

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_D$ Max $T_C = +25^\circ\text{C}$
30V	3.8mΩ @ $V_{GS} = 10\text{V}$	145A
	6mΩ @ $V_{GS} = 4.5\text{V}$	115A

## Description and Applications

This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ), yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

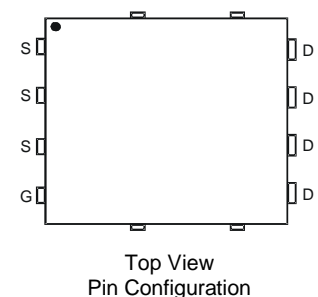
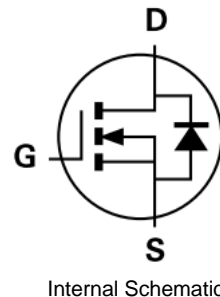
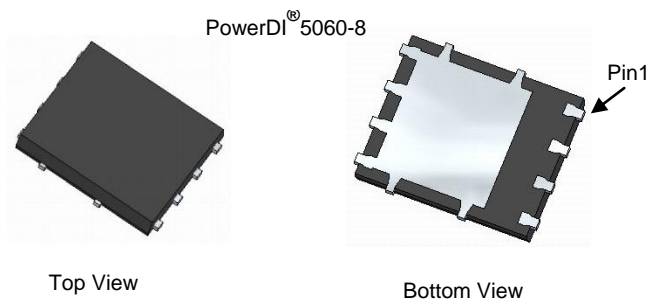
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low  $R_{DS(ON)}$  – Minimizes On-State Losses
- Excellent  $Q_{gd} \times R_{DS(ON)}$  Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching – Ensures More Reliability
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMTH3004LPSQ](#))**

## Mechanical Data

- Case: POWERDI® 5060-8
- 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 (B3)
- Weight: 0.097 grams (Approximate)

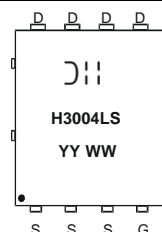


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH3004LPS-13	POWERDI® 5060-8	2,500/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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



D = Manufacturer's Marking  
 H3004LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 15 = 2015)  
 WW = Week (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>	30	V
Gate-Source Voltage	V <sub>GSS</sub>	+20 -16	V
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 5)	I <sub>D</sub>	22 18	A
Continuous Drain Current, V <sub>GS</sub> = 10V	I <sub>D</sub>	145 120	A
Maximum Continuous Body Diode Forward Current (Note 5)	I <sub>S</sub>	3	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	180	A
Avalanche Current, L=0.3mH	I <sub>AS</sub>	27	A
Avalanche Energy, L=0.3mH	E <sub>AS</sub>	110	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation	P <sub>D</sub>	3.2 136	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	47	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1.1	°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 (Note 6)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = +20V, V <sub>DS</sub> = 0V V <sub>GS</sub> = -16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	—	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	3.3 5	3.8 6	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7A
Diode Forward Voltage	V <sub>SD</sub>	—	0.70	1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	—	2370	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	1360	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	240	—		
Gate Resistance	R <sub>g</sub>	—	0.7	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	43.7	—	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 20A
Gate-Source Charge	Q <sub>gs</sub>	—	6.9	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	8	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	6.2	—	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 3Ω, R <sub>L</sub> = 0.75Ω
Turn-On Rise Time	t <sub>R</sub>	—	4.2	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	21	—		
Turn-Off Fall Time	t <sub>F</sub>	—	8	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	25	—	ns	I <sub>F</sub> = 15A, di/dt = 500A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	37	—	nC	

- Notes:
5. R<sub>θJA</sub> is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1in. square copper plate. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.
  6. Short duration pulse test used to minimize self-heating effect.
  7. Guaranteed by design. Not subject to product testing.

