

## Product Summary

BV <sub>DSS</sub>	R <sub>DSON</sub>	I <sub>D</sub> T <sub>C</sub> = +25°C (Note 7)
60V	8mΩ @ V <sub>GS</sub> = 10V	80A
	12mΩ @ V <sub>GS</sub> = 4.5V	79A

## Description and Applications

This new generation n-channel enhancement mode MOSFET is designed to minimize R<sub>DSON</sub> yet maintain superior switching performance. This device is ideal for use in notebook battery power management and Load switches.

- Notebook battery power management
- DC-DC converters
- Load switches

## Features

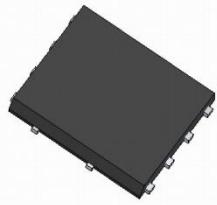
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low R<sub>DSON</sub> – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

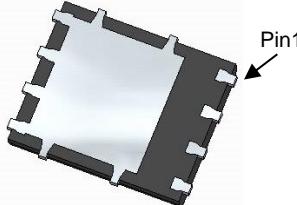
- Package: PowerDI<sup>®</sup>5060-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.097 grams (Approximate)

Site 1:

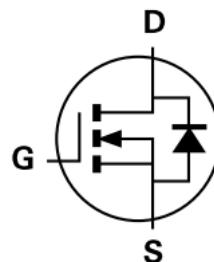
PowerDI5060-8



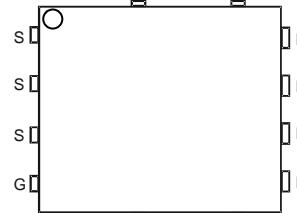
Top View



Bottom View



Internal Schematic

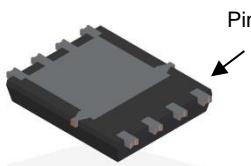
Top View  
Pin Configuration

Site 2:

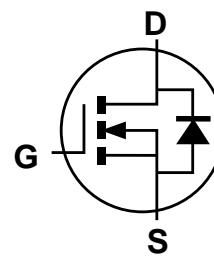
PowerDI5060-8/SWP (Type UX)



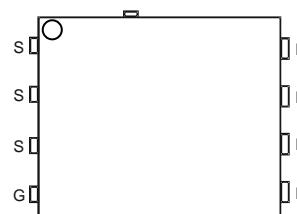
Top View



Bottom View



Internal Schematic

Top View  
Pin Configuration

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.

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DMT6010LPS

Document number: DS37590 Rev. 4 - 2

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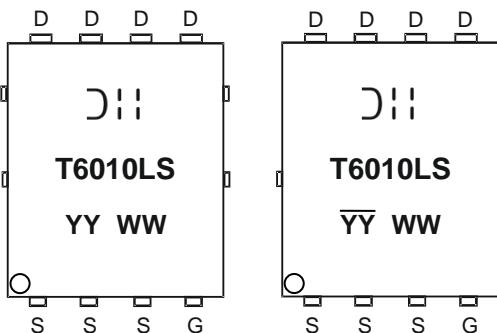
July 2025

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**Ordering Information** (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT6010LPS-13	PowerDI5060-8	2,500	Tape & Reel
DMT6010LPS-13	PowerDI5060-8/SWP (Type UX)	2,500	Tape & Reel

