

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
30V	3.8mΩ @ V _{GS} = 10V	145A
	6mΩ @ V _{GS} = 4.5V	115A

Description and Applications

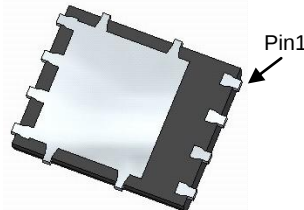
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Backlighting
- Power Management Functions
- DC-DC Converters

POWERDI®5060-8



Top View



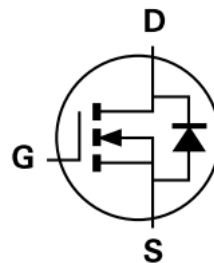
Bottom View

Features and Benefits

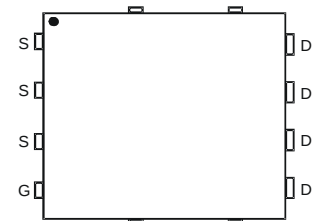
- Low R_{DS(ON)} – Minimizes On-State Losses
- Excellent Q_{gd} x R_{DS(ON)} Product (FOM)
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching – Ensures More Reliability
- Rated to +175°C – Ideal for High Ambient Temperature Environments
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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 Ⓔ③
- Weight: 0.097 grams (Approximate)



Internal Schematic

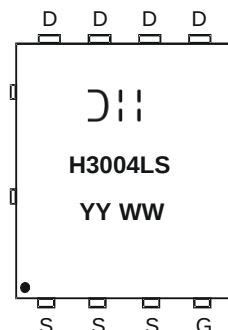

 Top View
 Pin Configuration

Ordering Information (Note 5)

Part Number	Case	Packaging
DMTH3004LPSQ-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 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. 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



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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	30	V
Gate-Source Voltage	V _{GSS}	+20 -16	V
Continuous Drain Current (Note 6)	I _D	22 16	A
Continuous Drain Current (Note 7)	I _D	145 103	A
Maximum Continuous Body Diode Forward Current	I _S	100	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	180	A
Avalanche Current, L=0.3mH	I _{AS}	27	A
Avalanche Energy, L=0.3mH	E _{AS}	110	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation	P _D	136	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	47	°C/W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	1.1	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 24V, V _{GS} = 0V
Zero Gate Voltage Drain Current (Note 9)	I _{DSS}	—	—	10	μA	V _{DS} = 24V, V _{GS} = 0V T _J = +125°C
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = +20V, V _{DS} = 0V V _{GS} = -16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1	1.6	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.3	3.8	mΩ	V _{GS} = 10V, I _D = 20A
		—	5	6		V _{GS} = 4.5V, I _D = 7A
Diode Forward Voltage	V _{SD}	—	0.70	1	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS						
Input Capacitance (Note 9)	C _{iss}	—	2370	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz
Output Capacitance (Note 9)	C _{oss}	—	1360	—		
Reverse Transfer Capacitance (Note 9)	C _{rss}	—	240	—		
Gate Resistance	R _g	0.14	0.7	1.75	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
SWITCHING CHARACTERISTICS (Note 9)						
Total Gate Charge (V _{GS} = 10V)	Q _g	—	43.7	—	nC	V _{DS} = 15V, I _D = 20A
Gate-Source Charge	Q _{gs}	—	6.9	—		
Gate-Drain Charge	Q _{gd}	—	8	—		
Turn-On Delay Time	t _{D(ON)}	—	6.2	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _G = 3Ω, R _L = 0.75Ω
Turn-On Rise Time	t _R	—	4.2	—		
Turn-Off Delay Time	t _{D(OFF)}	—	21	—		
Turn-Off Fall Time	t _F	—	8	—		
Body Diode Reverse Recovery Time	t _{RR}	—	25	—	ns	I _F = 15A, dI/dt = 500A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	37	—	nC	

- Notes:
- Device mounted with exposed drain pad on 25mm by 25mm 2oz copper on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady state.
 - 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 production testing.