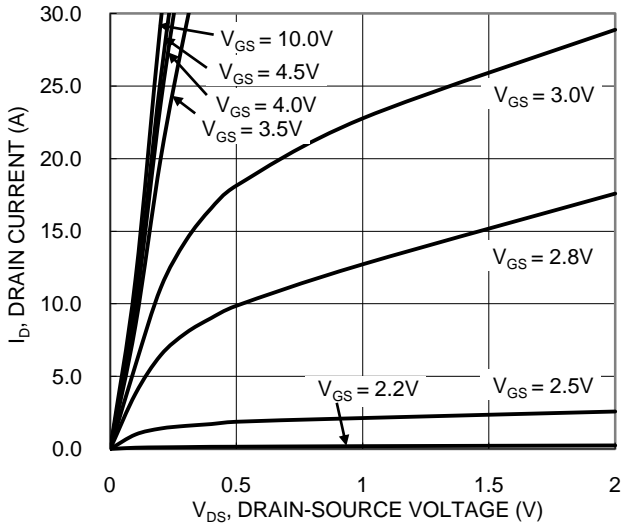


Figure 1. Typical Output Characteristic

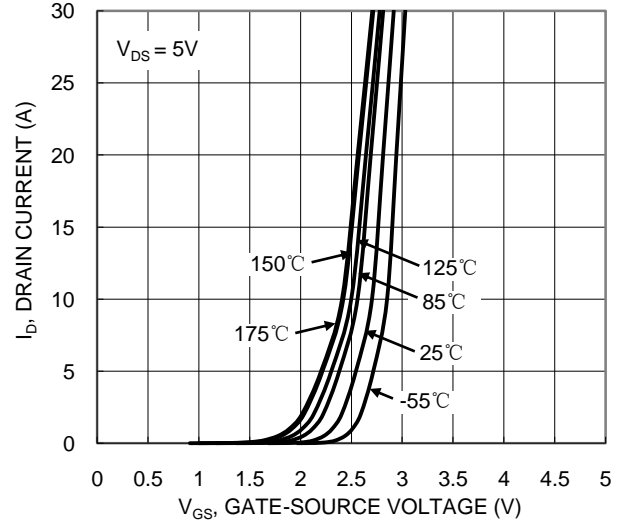


Figure 2. Typical Transfer Characteristic

