

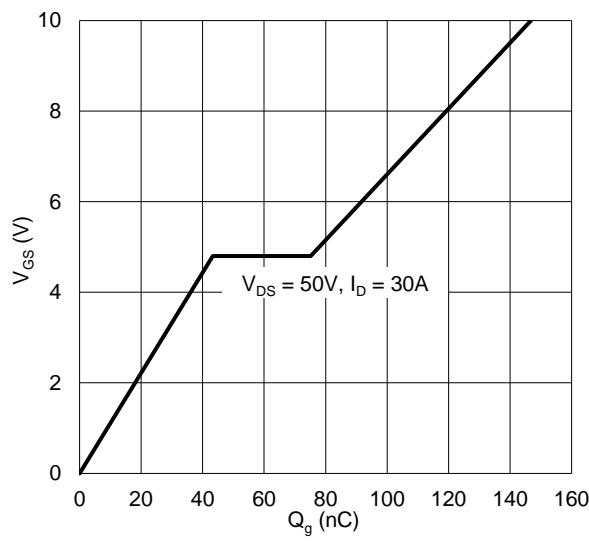


Figure 11. Gate Charge

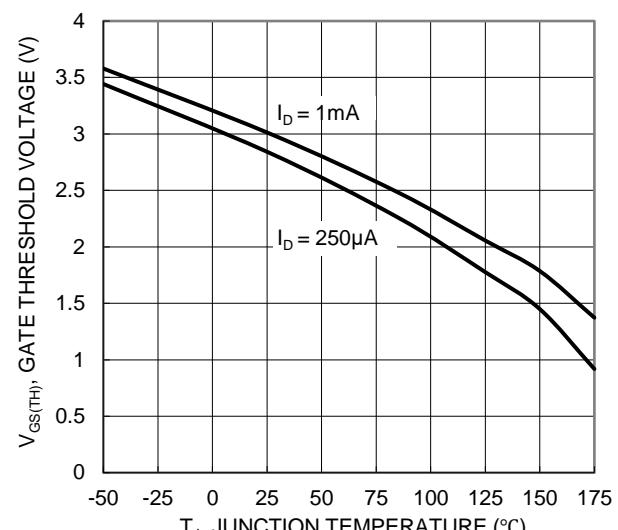


Figure 8. Gate Threshold Variation vs. Junction Temperature

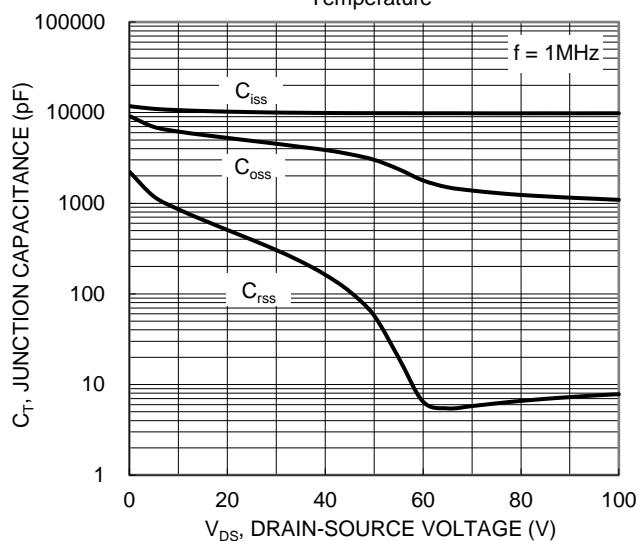


