

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
80V	1.7mΩ @ V _{GS} = 10V	270A

Description and Applications

This new generation N-Channel enhancement mode MOSFET is designed to minimize R_{DS(ON)} yet maintain superior switching performance. This device is ideal for use in Notebook battery power management and load switch.

Applications

- 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_{DS(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)**
- **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_us@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMTH8001STLWQ](#))**

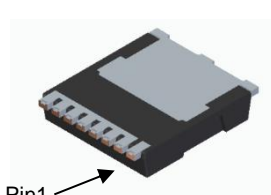
Mechanical Data

- Case: POWERDI®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 Lead-Frame. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.388 grams (Approximate)

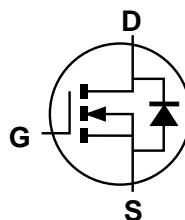
POWERDI1012-8



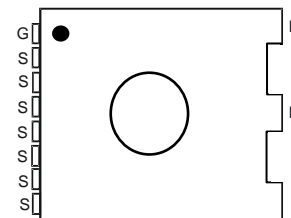
Top View



Bottom View



Internal Schematic



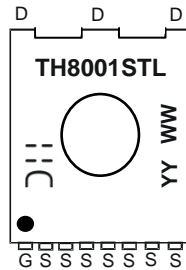
Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH8001STLW-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



D = Manufacturer's Marking
 TH8001STL = 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	± 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	270 190	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)		I_{DM}	1080	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	270	A
Pulsed Body Diode Forward Current (10 μs Pulse, Duty Cycle = 1%)		I_{SM}	1080	A
Avalanche Current, $L=1\text{mH}$		I_{AS}	47	A
Avalanche Energy, $L=1\text{mH}$		E_{AS}	1104	mJ

