

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C (Note 10)
100V	8.8mΩ @ V _{GS} = 10V	100A
	11.5mΩ @ V _{GS} = 6V	100A

Description

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP.

Applications

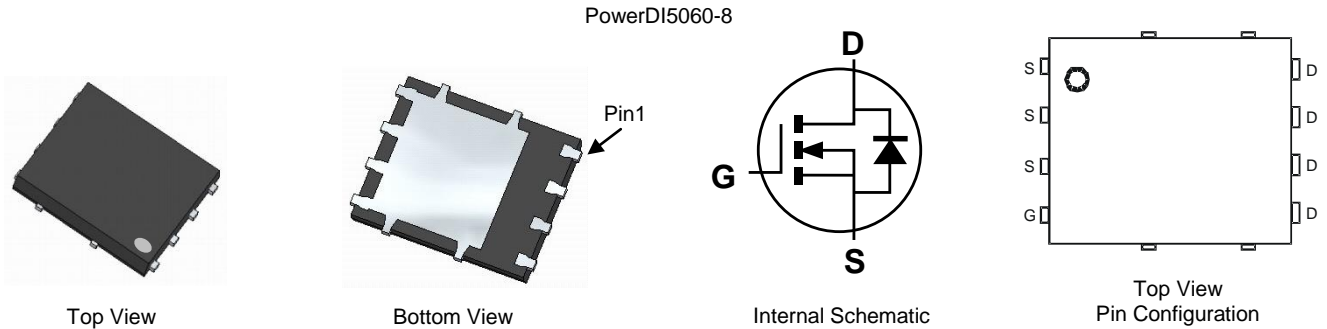
- Motor Control
- DC-DC Converters
- Power Management

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Minimizes On-State Losses
- Fast Switching Speed
- **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: See Diagram Below
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)

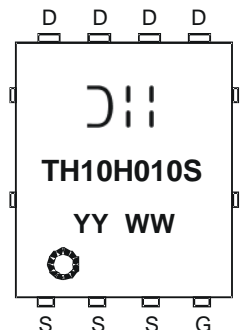


Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH10H010SPSQ-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 http://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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



= Manufacturer's Marking
 TH10H010S = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 18 = 2018)
 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_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	I_D	$T_A = +25^\circ\text{C}$ 11.8	A
		$T_A = +100^\circ\text{C}$ 8.3	
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 7)	I_D	$T_C = +25^\circ\text{C}$ (Note 10) 100	A
		$T_C = +100^\circ\text{C}$ 87	
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	250	A
Maximum Continuous Body Diode Forward Current	I_S	100	A
Avalanche Current, $L = 0.3\text{mH}$	I_{AS}	25	A
Avalanche Energy, $L = 0.3\text{mH}$	E_{AS}	93.7	mJ
Avalanche Current (Note 8), $L = 3\text{mH}$	I_{AS}	14.3	A
Avalanche Energy (Note 8), $L = 3\text{mH}$	E_{AS}	307	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	$T_A = +25^\circ\text{C}$ 1.5	W
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$ 99	
Total Power Dissipation (Note 7)	P_D	$T_C = +25^\circ\text{C}$ 166	W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$ 0.9	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.6	8.8	m Ω	$V_{GS} = 10\text{V}, I_D = 13\text{A}$
		—	8.5	11.5		$V_{GS} = 6\text{V}, I_D = 13\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.3	V	$V_{GS} = 0\text{V}, I_S = 13\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	4468	—	pF	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{OSS}	—	746	—		
Reverse Transfer Capacitance	C_{RSS}	—	32	—		
Gate Resistance	R_g	—	0.91	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	56.4	—	nC	$V_{DD} = 50\text{V}, I_D = 13\text{A},$ $V_{GS} = 10\text{V}$
Gate-Source Charge	Q_{GS}	—	15.4	—		
Gate-Drain Charge	Q_{gd}	—	14	—		
Turn-On Delay Time	$t_{D(ON)}$	—	18.6	—	ns	$V_{DD} = 50\text{V}, V_{GS} = 10\text{V},$ $I_D = 13\text{A}, R_g = 6\Omega$
Turn-On Rise Time	t_R	—	22.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	44.8	—		
Turn-Off Fall Time	t_F	—	29.5	—		
Reverse Recovery Time	t_{RR}	—	54.5	—	ns	$I_F = 13\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	106.4	—	nC	

- Notes:
6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing
 10. Package limited.

