

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>C</sub> = +25°C
30V	3.8mΩ @ V <sub>GS</sub> = 10V	145A
	6mΩ @ V <sub>GS</sub> = 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

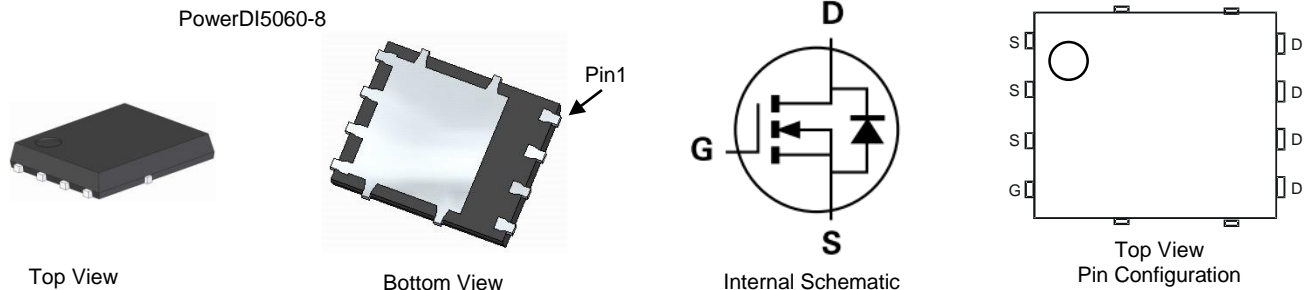
## Features and Benefits

- Low R<sub>DS(ON)</sub> – Minimizes On-State Losses
- Excellent Q<sub>gd</sub> x R<sub>DS(ON)</sub> 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)**
- **The DMTH3004LPSQ 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

- Case: PowerDI<sup>®</sup>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 (e3)
- Weight: 0.097 grams (Approximate)

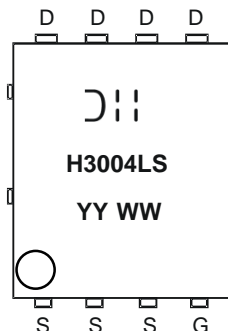


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH3004LPSQ-13	PowerDI5060-8	2,500/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



☺☺☺ = Manufacturer's Marking  
 H3004LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 21 = 2021)  
 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 (Note 5)	I <sub>D</sub>	T <sub>A</sub> = +25°C	22
		T <sub>A</sub> = +100°C	16
Continuous Drain Current (Note 6)	I <sub>D</sub>	T <sub>C</sub> = +25°C	145
		T <sub>C</sub> = +100°C	103
Maximum Continuous Body Diode Forward Current	I <sub>S</sub>	100	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>	136	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	47	°C/W
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	1.1	
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>	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
Zero Gate Voltage Drain Current (Note 8)	I <sub>DSS</sub>	—	—	10	µA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V T <sub>J</sub> = +125°C
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</b> (Note 7)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	1.6	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	3.8	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		—	5	6		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</b>						
Input Capacitance (Note 8)	C <sub>ISS</sub>	—	2370	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance (Note 8)	C <sub>OSS</sub>	—	1360	—		
Reverse Transfer Capacitance (Note 8)	C <sub>RSS</sub>	—	240	—		
Gate Resistance	R <sub>g</sub>	0.14	0.7	1.75	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
<b>SWITCHING CHARACTERISTICS</b> (Note 8)						
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:
- 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.