Thermal Characteristics

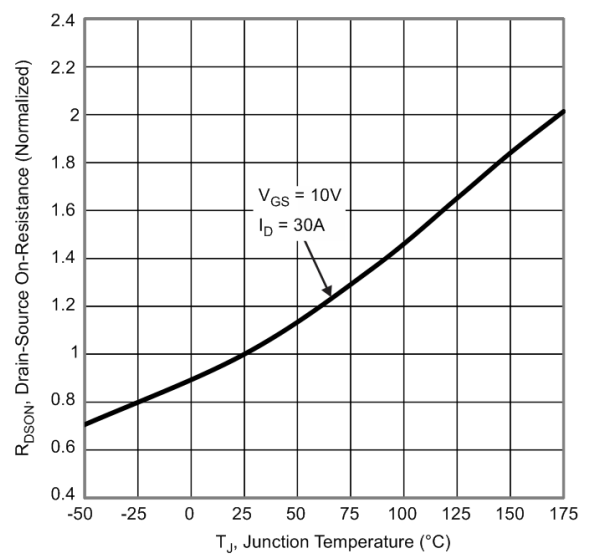
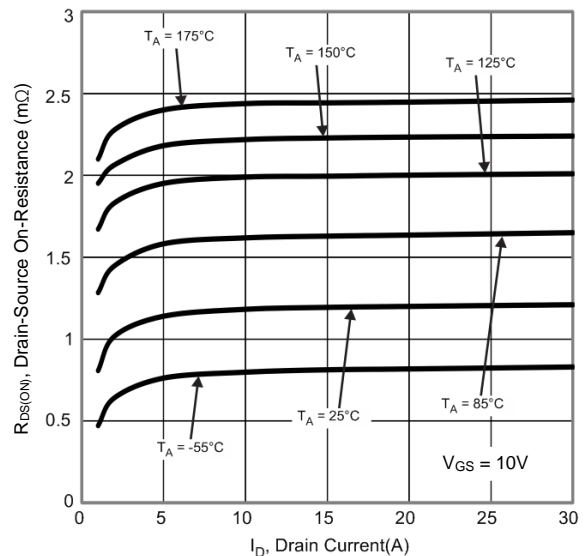
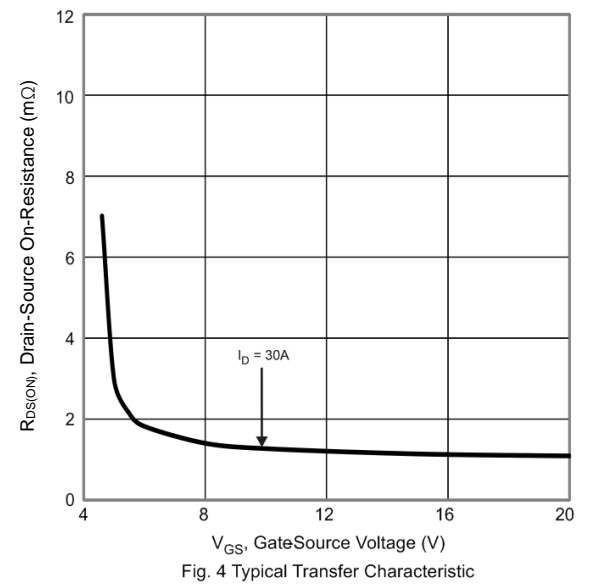
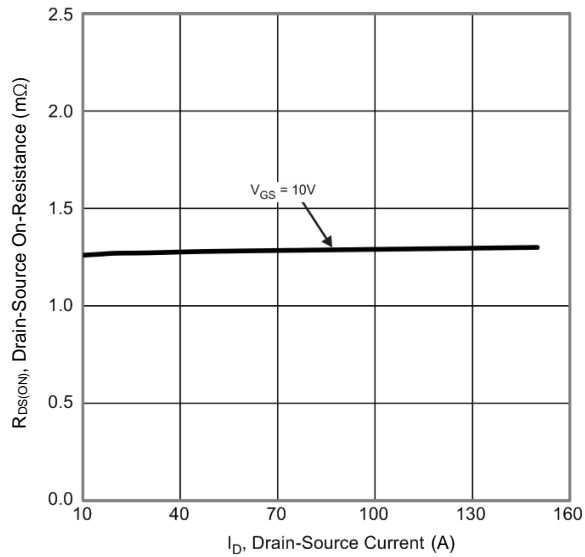
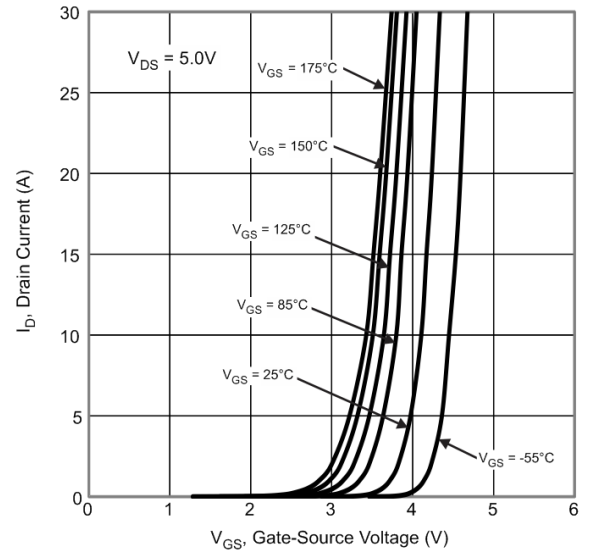
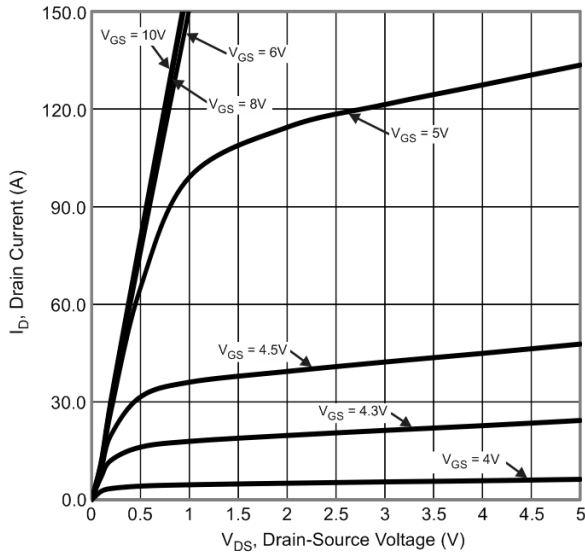
Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	6	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	25	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_C = +25^\circ\text{C}$	P_D	136	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	0.6	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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).

