



**THE DATASHEET OF  
FEMDRW008G-88A39**



## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>C</sub> = +25°C
80V	17mΩ @ V <sub>GS</sub> = 10V	53.7A
	23.5mΩ @ V <sub>GS</sub> = 4.5V	44.3A

## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Synchronous rectifiers
- Backlighting
- Power-management functions
- DC-DC converters

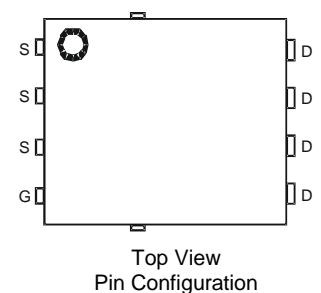
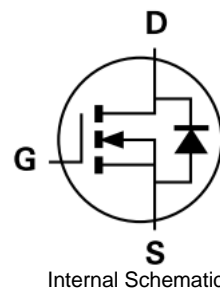
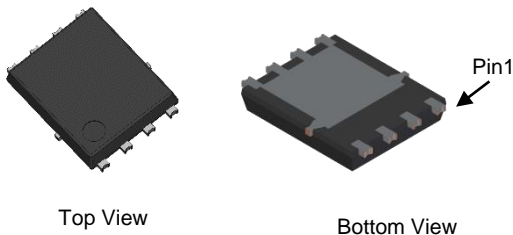
## Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub> – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- Additional Tin-Plated on Sidewall Pads for Optical Solder Inspection
- **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/>**

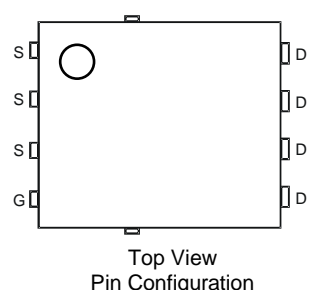
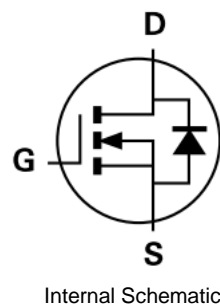
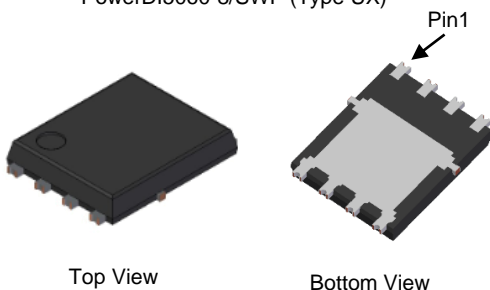
## Mechanical Data

- 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)

PowerDI5060-8 (SWP) (Type Q)



PowerDI5060-8/SWP (Type UX)

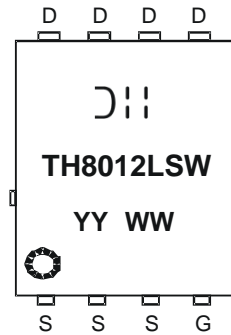


- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  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.

**Ordering Information** (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMTH8012LPSW-13	PowerDI5060-8 (SWP) (Type Q)	2,500	Tape & Reel
DMTH8012LPSW-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  
 TH8012LSW = Product Type Marking Code  
 YYWW or YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 24 = 2024)  
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DS}$	80	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 5)	$I_D$	$T_A = +25^\circ\text{C}$ $T_A = +100^\circ\text{C}$	10.3 7.3	A
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)		$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	53.7 38	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	80	A	
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	69	A	
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{SM}$	80	A	
Avalanche Current, $L = 0.1\text{mH}$	$I_{AS}$	11.6	A	
Avalanche Energy, $L = 0.1\text{mH}$	$E_{AS}$	6.7	mJ	

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).

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$ $P_D$	3.1	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	49	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_C = +25^\circ\text{C}$ $P_D$	83.3	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
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
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	80	—	—	V	$V_{GS} = 0V, I_D = 1mA$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu A$	$V_{DS} = 64V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	14	17	m $\Omega$	$V_{GS} = 10V, I_D = 12A$
		—	16.5	23.5		$V_{GS} = 4.5V, I_D = 6A$
Diode Forward Voltage	$V_{SD}$	—	0.9	1.2	V	$V_{GS} = 0V, I_S = 20A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	1949	—	pF	$V_{DS} = 40V, V_{GS} = 0V,$ $f = 1MHz$
Output Capacitance	$C_{oss}$	—	177	—		
Reverse Transfer Capacitance	$C_{rss}$	—	10	—		
Gate Resistance	$R_g$	—	0.7	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge ( $V_{GS} = 4.5V$ )	$Q_g$	—	15	—	nC	$V_{DS} = 40V, I_D = 12A$
Total Gate Charge ( $V_{GS} = 10V$ )	$Q_g$	—	34	—		
Gate-Source Charge	$Q_{gs}$	—	6	—		
Gate-Drain Charge	$Q_{gd}$	—	4.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.9	—	ns	$V_{DD} = 40V, V_{GS} = 10V,$ $I_D = 12A, R_g = 1.6\Omega$
Turn-On Rise Time	$t_r$	—	3.8	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	16.5	—		
Turn-Off Fall Time	$t_f$	—	3.5	—		
Body Diode Reverse Recovery Time	$t_{RR}$	—	30.2	—	ns	$I_F = 12A, di/dt = 100A/\mu s$
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	34.6	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - 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 product testing.

