

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D $T_C = +25^\circ C$
30V	1.6m Ω @ $V_{GS} = 10V$	100A

Description

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 power management and load switch.

Applications

- DC-DC Converters
- Load Switch

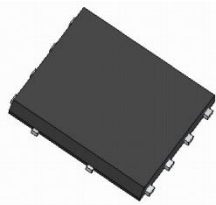
Features

- Thermally Efficient Package – Cooler Running Applications
- <1.1mm Package Profile – Ideal for Thin Applications
- High Conversion Efficiency
- Low $R_{DS(ON)}$ – Minimizes On-State Losses
- Low Input Capacitance
- 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**

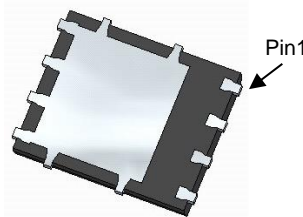
Mechanical Data

- 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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.097 grams (Approximate)

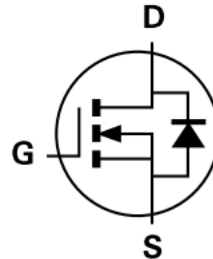
PowerDI5060-8



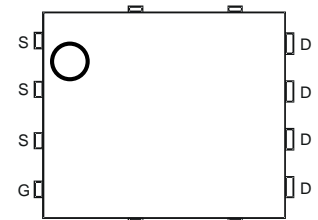
Top View



Bottom View



Internal Schematic

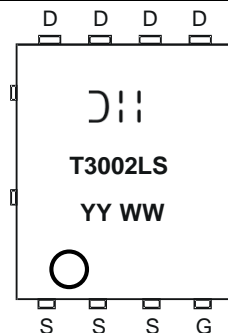

 Top View
 Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT3002LPS-13	PowerDI5060-8	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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



- $\text{D} \text{D} \text{D} \text{D}$ = Manufacturer's Marking
- T3002LS = Product Type Marking Code
- YYWW = Date Code Marking
- YY = Year (ex: 16 = 2016)
- WW = Week (01 to 53)

Maximum Ratings (@ $T_C = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	± 16	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 7)	I_D	100	A
Steady State		100	
Maximum Continuous Body Diode Forward Current (Note 7)	I_S	100	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	150	A
Avalanche Current, $L=3\text{mH}$ (Note 8)	I_{AS}	15	A
Avalanche Energy, $L=3\text{mH}$ (Note 8)	E_{AS}	700	mJ

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	103	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	51	$^\circ\text{C/W}$
Total Power Dissipation (Note 7)	P_D	136	W
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	1.1	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	2	V	$V_{DS} = V_{GS}, I_D = 1\text{mA}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.25	1.6	m Ω	$V_{GS} = 10\text{V}, I_D = 25\text{A}$
		—	2	2.5		$V_{GS} = 4.5\text{V}, I_D = 25\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.1	V	$V_{GS} = 0\text{V}, I_S = 25\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{ISS}	—	5,000	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{OSS}	—	2,660	—		
Reverse Transfer Capacitance	C_{RSS}	—	300	—		
Gate Resistance	R_G	—	0.75	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_G	—	37	—	nC	$V_{DS} = 15\text{V}, I_D = 25\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_G	—	77	—		
Gate-Source Charge	Q_{GS}	—	10	—		
Gate-Drain Charge	Q_{GD}	—	14	—		
Turn-On Delay Time	$t_{D(ON)}$	—	21	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 4.5\text{V}, I_D = 25\text{A}, R_G = 4.7\Omega$
Turn-On Rise Time	t_R	—	45	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	32	—		
Turn-Off Fall Time	t_F	—	26	—		
Body Diode Reverse Recovery Time	t_{RR}	—	44	—	ns	$I_S = 15\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	52	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