Note: 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**


○ = Manufacturer's Marking  
 T6010LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 25 = 2025)  
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5)	$I_D$	13.5 11	A
Continuous Drain Current (Note 6)	$I_D$	80 77	A
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	80	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	125	A
Avalanche Current, L=0.1mH	$I_{AS}$	20	A
Avalanche Energy, L=0.1mH	$E_{AS}$	20	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	2.2	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	57	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$P_D$	113	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	1.1	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.  
 6. Thermal resistance from junction to soldering point (on the exposed drain pad).  
 7. Package limited.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	60	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = 1\text{mA}$
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	—	—	1	$\mu\text{A}$	$\text{V}_{\text{DS}} = 48\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	—	—	$\pm 100$	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	1	—	3	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	6	8	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$ , $\text{I}_D = 20\text{A}$
		—	8	12		$\text{V}_{\text{GS}} = 4.5\text{V}$ , $\text{I}_D = 20\text{A}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	—	0.9	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = 20\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$\text{C}_{\text{iss}}$	—	2090	—	$\text{pF}$	$\text{V}_{\text{DS}} = 30\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	—	746	—		
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	—	38.5	—		
Gate Resistance	$\text{R}_g$	—	0.59	—		
Total Gate Charge ( $\text{V}_{\text{GS}} = 4.5\text{V}$ )	$\text{Q}_g$	—	19.3	—	$\text{nC}$	$\text{V}_{\text{DS}} = 30\text{V}$ , $\text{I}_D = 20\text{A}$
Total Gate Charge ( $\text{V}_{\text{GS}} = 10\text{V}$ )	$\text{Q}_g$	—	41.3	—		
Gate-Source Charge	$\text{Q}_{\text{gs}}$	—	6.0	—		
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	—	8.8	—		
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	5.7	—	$\text{ns}$	$\text{V}_{\text{DD}} = 30\text{V}$ , $\text{V}_{\text{GS}} = 10\text{V}$ , $\text{I}_D = 20\text{A}$ , $\text{R}_G = 3\Omega$
Turn-On Rise Time	$\text{t}_r$	—	4.3	—		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	23.4	—		
Turn-Off Fall Time	$\text{t}_f$	—	9.7	—		
Body Diode Reverse-Recovery Time	$\text{t}_{\text{RR}}$	—	35.4	—	$\text{ns}$	$\text{I}_F = 20\text{A}$ , $\text{di/dt} = 100\text{A}/\mu\text{s}$
Body Diode Reverse-Recovery Charge	$\text{Q}_{\text{RR}}$	—	38.2	—	$\text{nC}$	

Notes: 8. Short duration pulse test used to minimize self-heating effect.  
9. Guaranteed by design. Not subject to product testing.