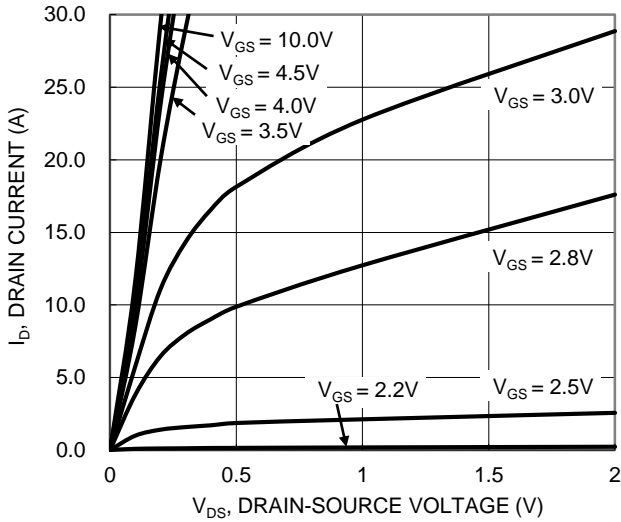


Figure 1. Typical Output Characteristic

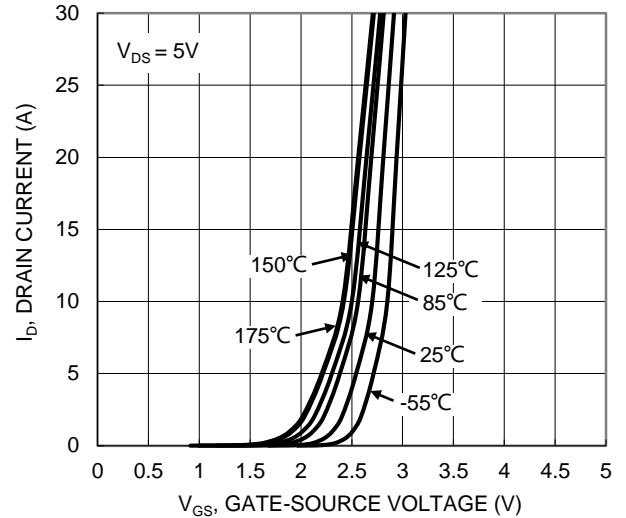


Figure 2. Typical Transfer Characteristic

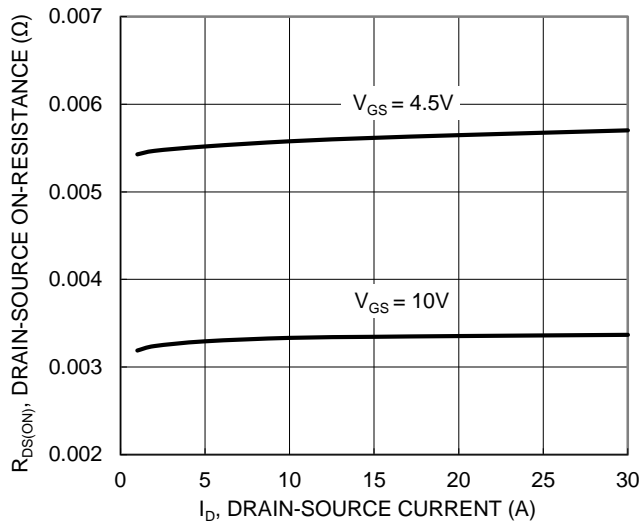


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

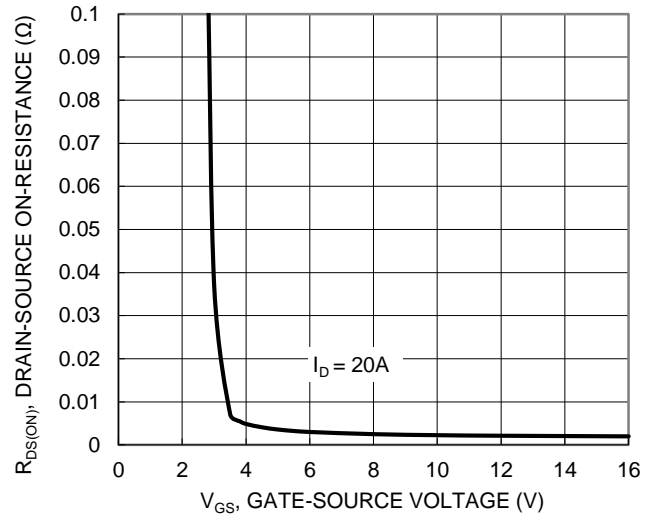


Figure 4. Typical Transfer Characteristic

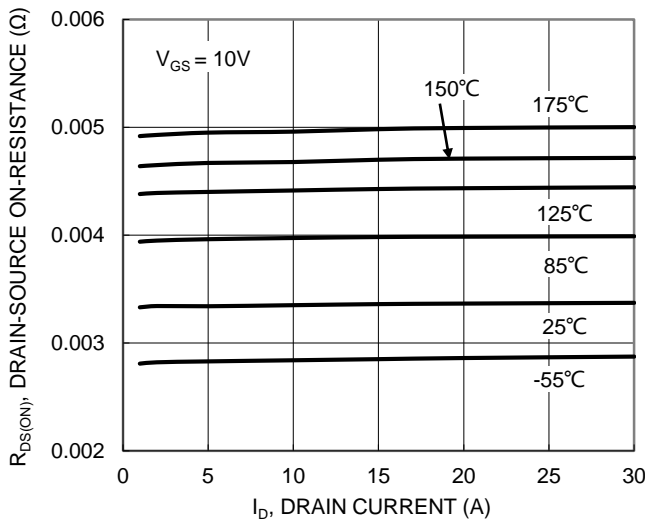