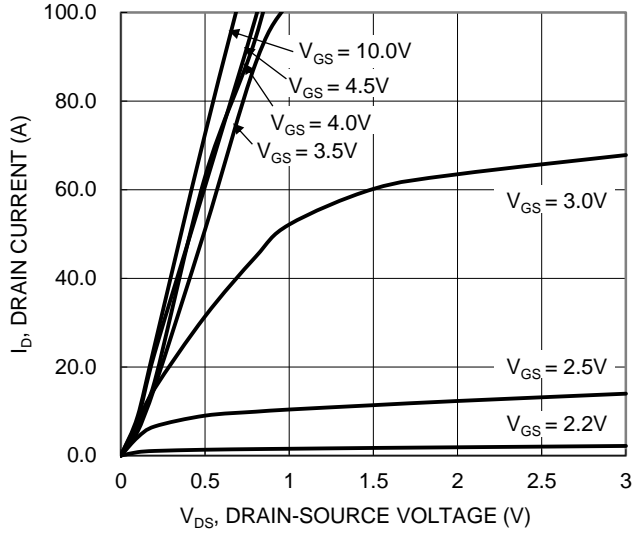


Figure 1. Typical Output Characteristic

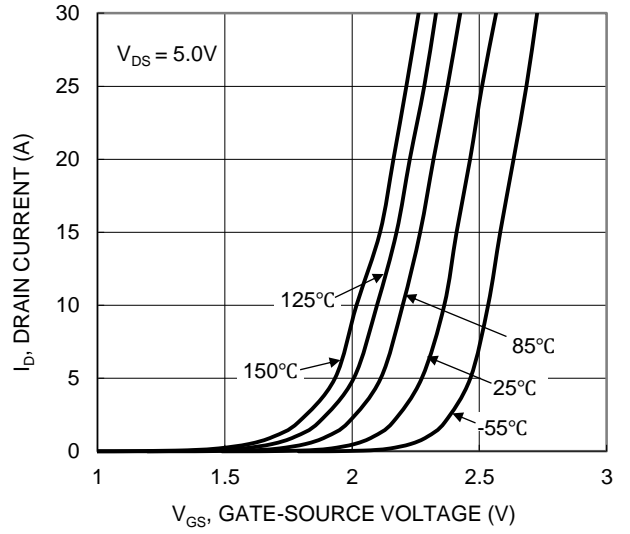


Figure 2. Typical Transfer Characteristic