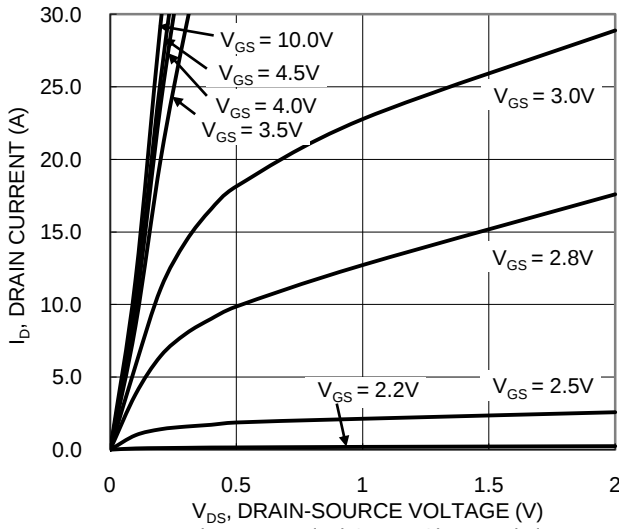


Figure 1. Typical Output Characteristic

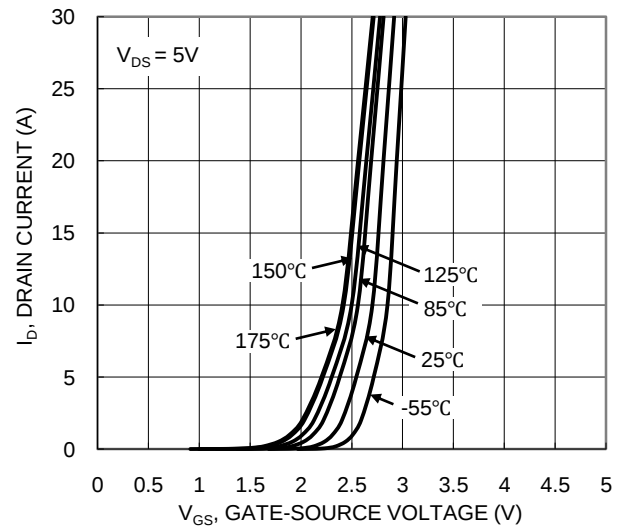


Figure 2. Typical Transfer Characteristic

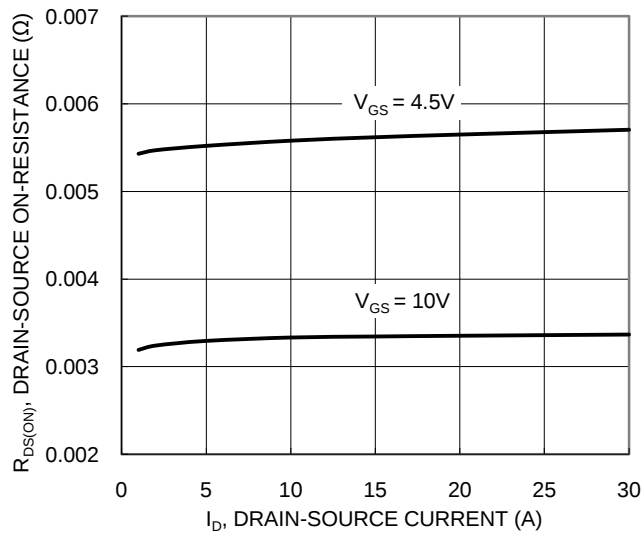


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