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

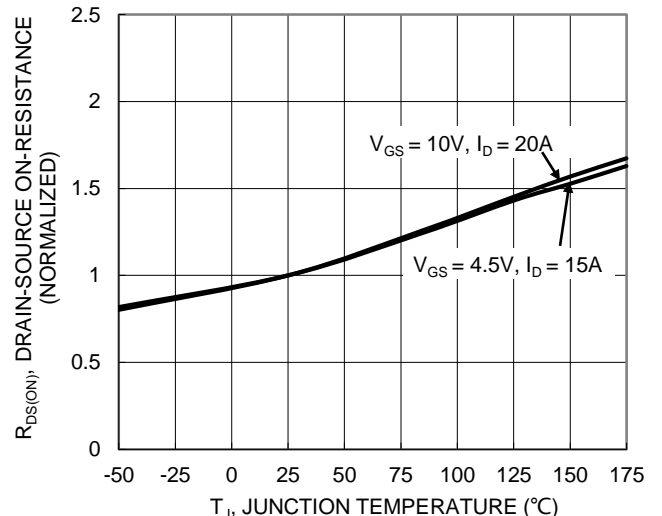


Figure 6. On-Resistance Variation with Junction Temperature

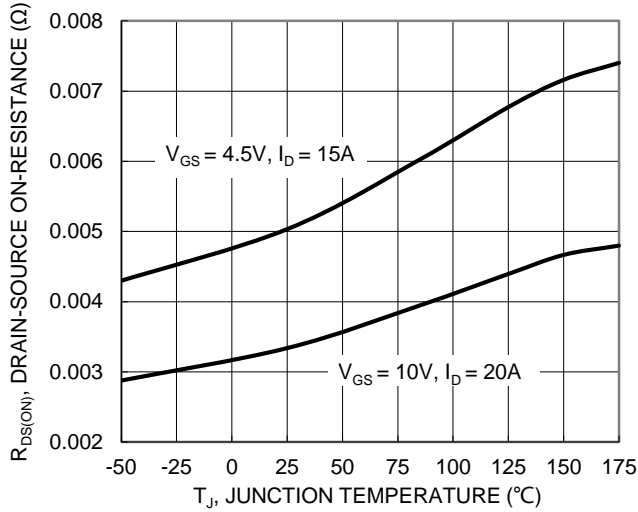


Figure 7. On-Resistance Variation with Junction Temperature

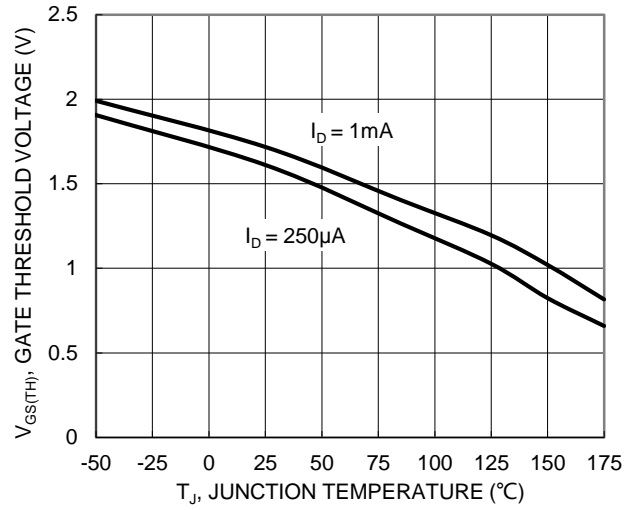


Figure 8. Gate Threshold Variation vs. Junction Temperature

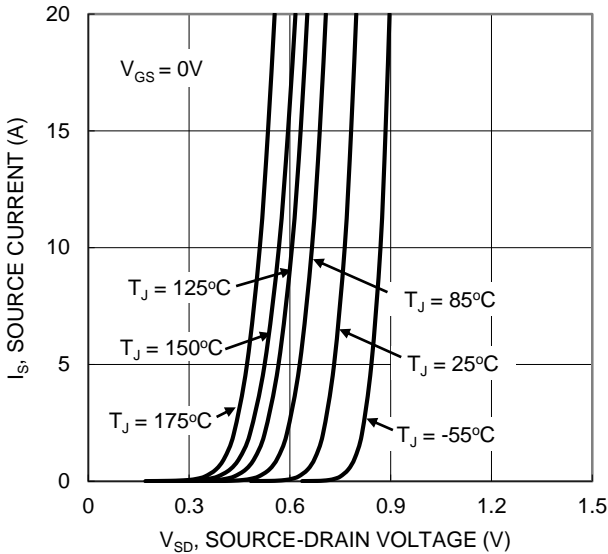


Figure 9. Diode Forward Voltage vs. Current

