

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
100V	2.5mΩ @ V <sub>GS</sub> = 10V	215A

## 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<sub>DS(ON)</sub> – 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)**
- **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](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMTH10H2M5STLWQ](#))**

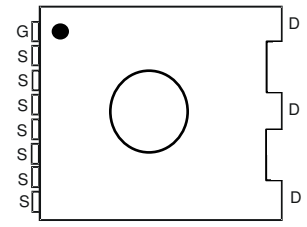
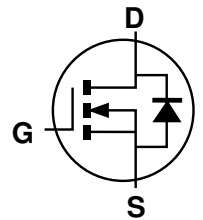
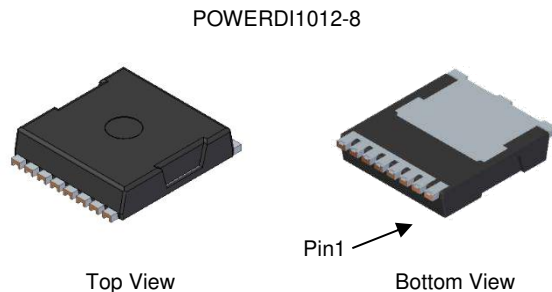
## Description and Applications

This new generation N-channel enhancement mode MOSFET is designed to minimize R<sub>DS(ON)</sub> yet maintain superior switching performance. This device is ideal for use in power management and load switch.

- Motor Control
- DC-DC Converters
- Power Management

## Mechanical Data

- Case: POWERDI<sup>®</sup>1012-8 (TOLL)
- Case 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 (63)
- Weight: 0.388 grams (Approximate)

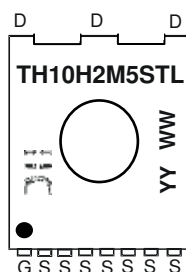


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH10H2M5STLW-13	POWERDI1012-8	1500/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



- ⌋⌋⌋ = Manufacturer's Marking
- TH10H2M5STL = Product Type Marking Code
- YYWW = Date Code Marking
- YY = Last Two Digits of Year (ex: 21 = 2021)
- WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	100	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>C</sub> = +25°C	215
		T <sub>C</sub> = +100°C	152
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	860	A
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	215	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)	I <sub>SM</sub>	860	A
Avalanche Current, L = 0.3mH	I <sub>AS</sub>	68	A
Avalanche Energy, L = 0.3mH	E <sub>AS</sub>	701	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	5.8	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	26	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	230.8	W
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	0.65	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +175	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 7)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 7)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	2	—	4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.68	2.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 30A
<b>DYNAMIC CHARACTERISTICS</b> (Note 8)						
Input Capacitance	C <sub>iSS</sub>	—	8450	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	2430	—		
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	17.7	—		
Gate Resistance	R <sub>G</sub>	—	1.0	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	124.4	—	nC	V <sub>DD</sub> = 50V, I <sub>D</sub> = 30A, V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>gs</sub>	—	34	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	28.3	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	32.7	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A, R <sub>G</sub> = 4.7Ω
Turn-On Rise Time	t <sub>r</sub>	—	47	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	91.3	—		
Turn-Off Fall Time	t <sub>f</sub>	—	53.9	—		
Reverse Recovery Time	t <sub>RR</sub>	—	87.6	—	ns	I <sub>F</sub> = 25A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	251.8	—	nC	