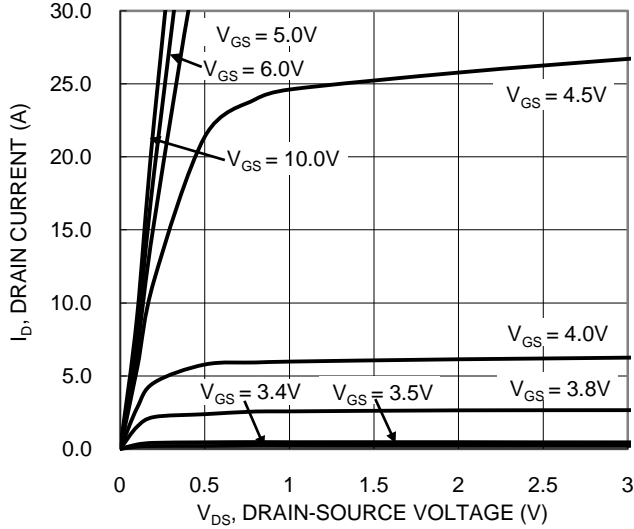


Figure 1. Typical Output Characteristic

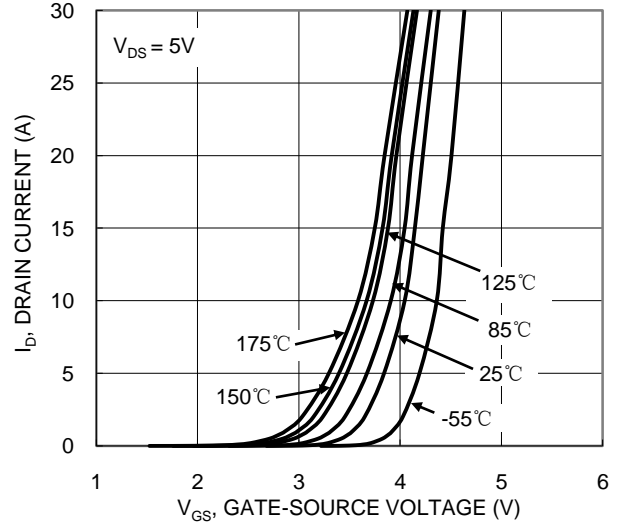


Figure 2. Typical Transfer Characteristic

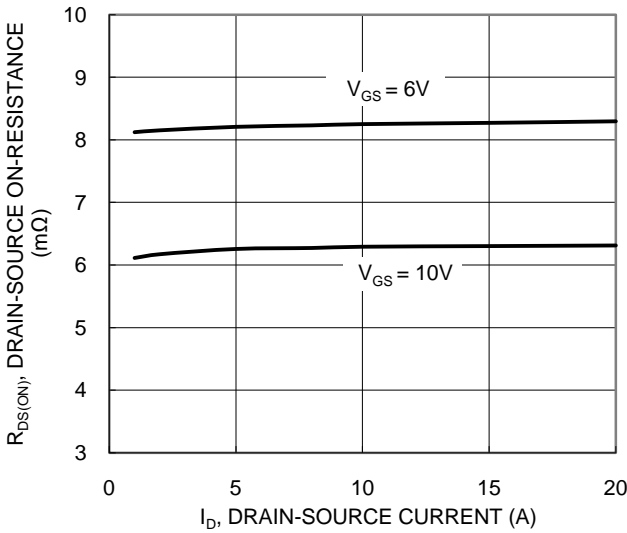


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