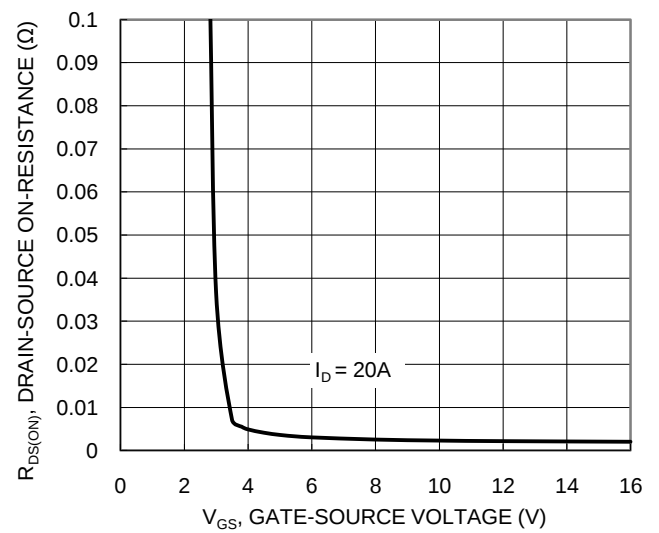


Figure 4. Typical Transfer Characteristic

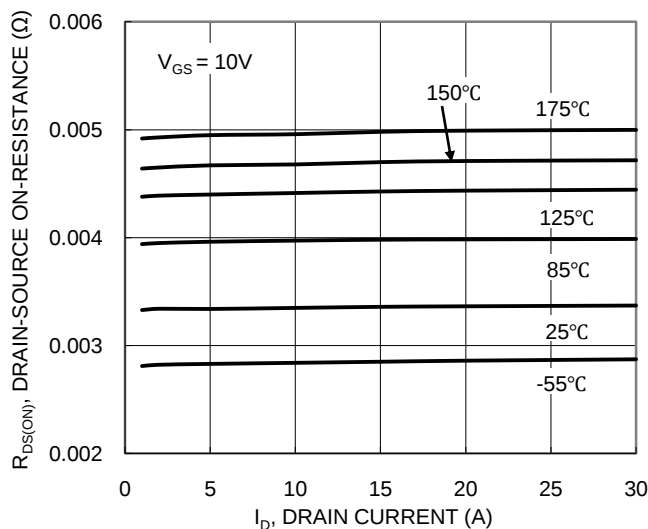


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

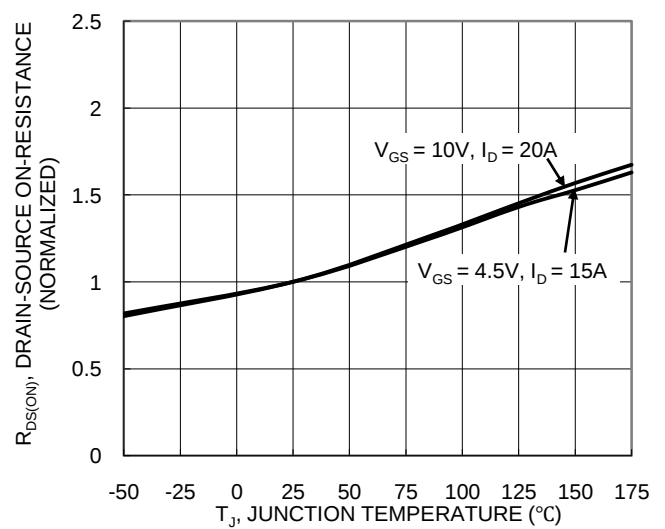