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

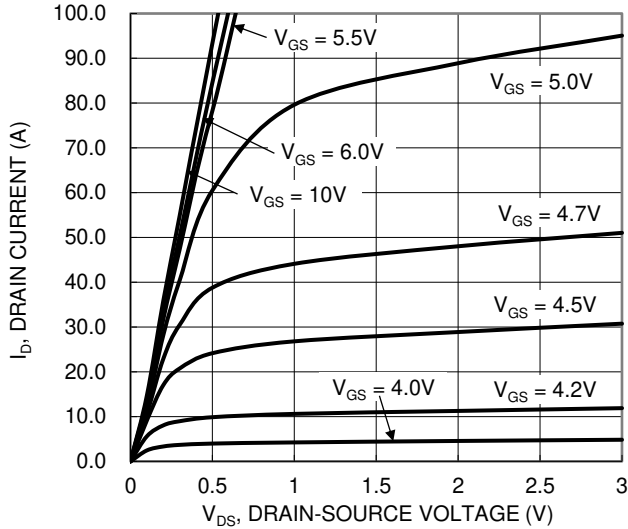


Figure 1. Typical Output Characteristic

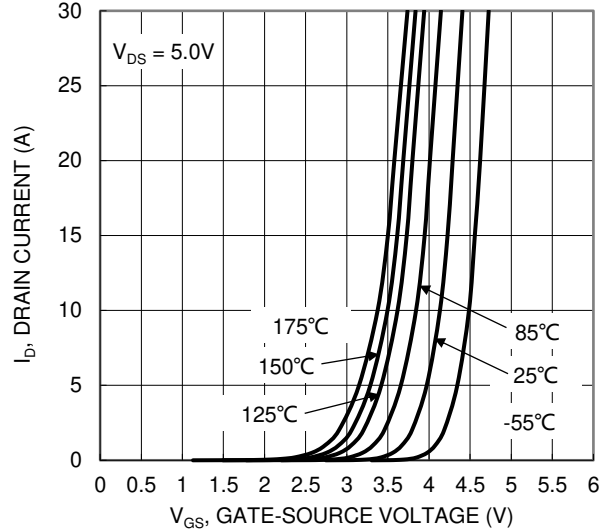


Figure 2. Typical Transfer Characteristic

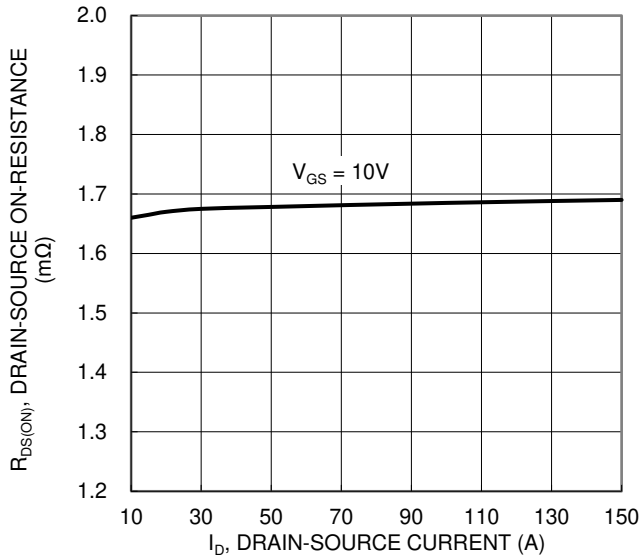


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