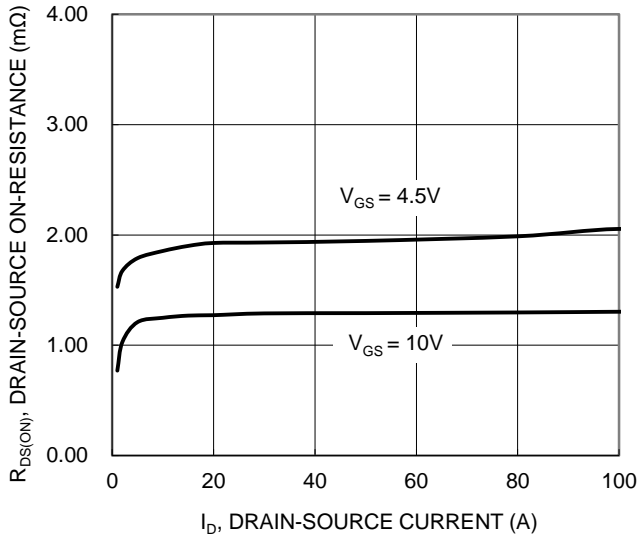


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

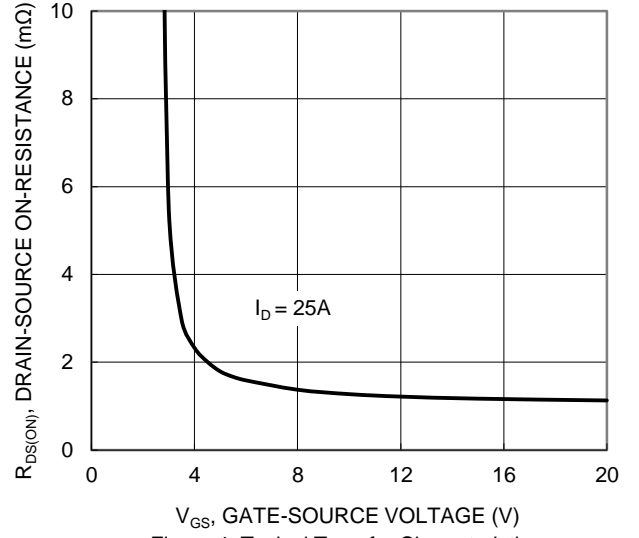


Figure 4. Typical Transfer Characteristic