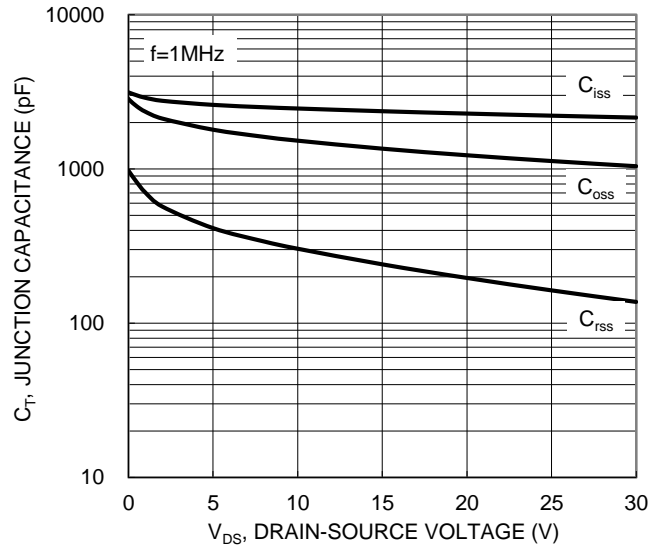


Figure 10. Typical Junction Capacitance

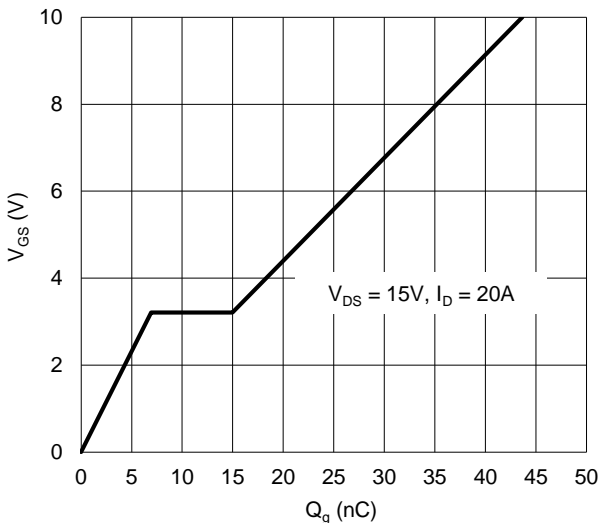


Figure 11. Gate Charge

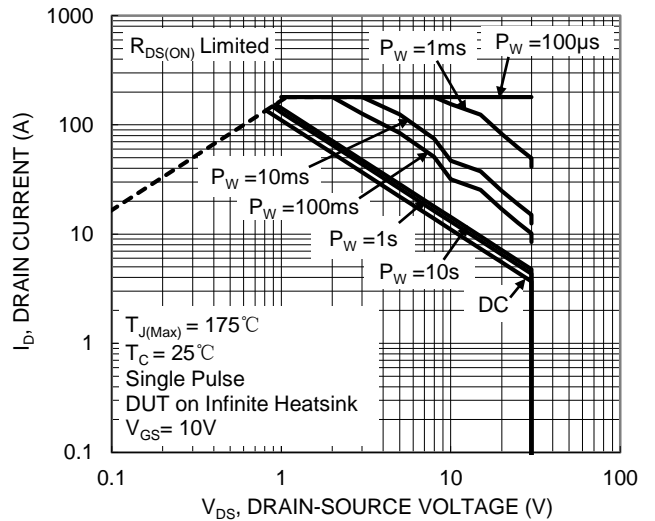


Figure 12. SOA, Safe Operation Area

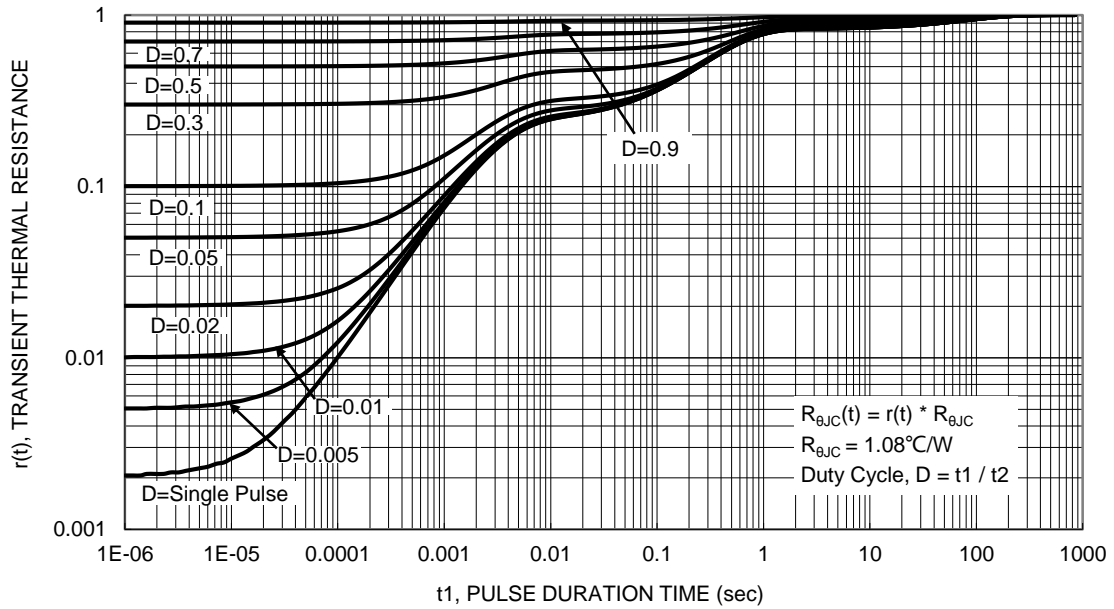
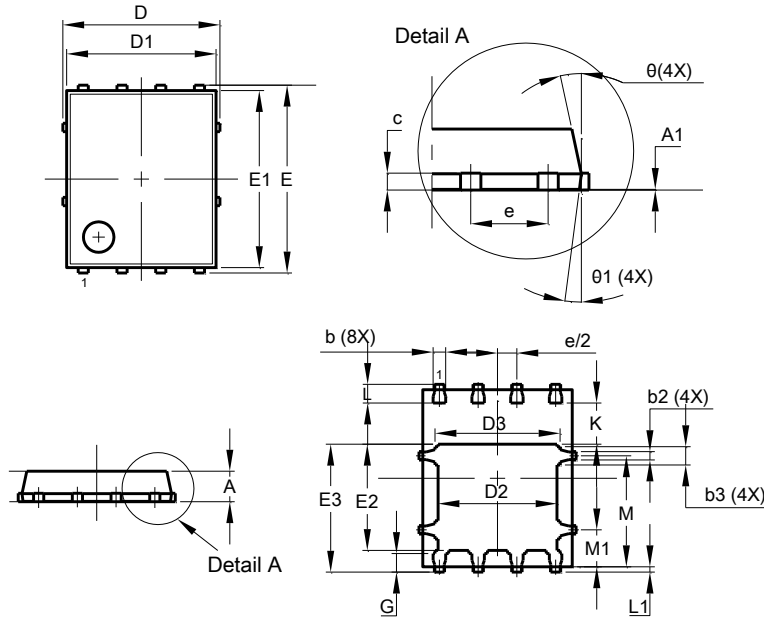


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**PowerDI5060-8**

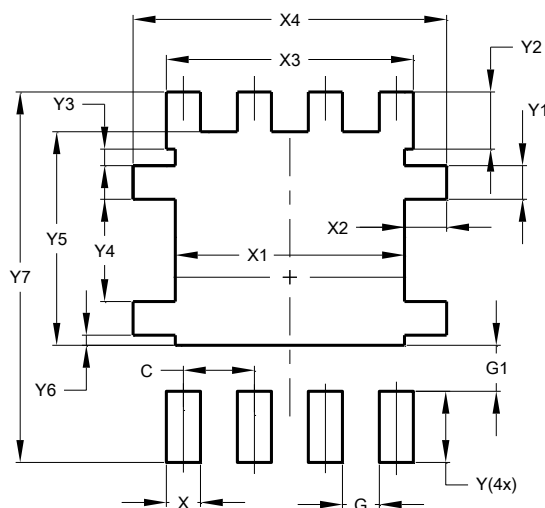


PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	–
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
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°
Θ1	6°	8°	7°
All Dimensions in mm			

## Suggested Pad Layout

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

**PowerDI5060-8**



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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