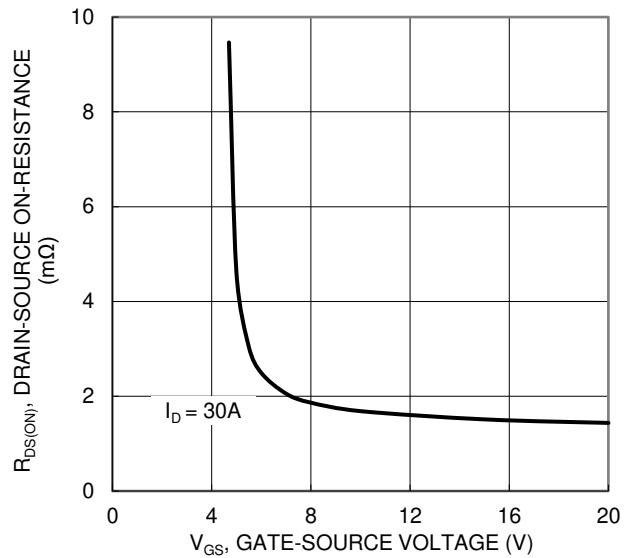


Figure 4. Typical Transfer Characteristic

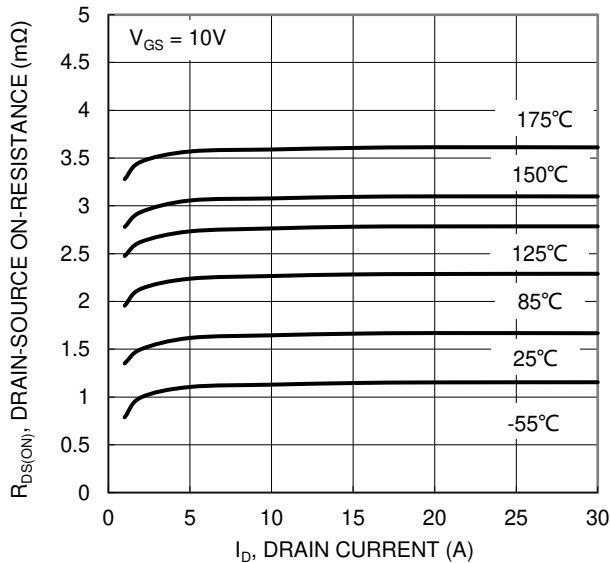


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

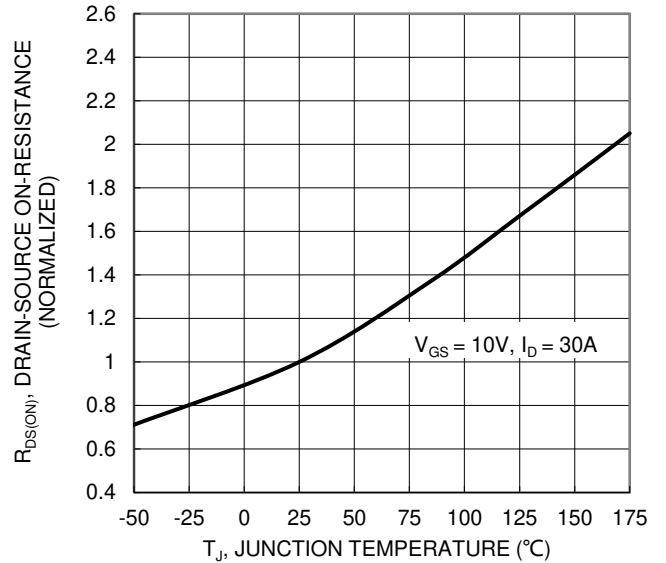


Figure 6. On-Resistance Variation with Temperature