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}	80	—	—	V	$V_{GS} = 0V, I_D = 1mA$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 64V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.1	1.7	m Ω	$V_{GS} = 10V, I_D = 30A$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0V, I_S = 30A$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	8894	—	pF	$V_{DS} = 50V, V_{GS} = 0V$ $f = 1MHz$
Output Capacitance	C_{oss}	—	2273	—		
Reverse Transfer Capacitance	C_{rss}	—	34	—		
Gate Resistance	R_G	—	2.6	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	Q_G	—	138	—	nC	$V_{DD} = 50V, I_D = 30A,$ $V_{GS} = 10V$
Gate-Source Charge	Q_{GS}	—	36	—		
Gate-Drain Charge	Q_{GD}	—	36	—		
Turn-On Delay Time	$t_{D(ON)}$	—	24	—	ns	$V_{DD} = 50V, V_{GS} = 10V,$ $I_D = 30A, R_G = 4.7\Omega$
Turn-On Rise Time	t_r	—	60	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	108	—		
Turn-Off Fall Time	t_f	—	72	—		
Reverse Recovery Time	t_{RR}	—	94	—	ns	$I_F = 25A, di/dt = 100A/\mu s$
Reverse Recovery Charge	Q_{RR}	—	291	—	nC	

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



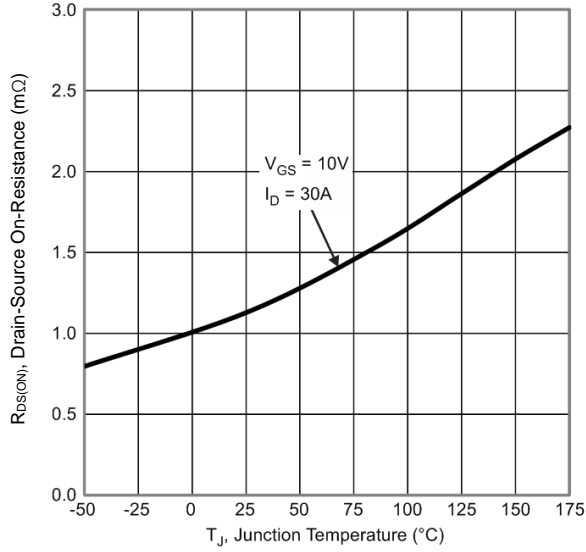


Fig. 7 On-Resistance Variation with Temperature

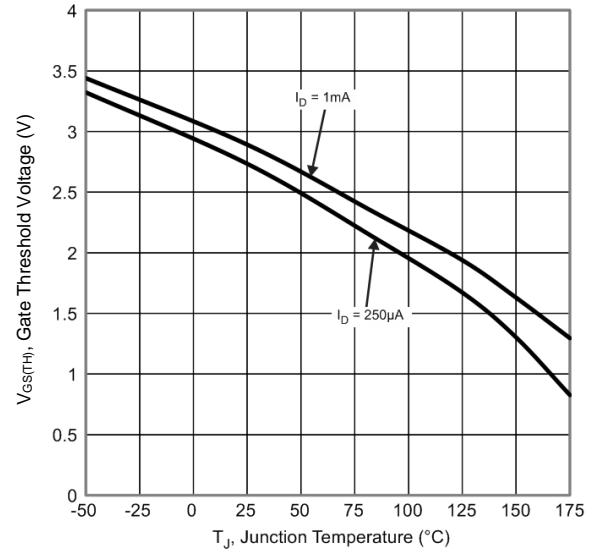


Fig. 8 Gate Threshold Variation vs. Junction Temperature

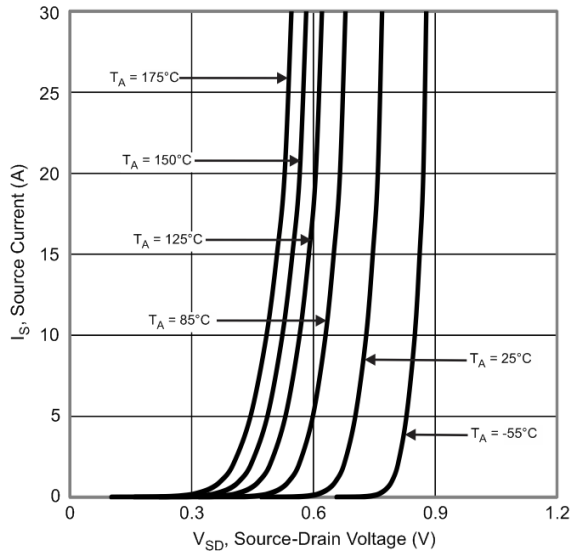


Fig. 9 Diode Forward Voltage vs. Current

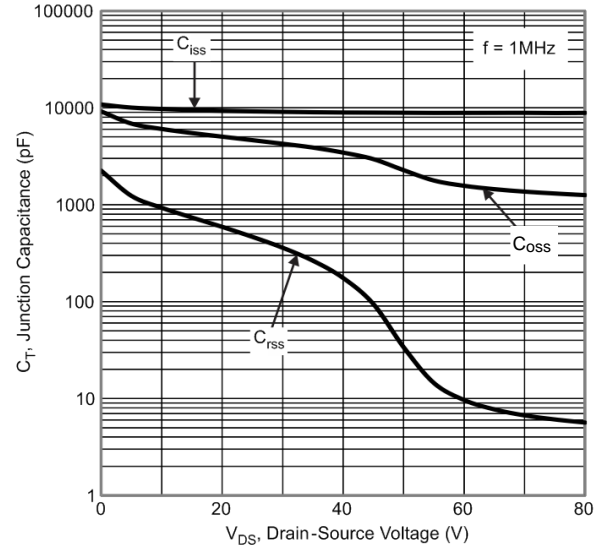


Fig. 10 Typical Junction Capacitance

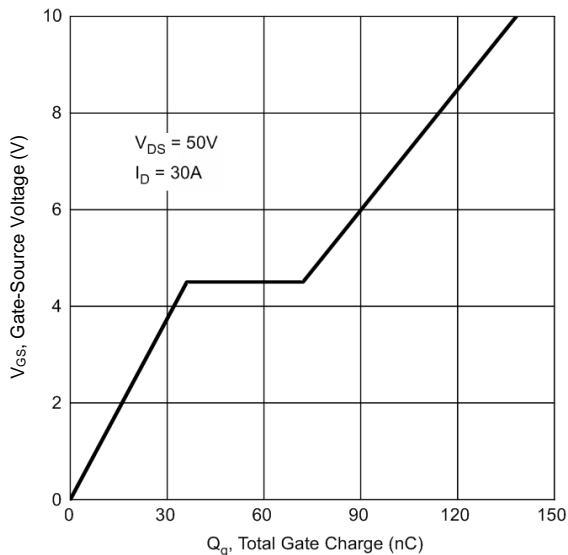


Fig. 11 Gate Charge

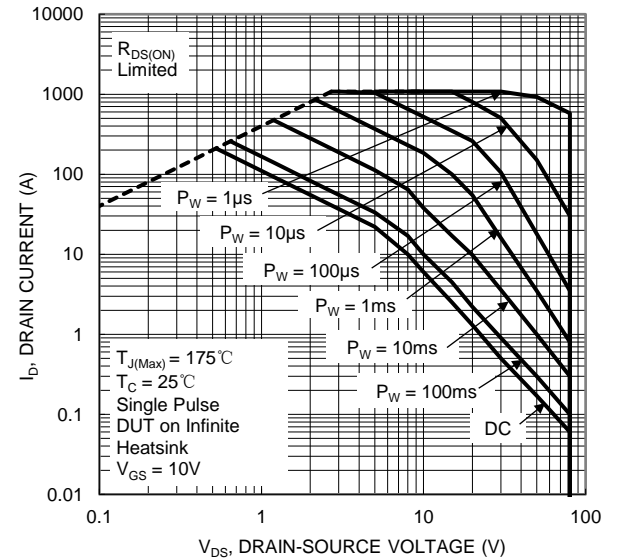