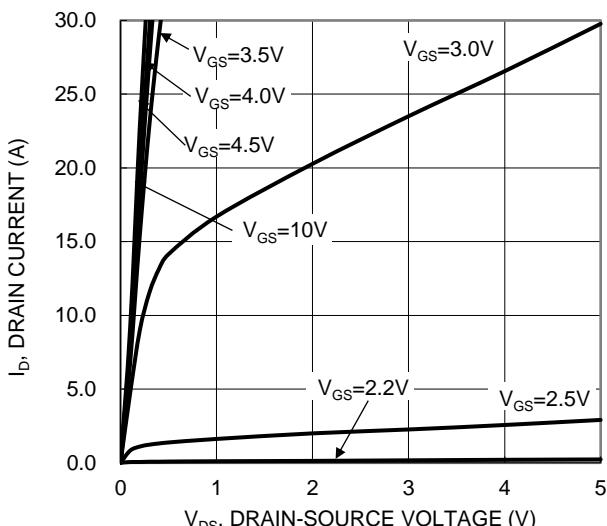


Figure 1. Typical Output Characteristic

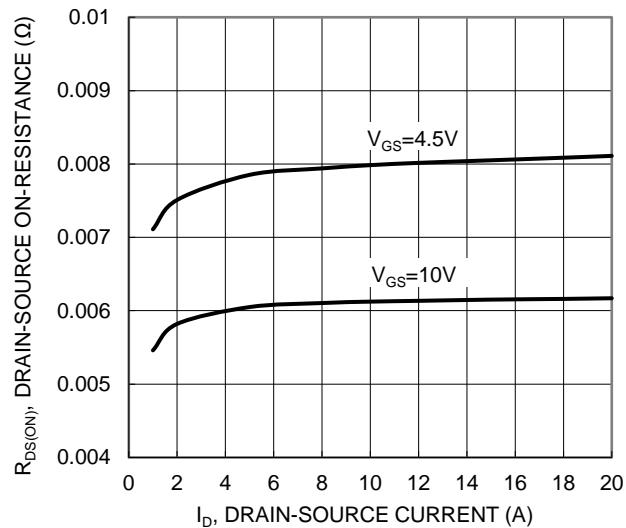


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

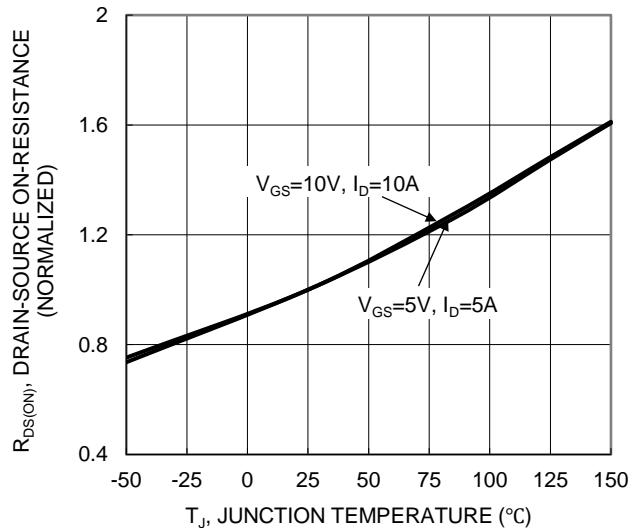