Figure 10. Typical Junction Capacitance

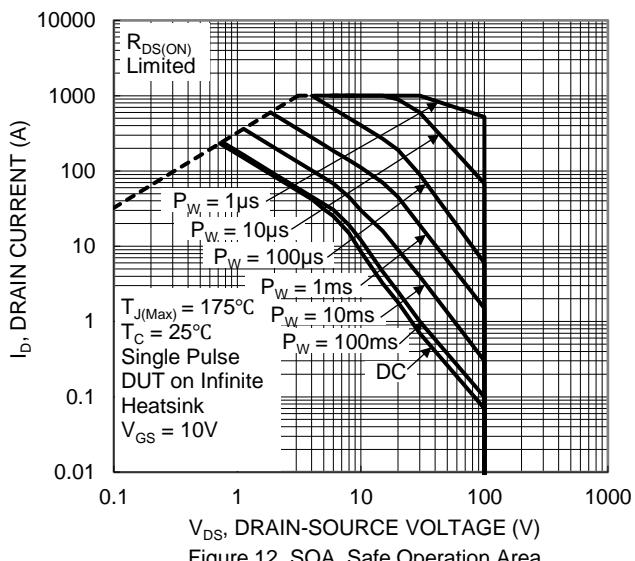


Figure 12. SOA, Safe Operation Area

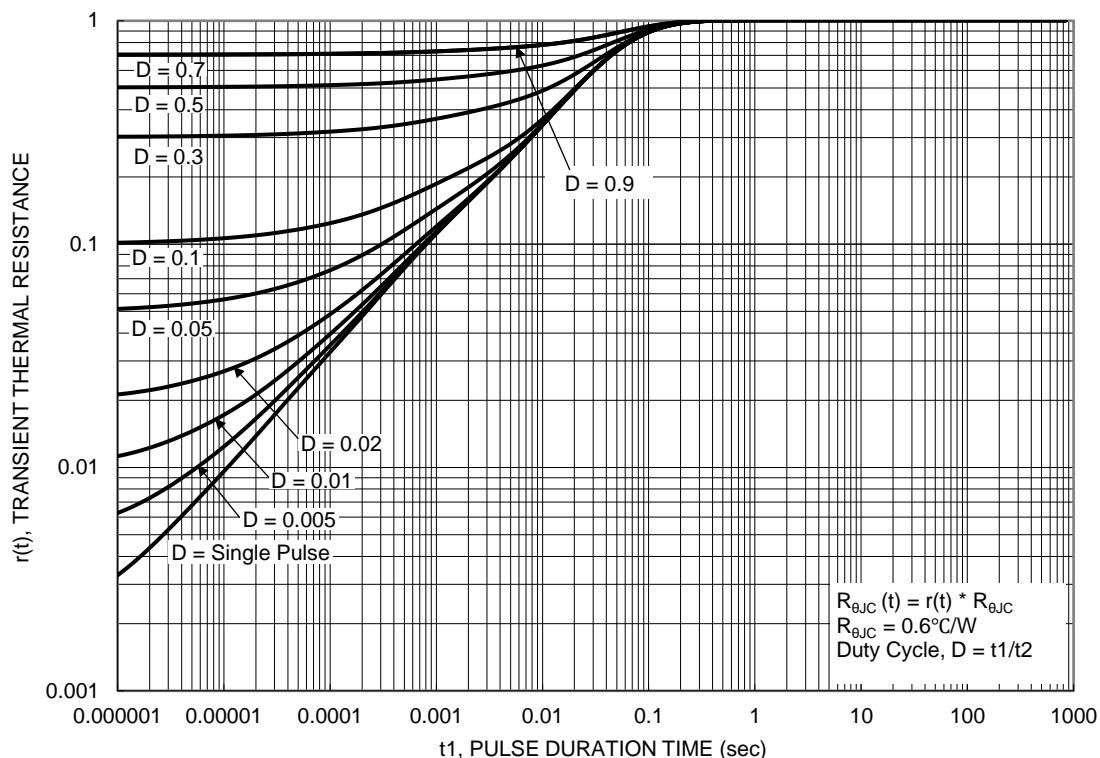
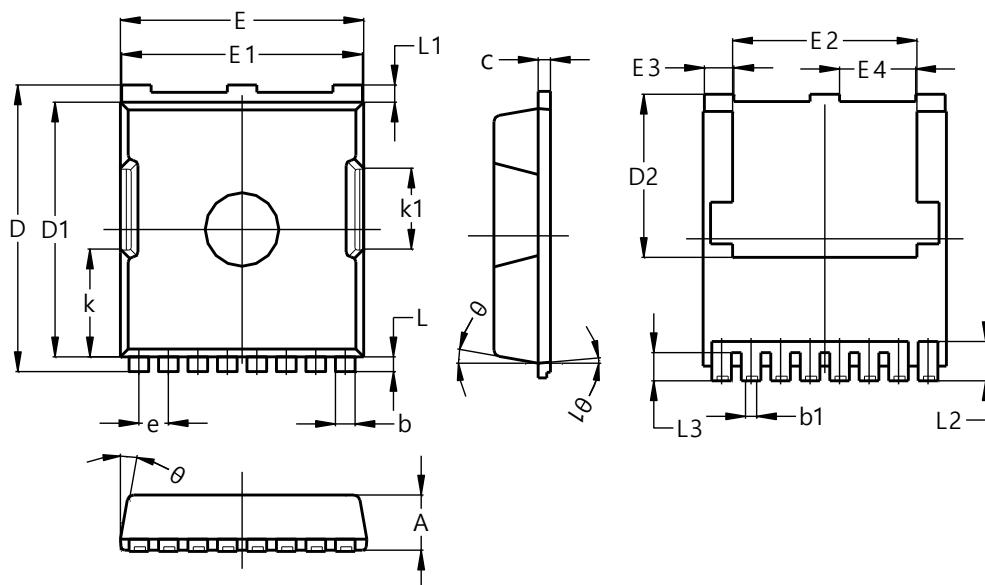