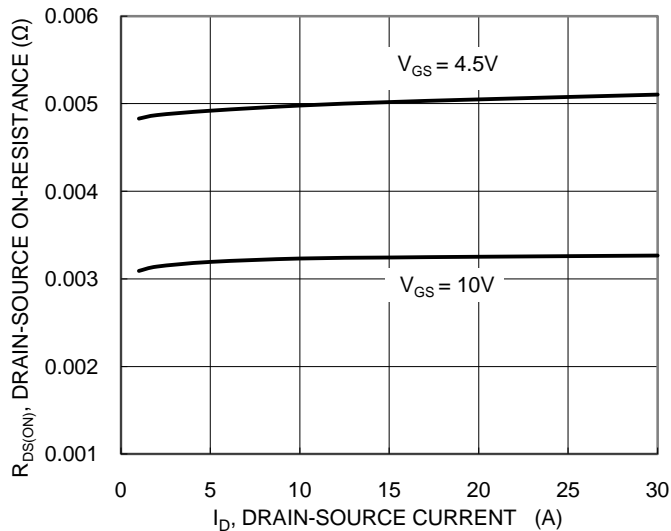


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

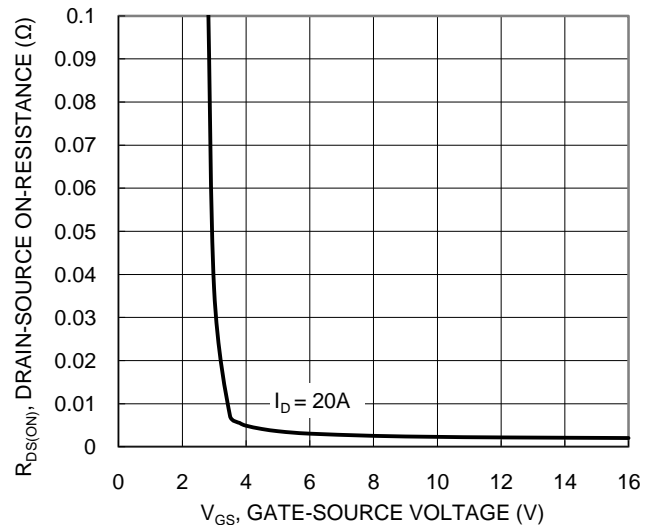


Figure 4. Typical Transfer Characteristic