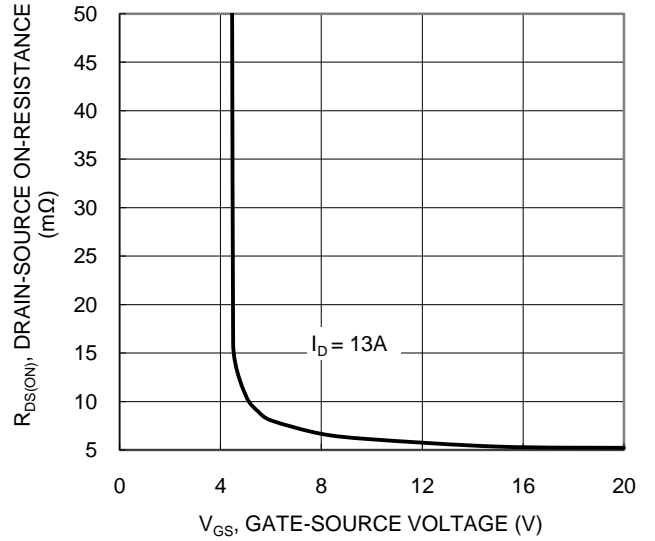


Figure 4. Typical Transfer Characteristic

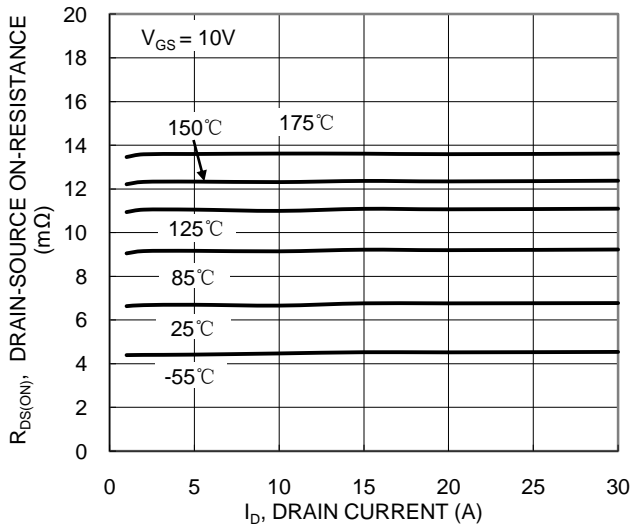


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

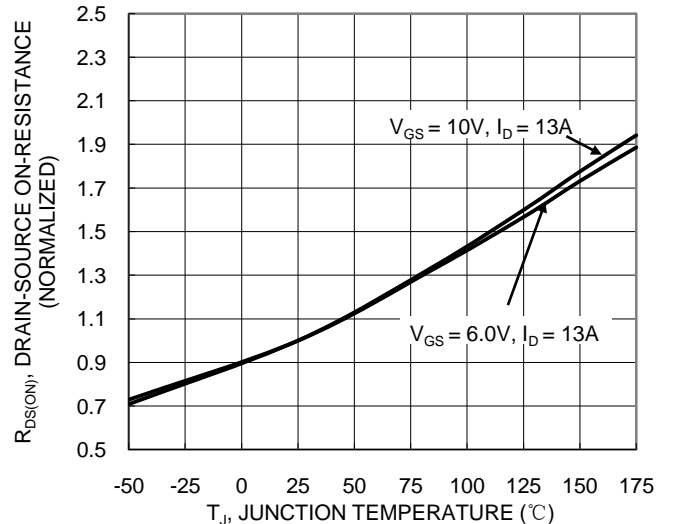


Figure 6. On-Resistance Variation with Junction Temperature