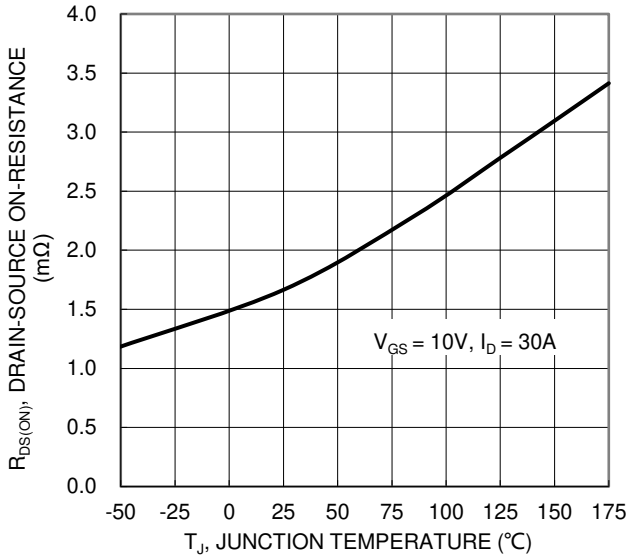


Figure 7. On-Resistance Variation with Temperature

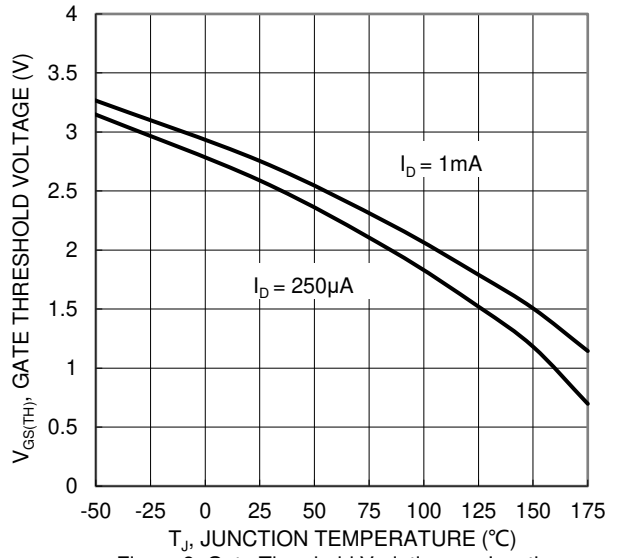


Figure 8. Gate Threshold Variation vs. Junction Temperature

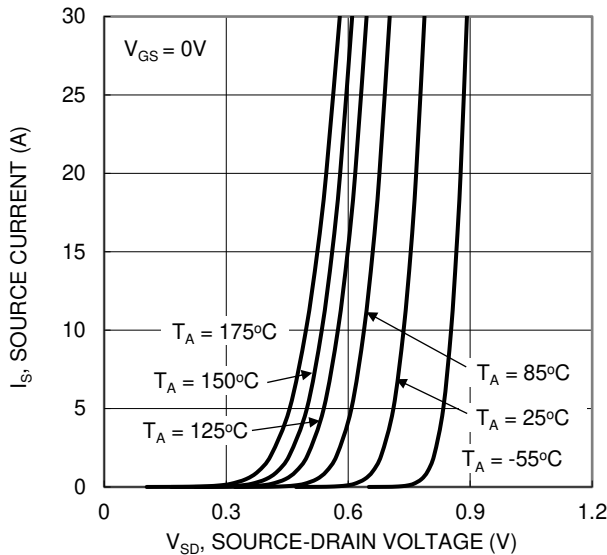


Figure 9. Diode Forward Voltage vs. Current