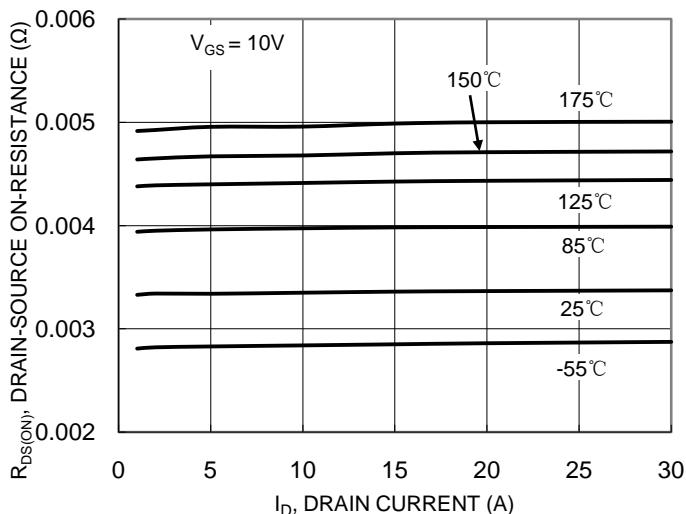


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

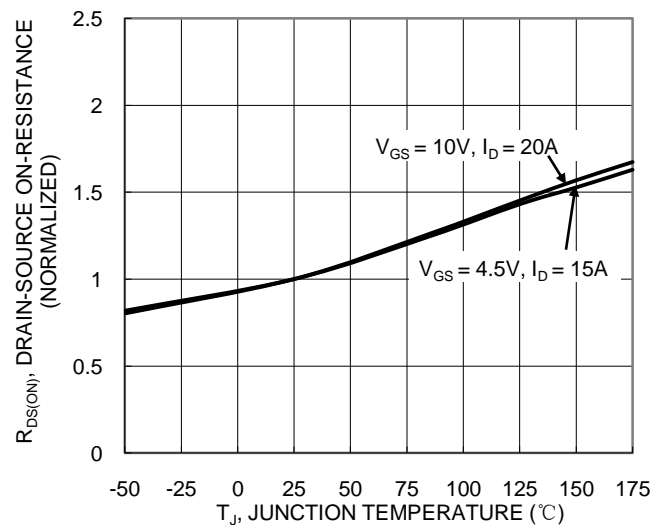
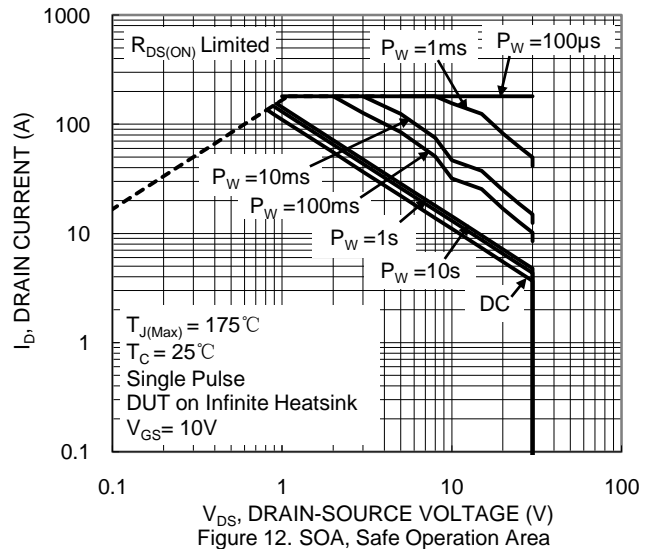
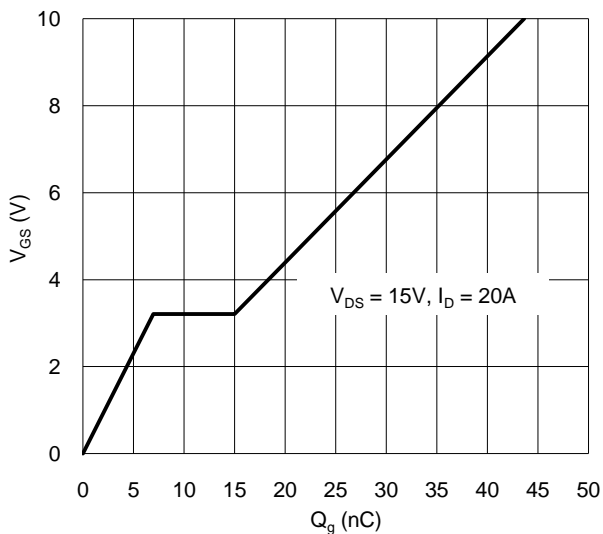