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

POWERDI1012-8



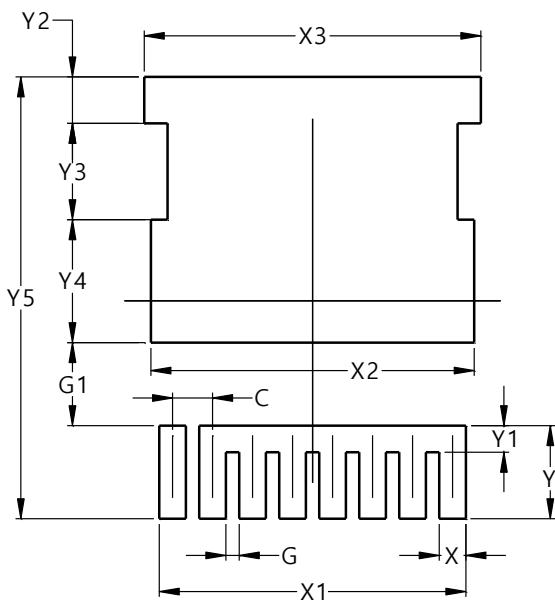
POWERDI1012-8			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
b	0.70	0.90	0.80
b1	0.42	0.50	0.45
c	0.40	0.60	0.50
D	11.48	11.88	11.68
D1	10.23	10.53	10.38
D2	6.45	6.85	6.65
E	9.70	10.10	9.90
E1	9.70	9.90	9.80
E2	7.00	8.00	7.50
E3	1.10	1.30	1.20
E4	3.00	3.20	3.10
e	1.20 BSC		
k	4.39 REF		
k1	3.30 REF		
L	0.50	0.70	0.60
L1	0.50	0.90	0.70
L2	1.40	1.80	1.60
L3	1.00	1.30	1.15
θ	0°	15°	10°
θ1	0°	10°	5°

All Dimensions in mm

Suggested Pad Layout

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

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Dimensions	Value (in mm)
C	1.200
G	0.400
G1	2.500
X	0.800
X1	9.200
X2	9.700
X3	10.100
Y	2.800
Y1	0.800
Y2	1.400
Y3	2.900
Y4	3.700
Y5	13.300

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