Figure 5. On-Resistance Variation with Temperature

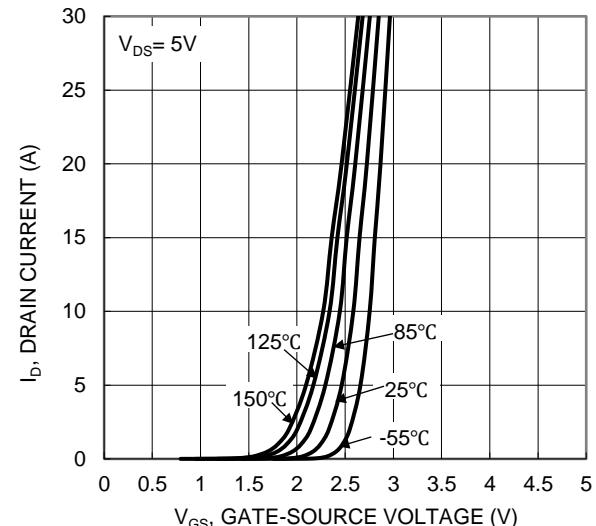


Figure 2. Typical Transfer Characteristic

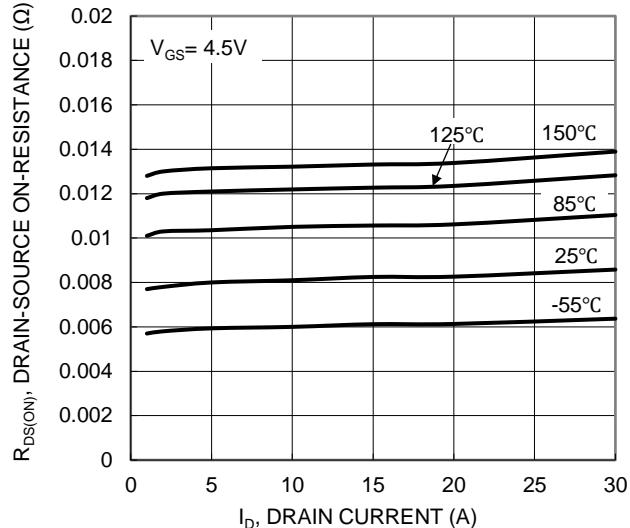


Figure 4. Typical On-Resistance vs. Drain Current and Temperature