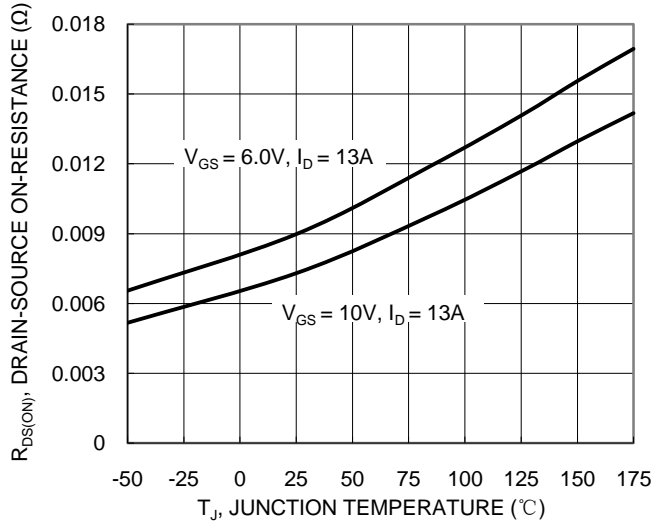


Figure 7. On-Resistance Variation with Junction Temperature

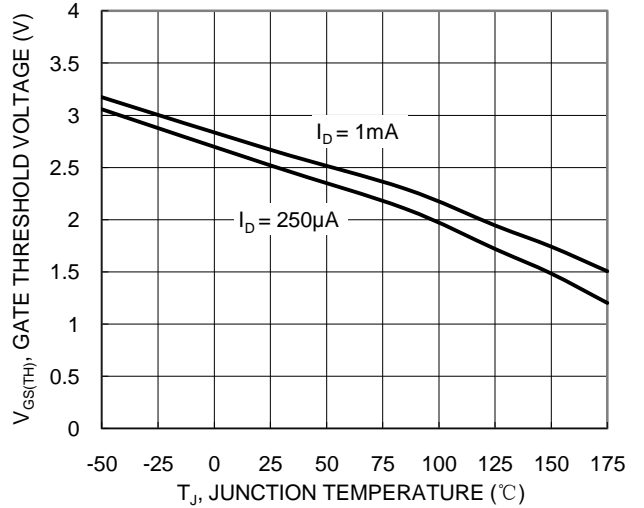


Figure 8. Gate Threshold Variation vs. Junction Temperature

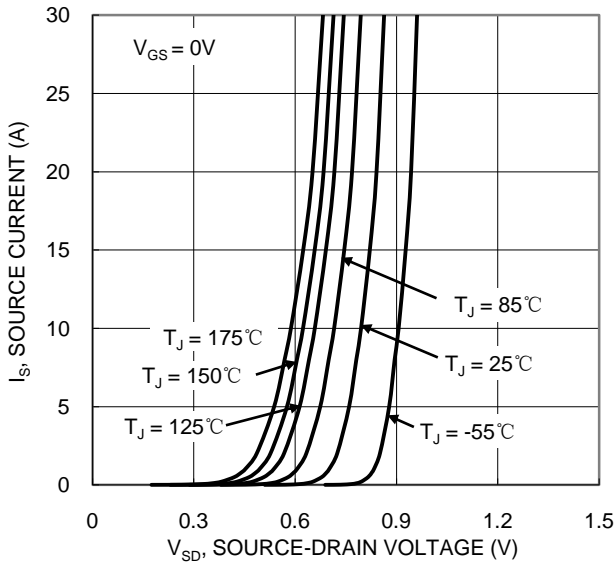


Figure 9. Diode Forward Voltage vs. Current