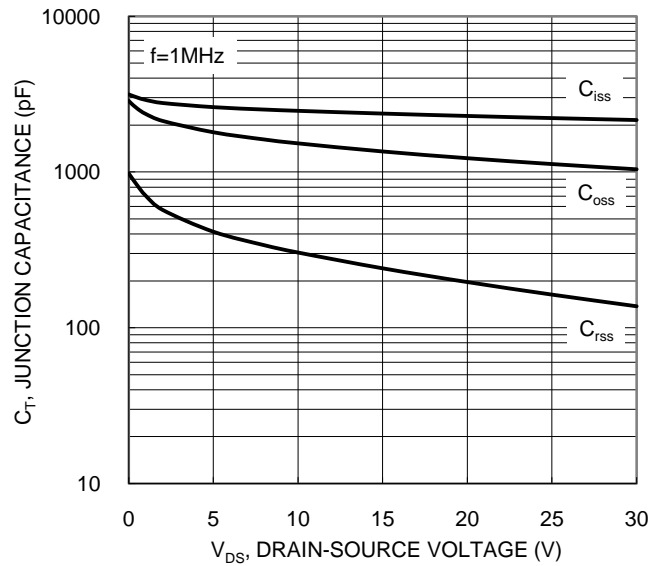
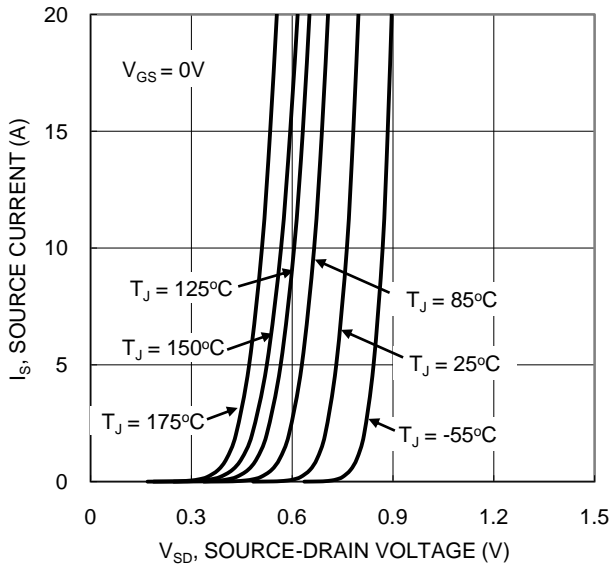
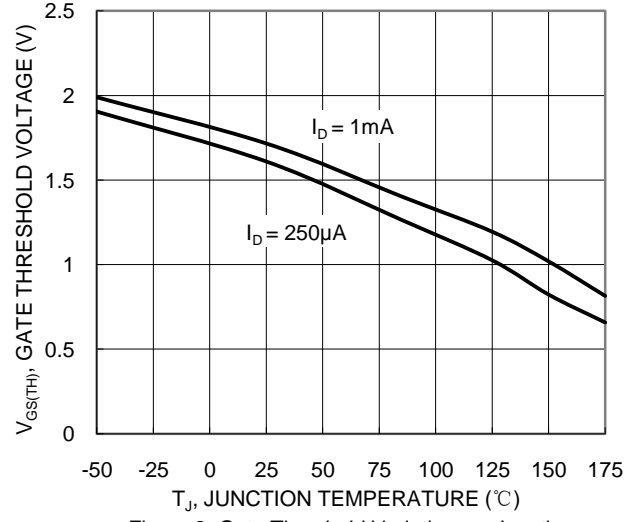
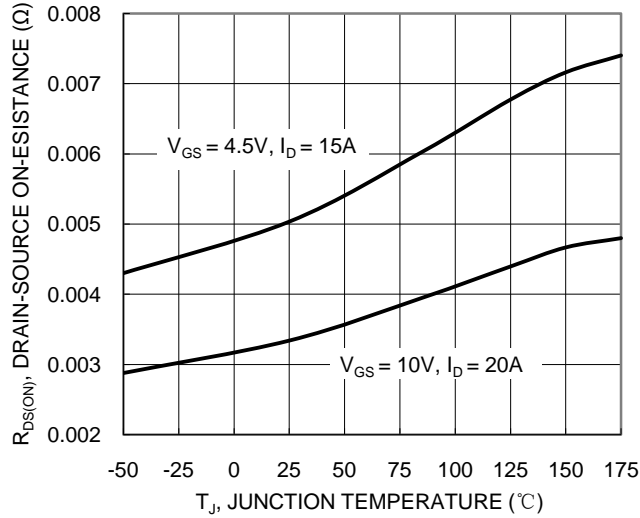