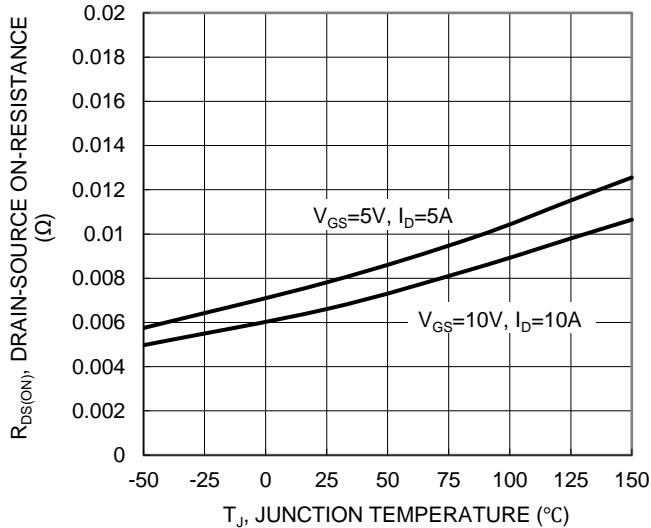
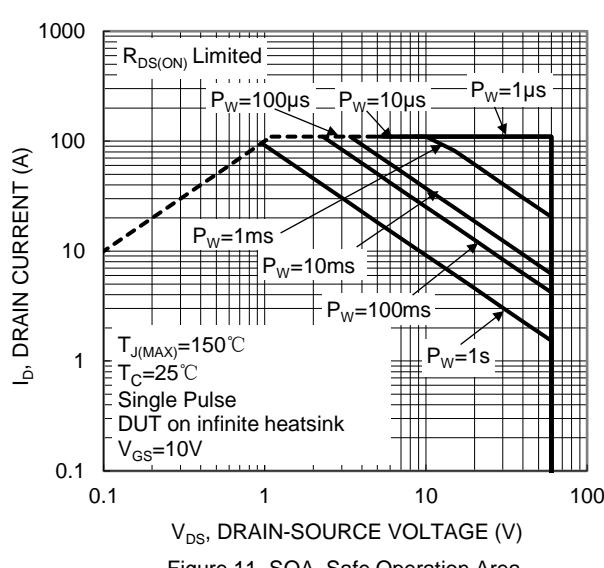
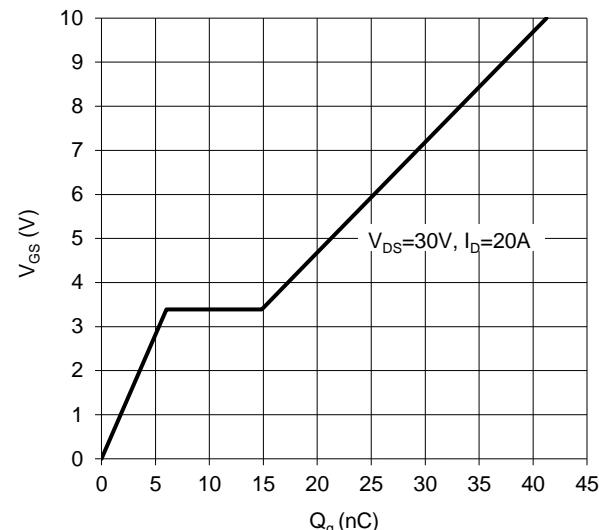
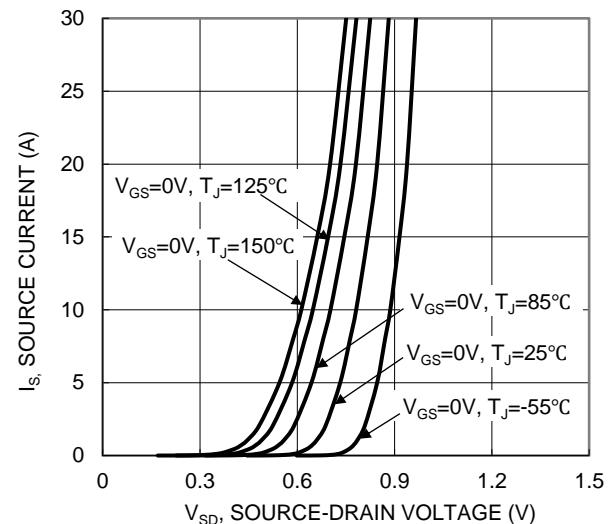
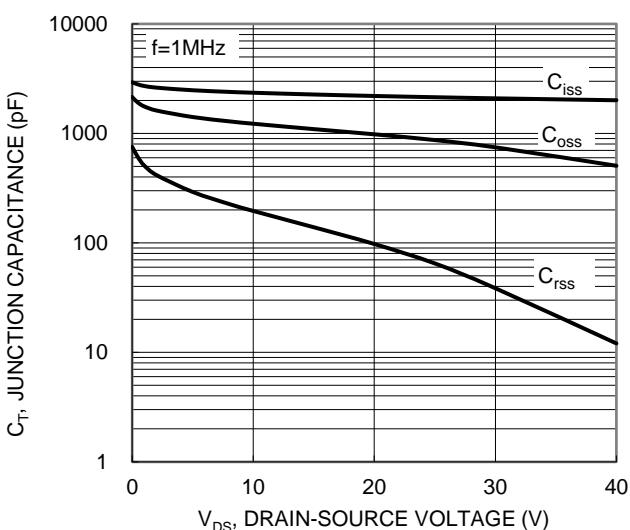
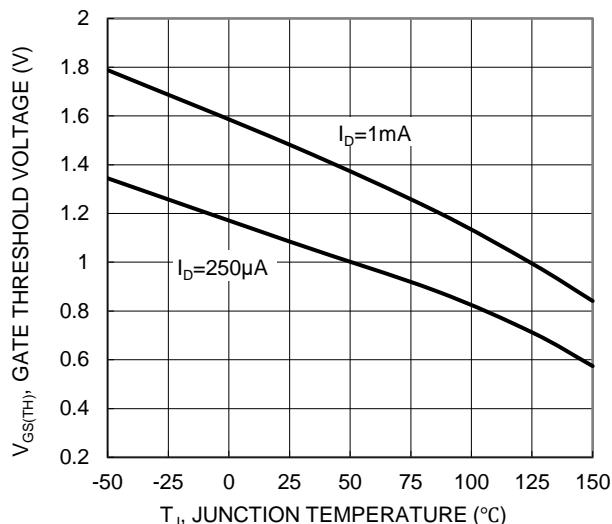