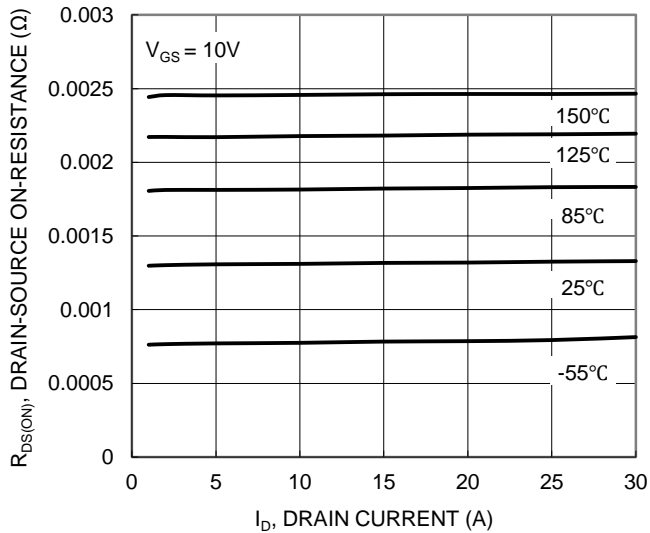


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

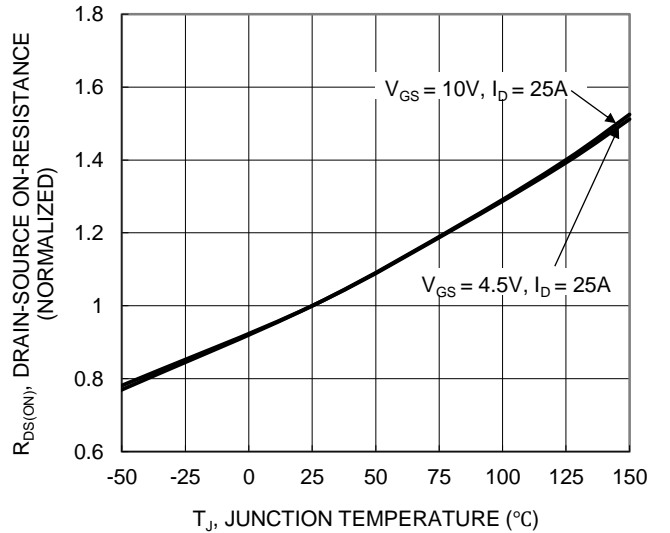
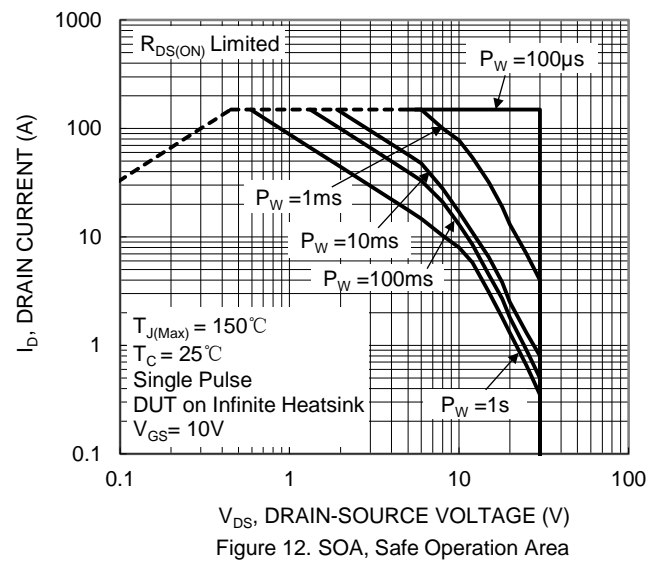
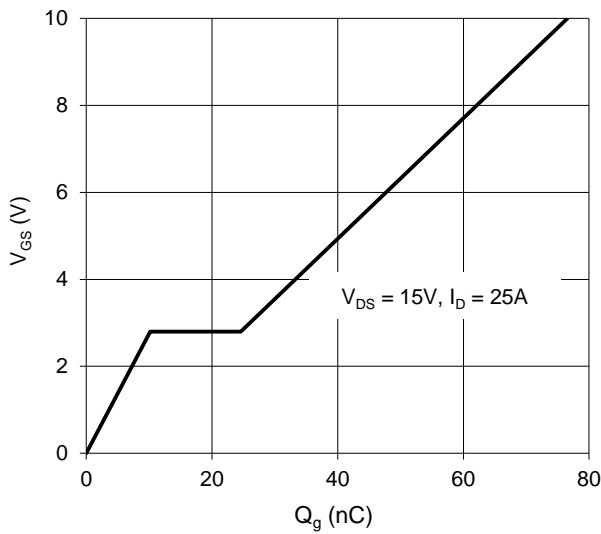