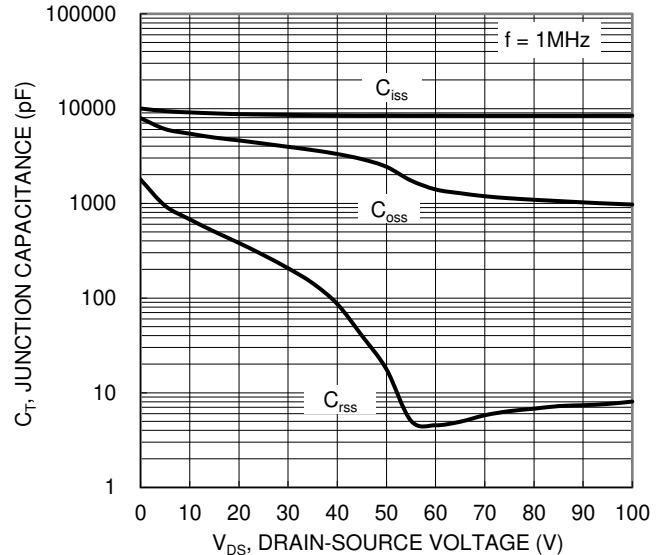


Figure 10. Typical Junction Capacitance

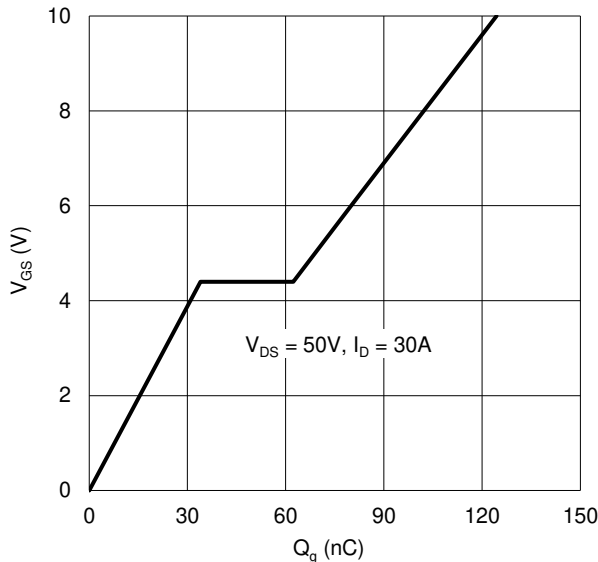


Figure 11. Gate Charge

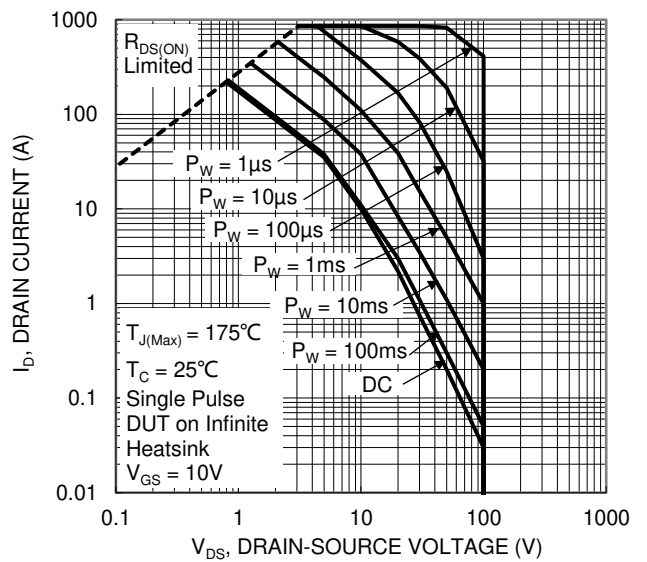


Figure 12. SOA, Safe Operation Area

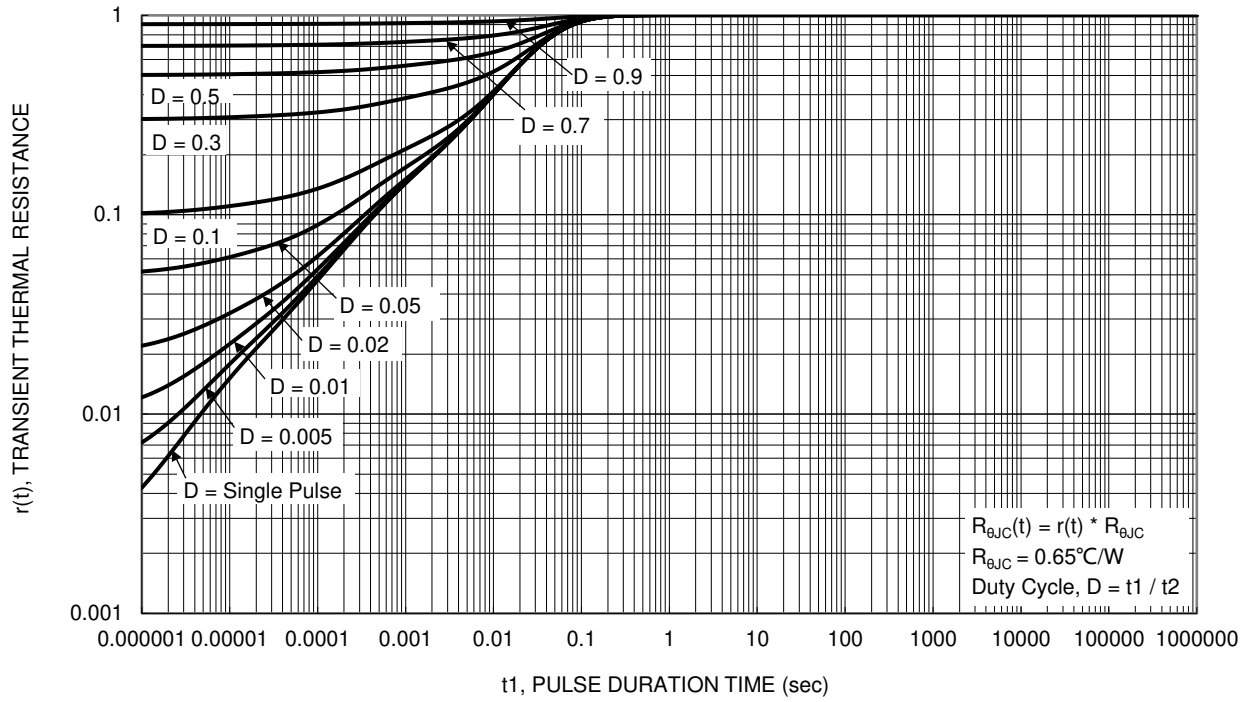
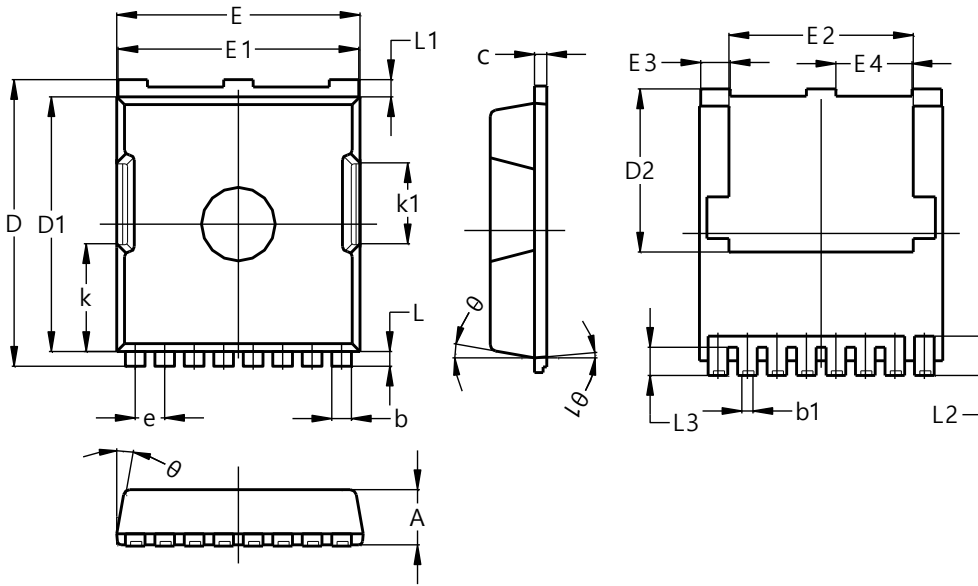