Fig. 12 SOA, Safe Operation Area

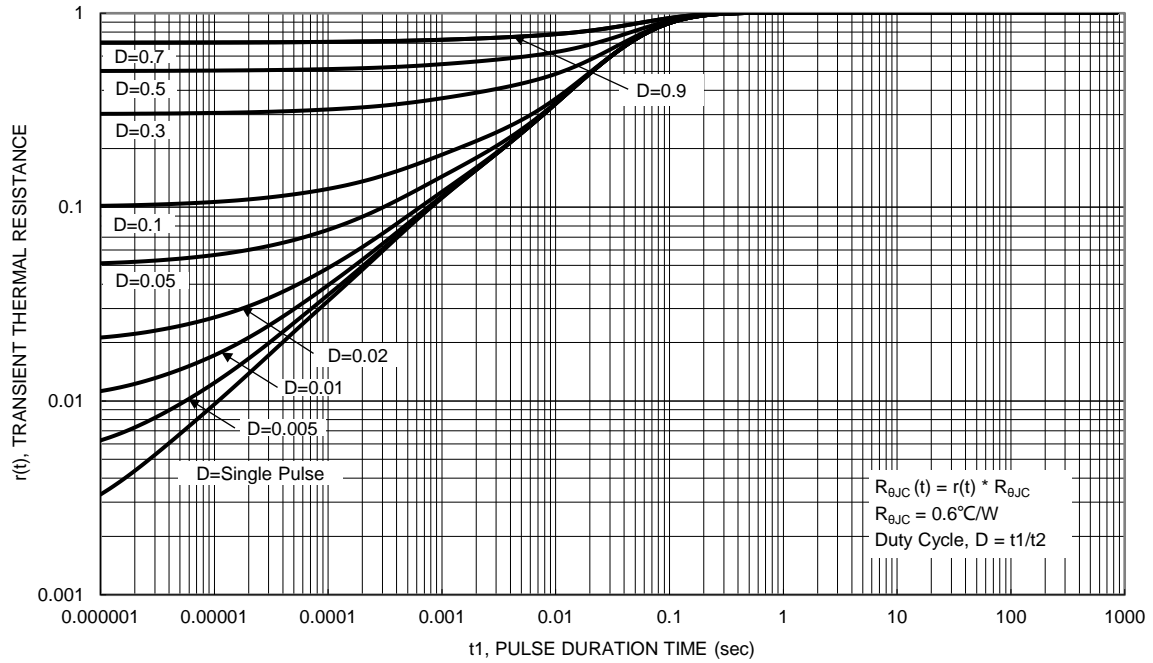
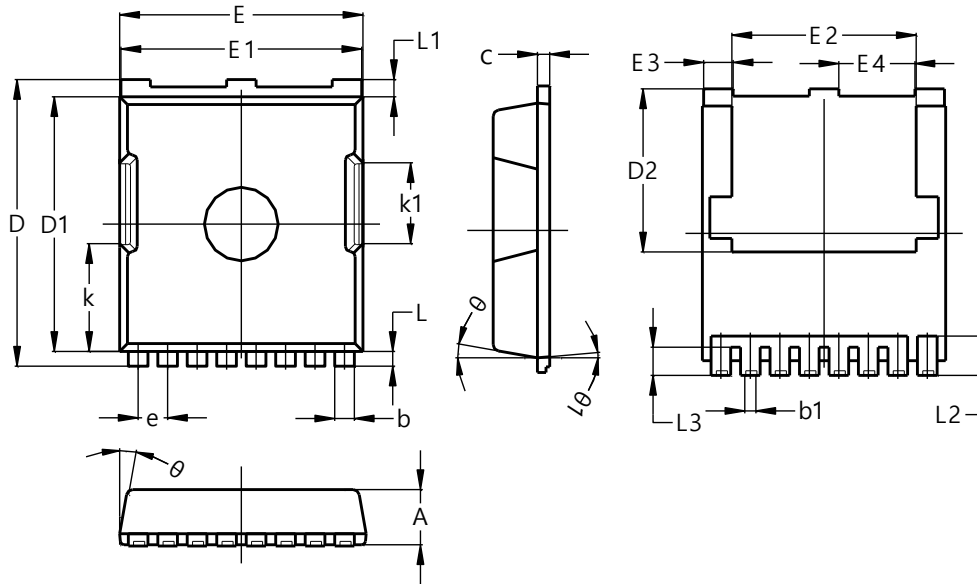


Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

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

POWERDI1012-8

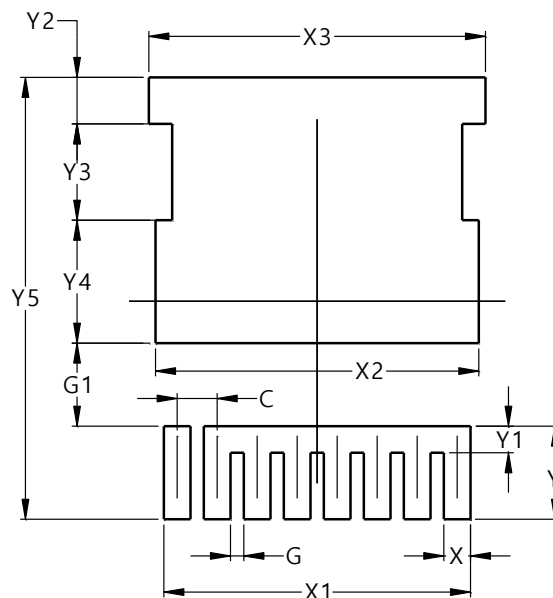


POWERDI1012-8			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
b	0.70	0.90	0.80
b1	0.42	0.50	0.45
c	0.40	0.60	0.50
D	11.48	11.88	11.68
D1	10.23	10.53	10.38
D2	6.45	6.85	6.65
E	9.70	10.10	9.90
E1	9.70	9.90	9.80
E2	7.00	8.00	7.50
E3	1.10	1.30	1.20
E4	3.00	3.20	3.10
e	1.20 BSC		
k	4.39 REF		
k1	3.30 REF		
L	0.50	0.70	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.

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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