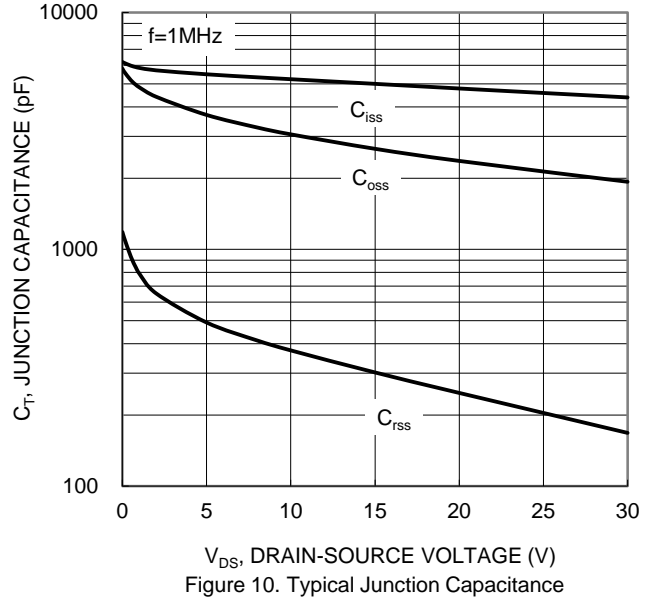
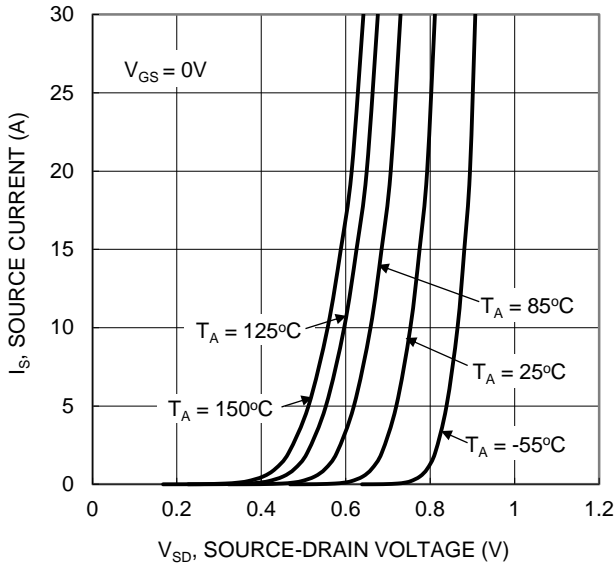
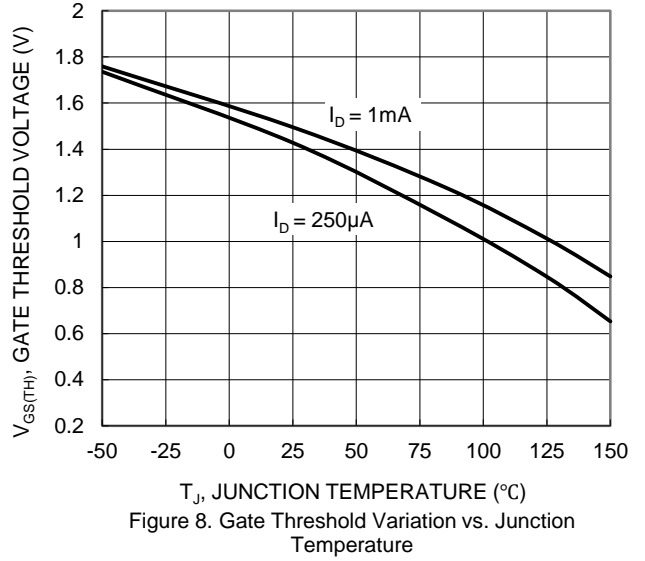
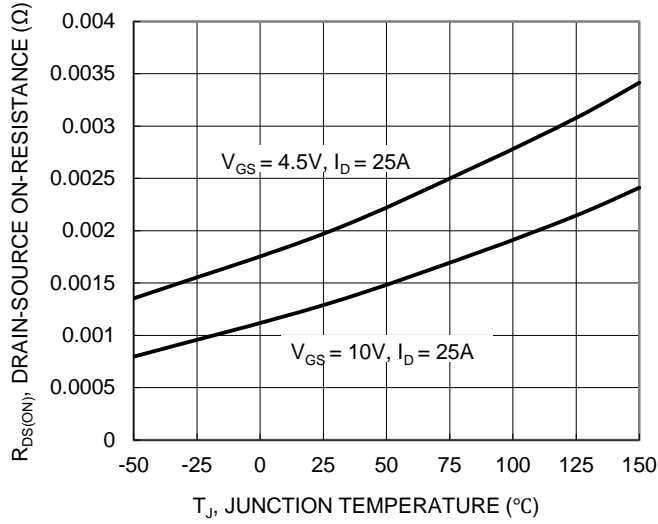