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**POWERDI1012-8**

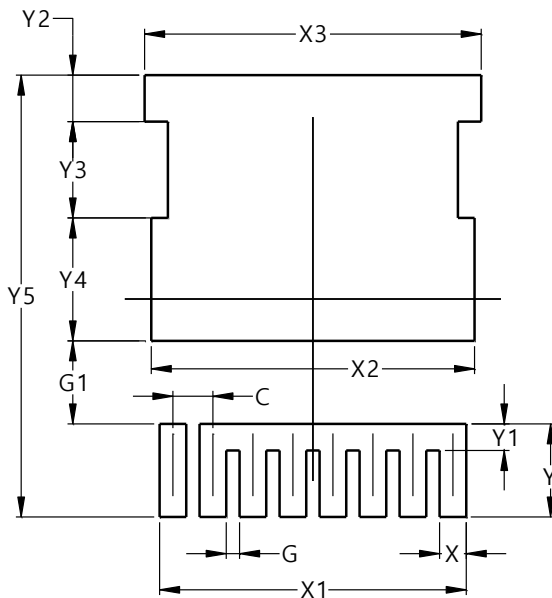


POWERDI1012-8			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
b	0.70	0.90	0.80
b1	0.42	0.50	0.45
c	0.40	0.60	0.50
D	11.48	11.88	11.68
D1	10.23	10.53	10.38
D2	6.45	6.85	6.65
E	9.70	10.10	9.90
E1	9.70	9.90	9.80
E2	7.00	8.00	7.50
E3	1.10	1.30	1.20
E4	3.00	3.20	3.10
e	1.20 BSC		
k	4.39 REF		
k1	3.30 REF		
L	0.50	0.70	0.60
L1	0.50	0.90	0.70
L2	1.40	1.80	1.60
L3	1.00	1.30	1.15
theta	0°	15°	10°
theta1	0°	10°	5°
All Dimensions in mm			

**Suggested Pad Layout**

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

**POWERDI1012-8**



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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