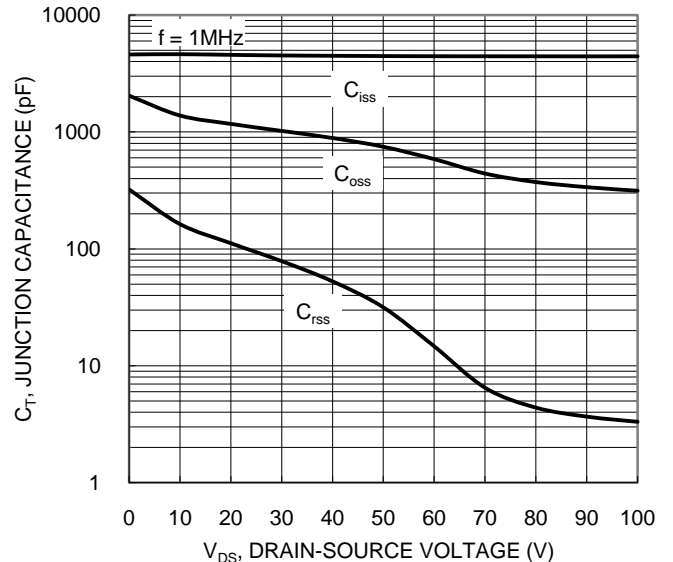


Figure 10. Typical Junction Capacitance

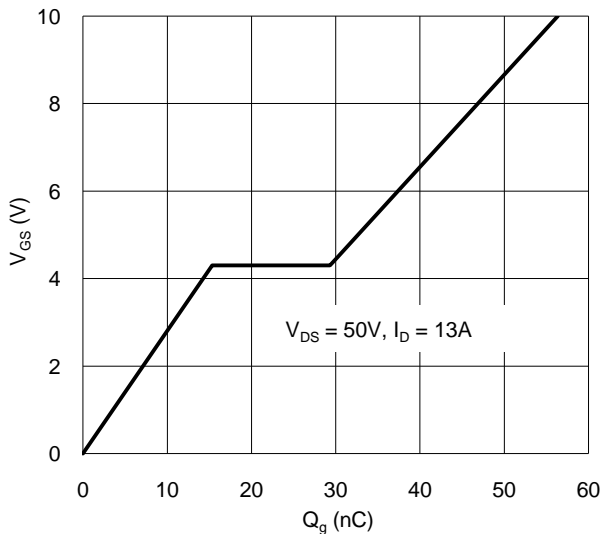


Figure 11. Gate Charge

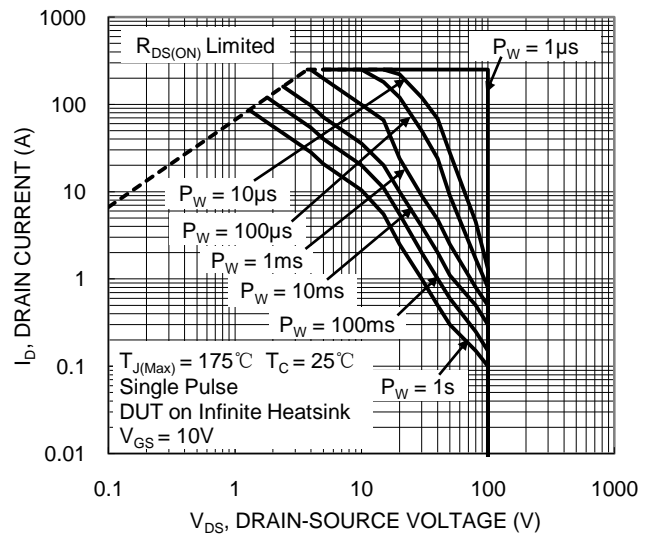


Figure 12. SOA, Safe Operation Area

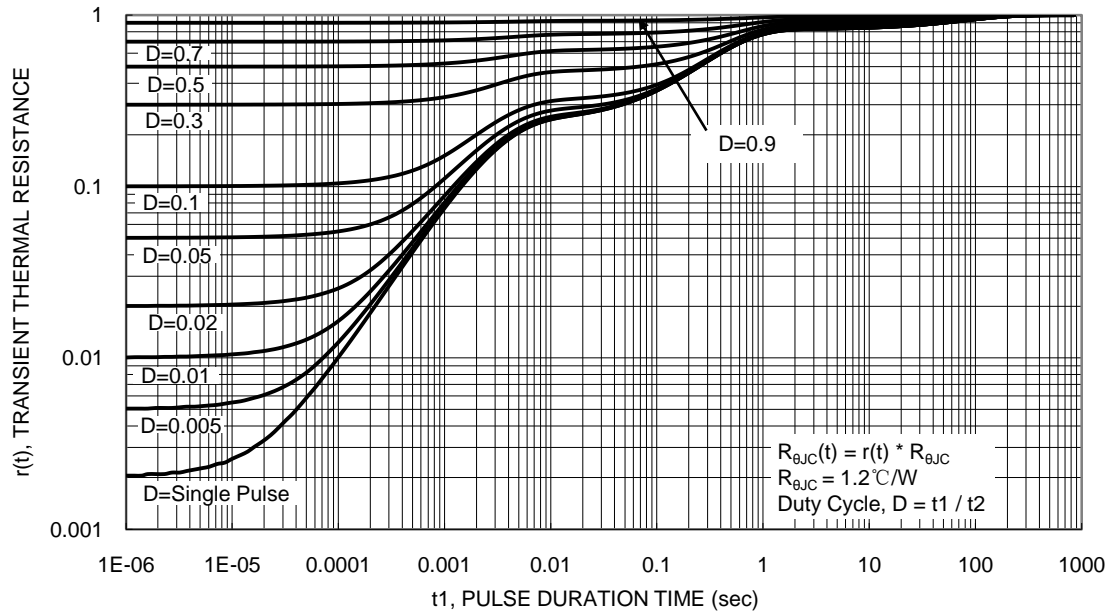