Figure 6. On-Resistance Variation with Temperature



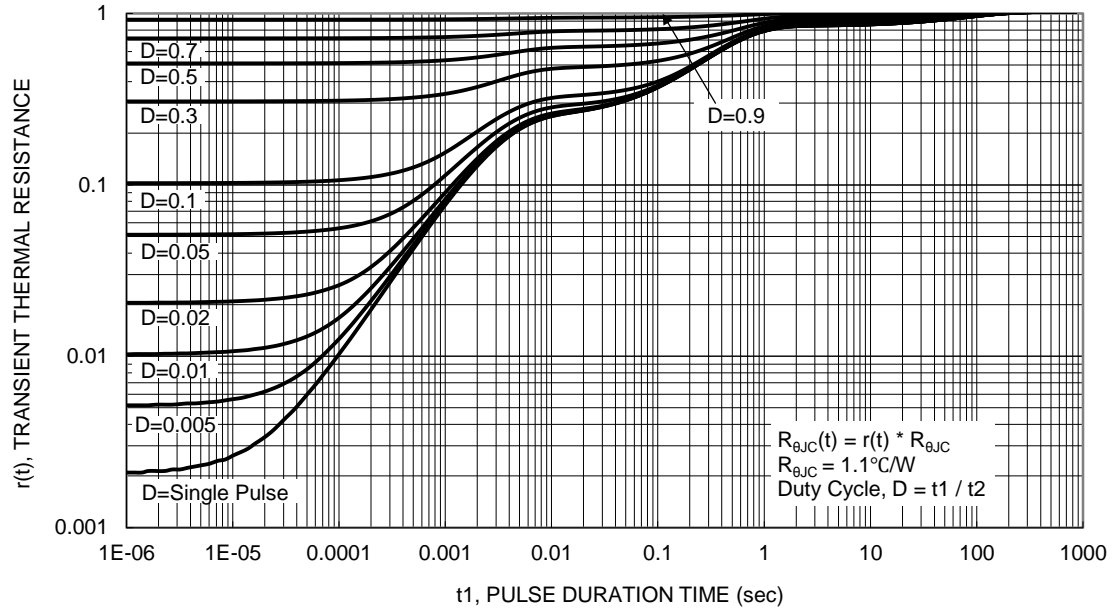
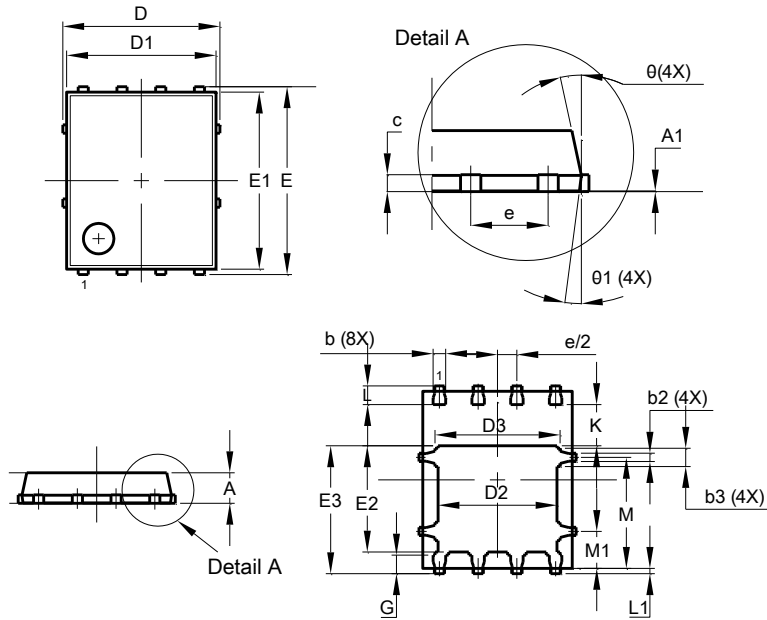


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8

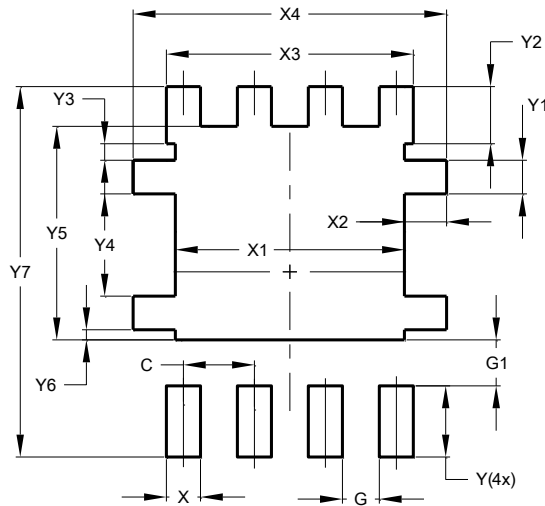


PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	–
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
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°
$\theta1$	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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