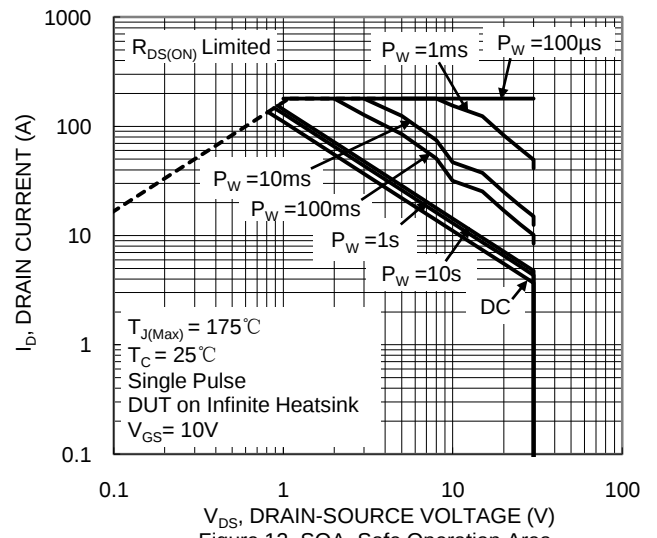
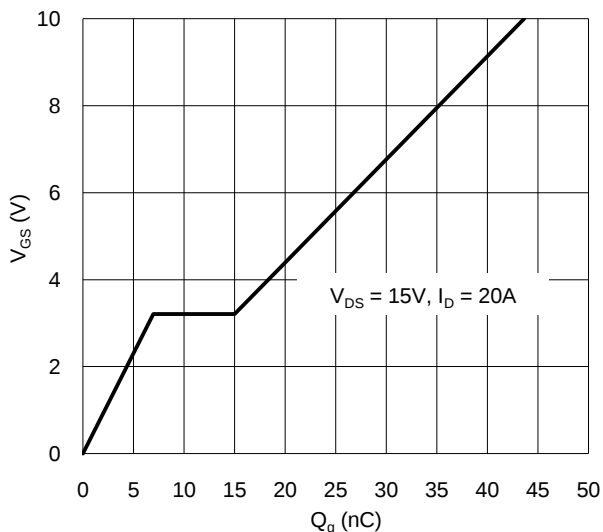
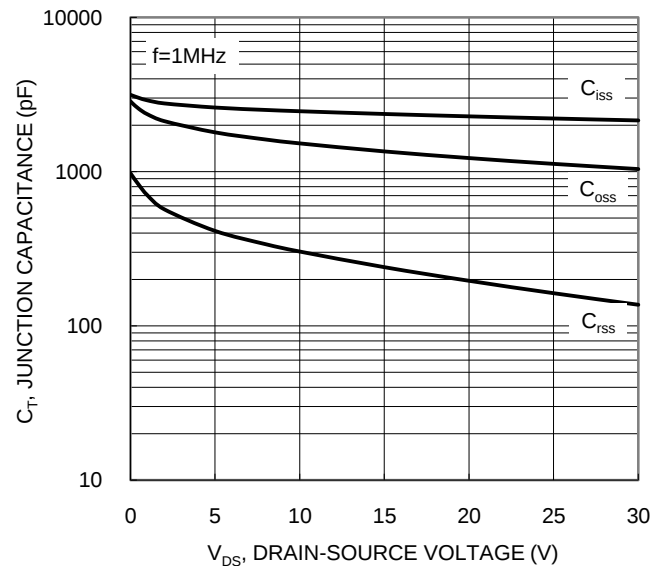
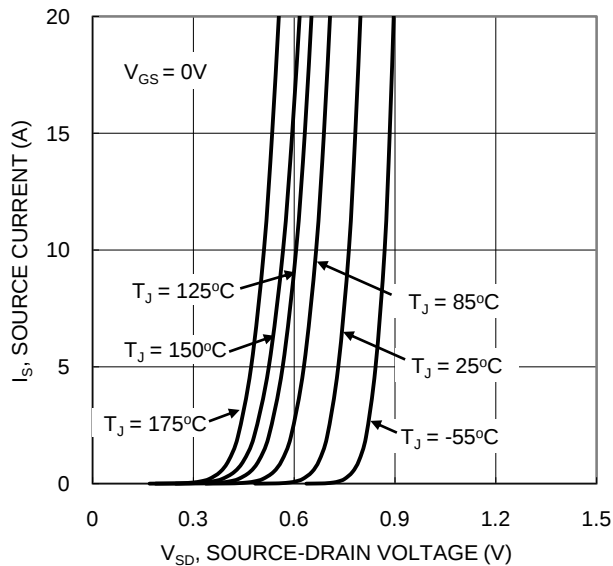
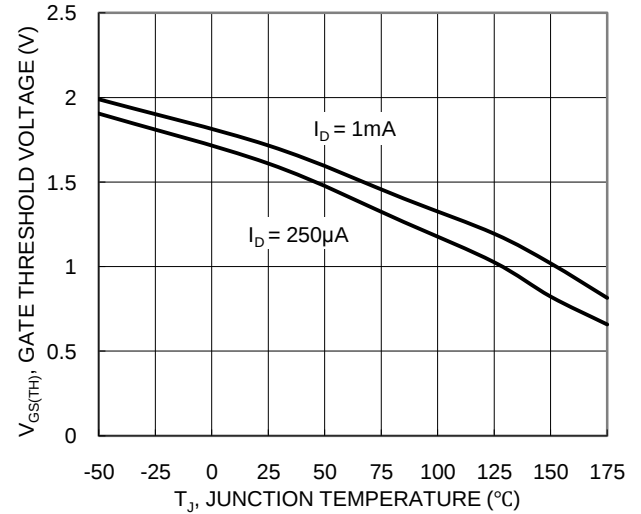
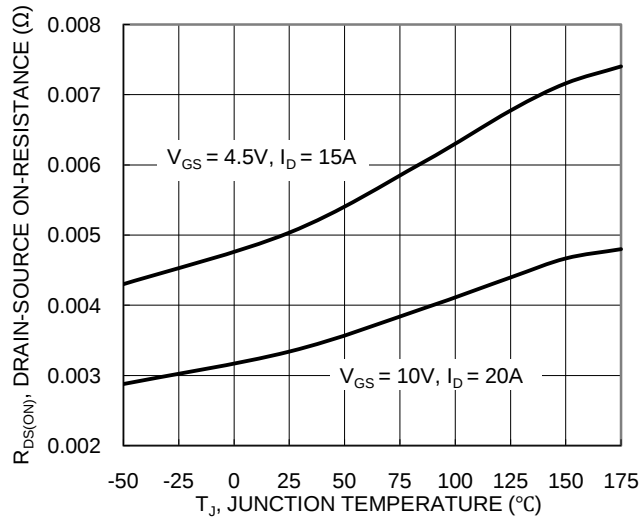