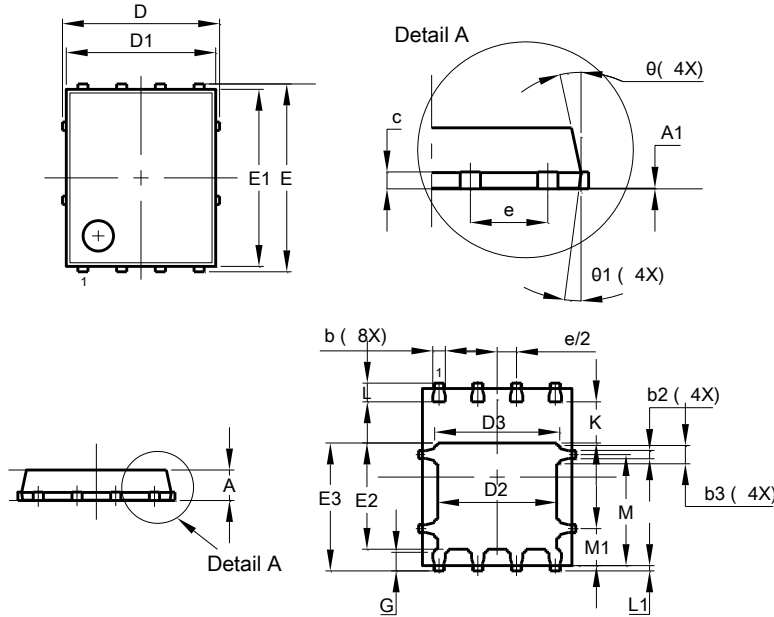


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8

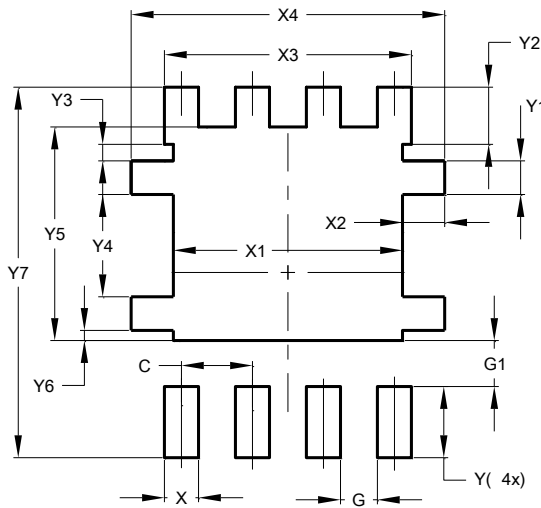


PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	–
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61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