Figure 6. On-Resistance Variation with Temperature



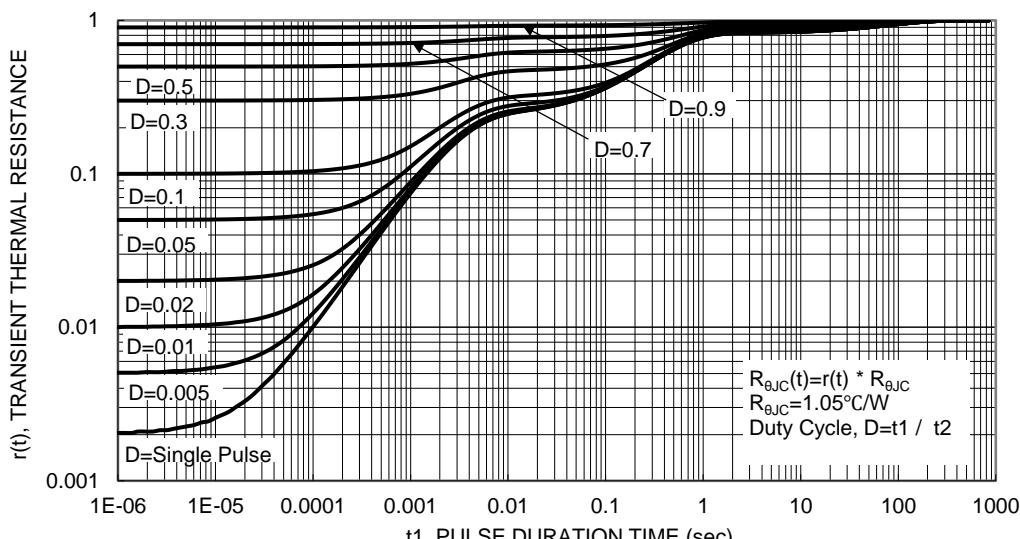


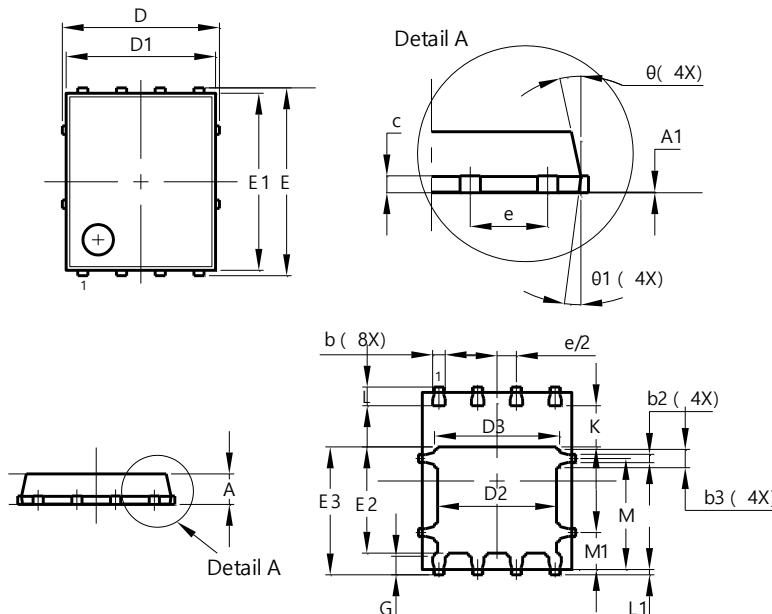
Figure 12. Transient Thermal Resistance

## Package Outline Dimensions

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

## Site 1:

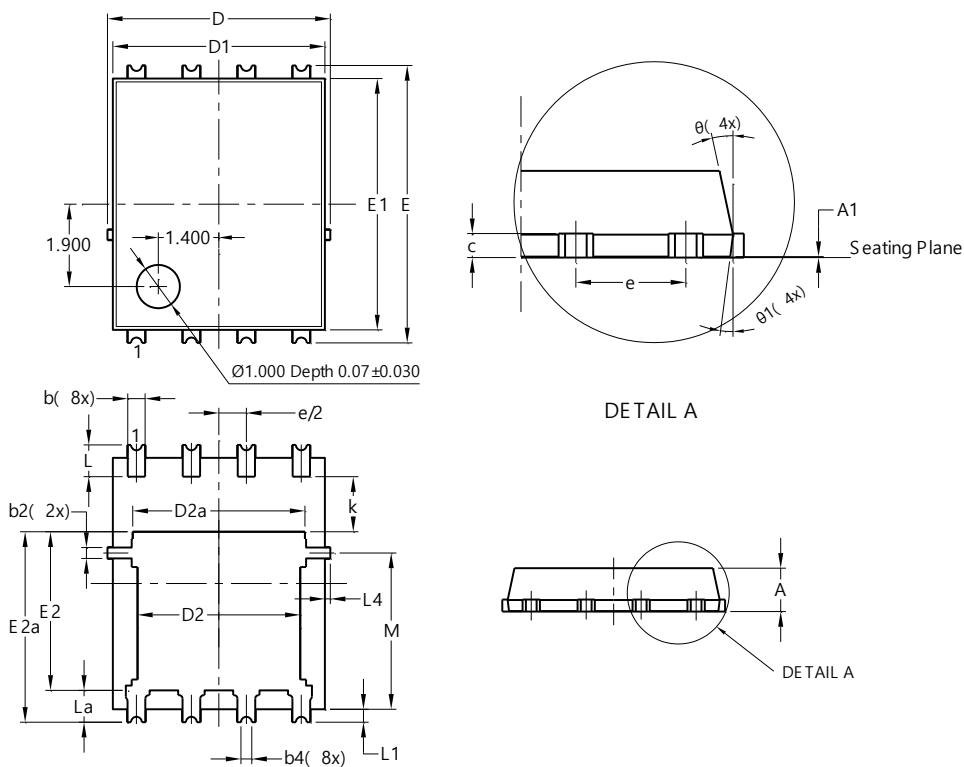
## PowerDI5060-8



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°

## Site 2:

PowerPI5060-8/SWP (Type UX)



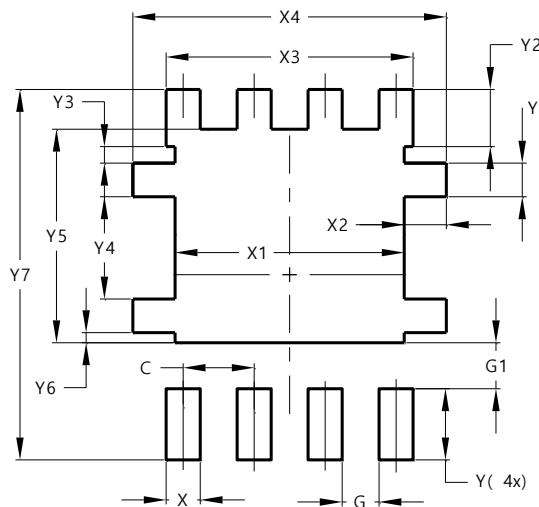
PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
<b>A</b>	0.90	1.10	1.00
<b>A1</b>	0	0.05	--
<b>b</b>	0.30	0.50	0.41
<b>b2</b>	0.20	0.35	0.25
<b>b4</b>	0.25REF		
<b>c</b>	0.230	0.330	0.277
<b>D</b>	5.15 BSC		
<b>D1</b>	4.70	5.10	4.90
<b>D2</b>	3.56	3.96	3.76
<b>D2a</b>	3.78	4.18	3.98