Figure 6. On-Resistance Variation with Junction Temperature



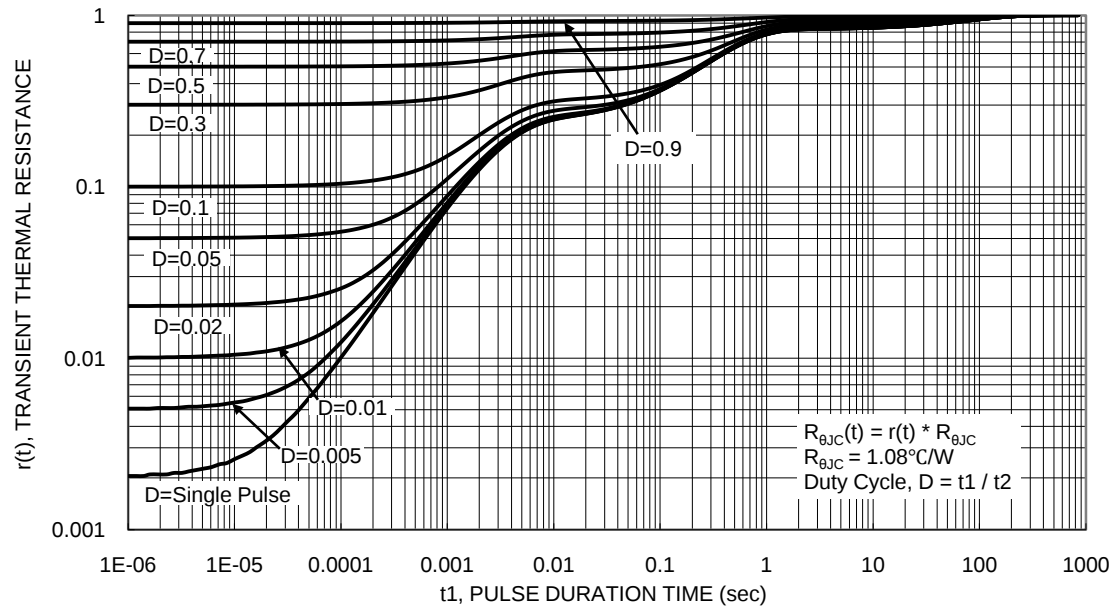
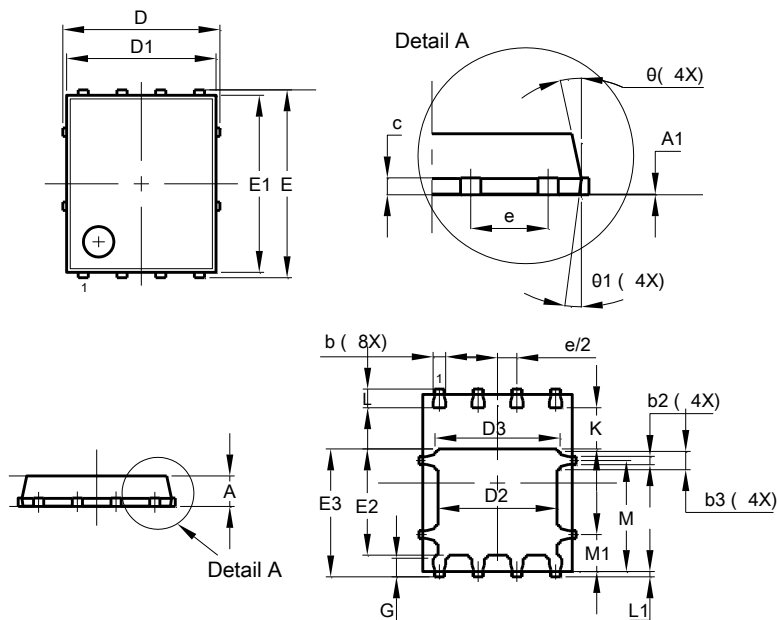


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

POWERDI® 5060-8

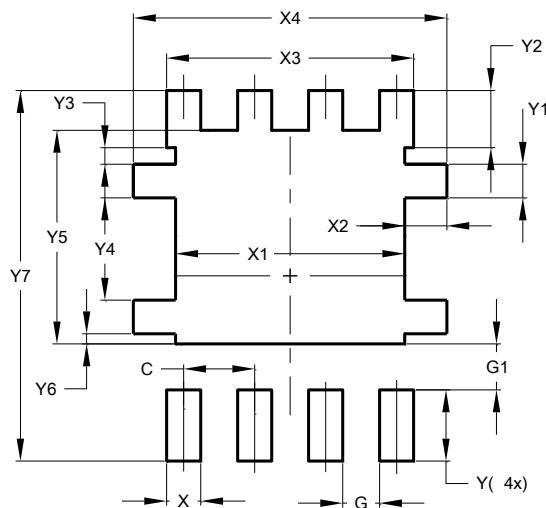


POWERDI® 5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	—
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	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
θ	10°	12°	11°
θ_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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