Figure 6. On-Resistance Variation with Junction Temperature



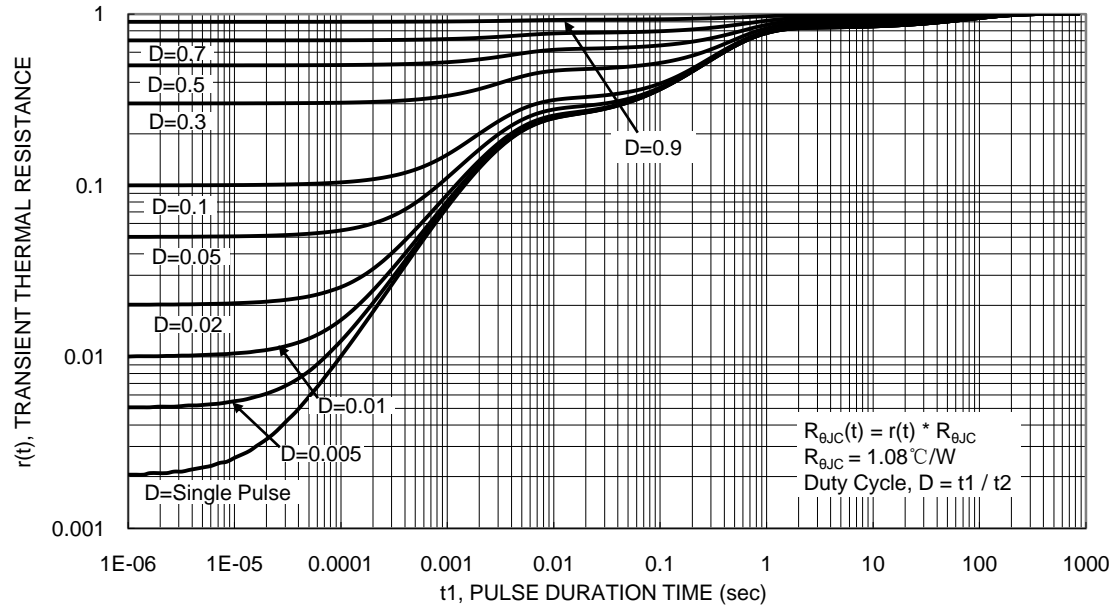
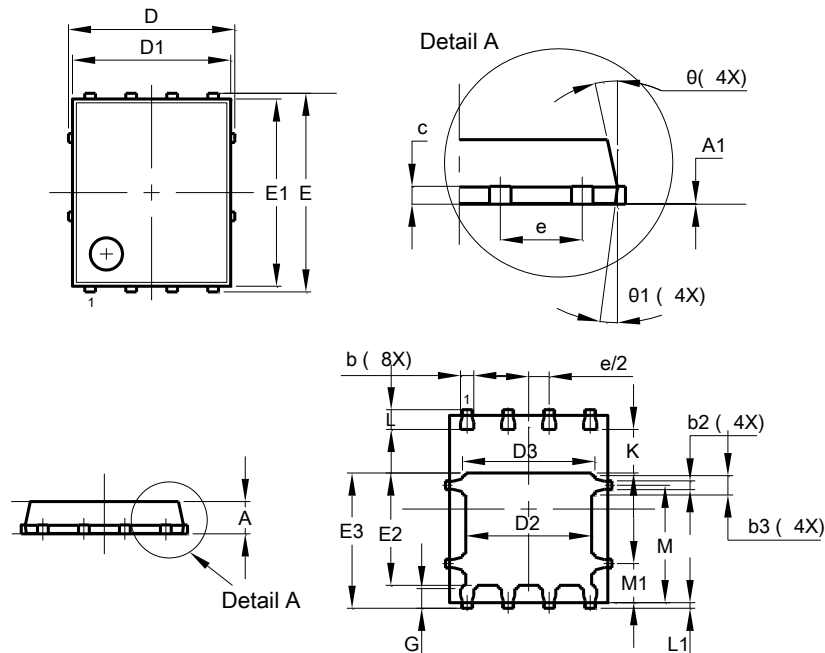


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### POWERDI® 5060-8

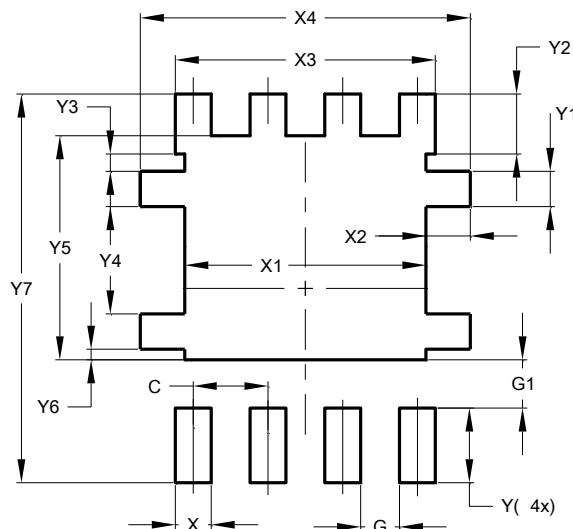


POWERDI® 5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	—
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	—	—
L	0.51	0.71	0.61
L1	0.100	0.200	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
$\theta$	10°	12°	11°
$\theta 1$	6°	8°	7°
All Dimensions in mm			

## Suggested Pad Layout

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

### POWERDI® 5060-8



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	0.755
X3	4.420
X4	5.610
Y	1.270
Y1	0.600
Y2	1.020
Y3	0.295
Y4	1.825
Y5	3.810
Y6	0.180
Y7	6.610

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