<b>E</b>	6.40 BSC		
<b>E1</b>	5.60	6.00	5.80
<b>E2</b>	3.46	3.86	3.66
<b>E2a</b>	4.195	4.595	4.395
<b>e</b>	1.27BSC		
<b>k</b>	1.05	--	--
<b>L</b>	0.635	0.835	0.735
<b>La</b>	0.635	0.835	0.735
<b>L1</b>	0.200	0.400	0.300
<b>L1a</b>	0.050REF		
<b>L4</b>	0.025	0.225	0.125
<b>M</b>	3.205	4.005	3.605
<b>θ</b>	10°	12°	11°
<b>θ1</b>	6°	8°	7°

## Suggested Pad Layout

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

### Site 1:

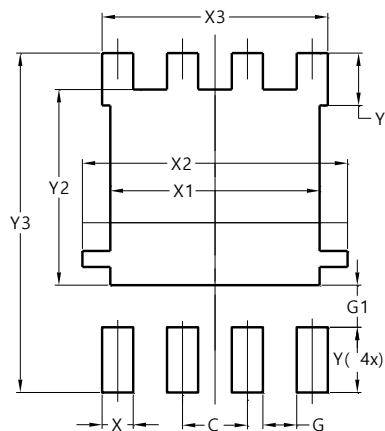
PowerDI5060-8



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

### Site 2:

PowerDI5060-8/SWP (Type UX)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	5.190
X3	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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