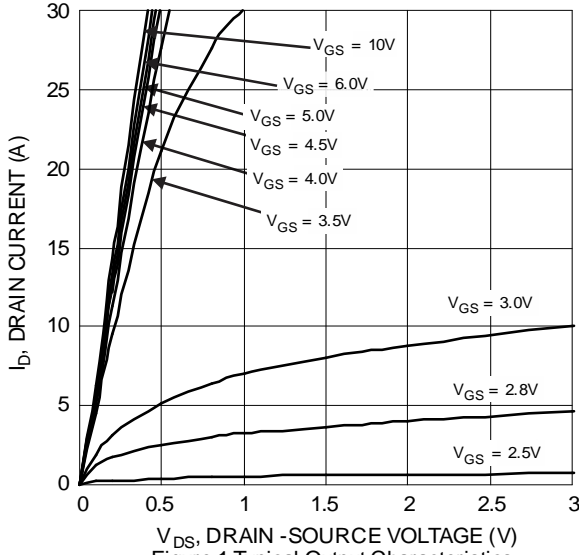


Figure 1 Typical Output Characteristics

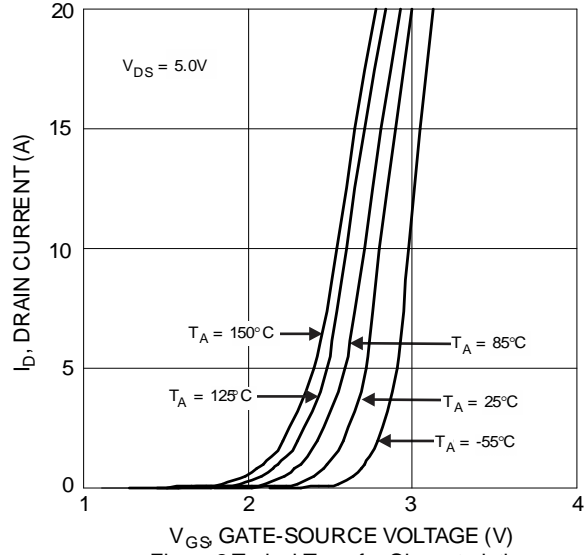


Figure 2 Typical Transfer Characteristics

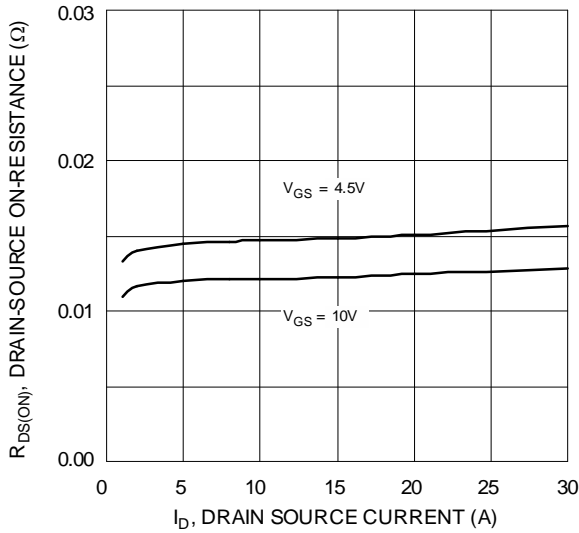


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

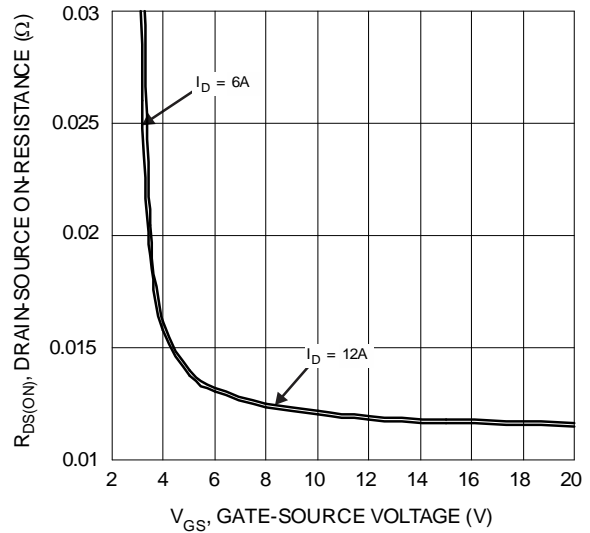


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

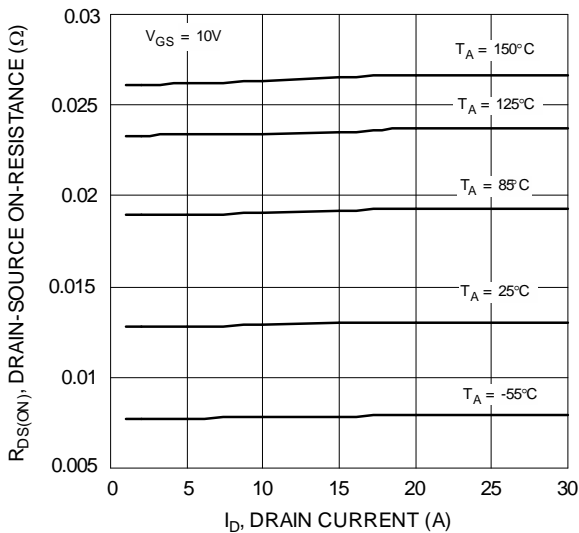


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

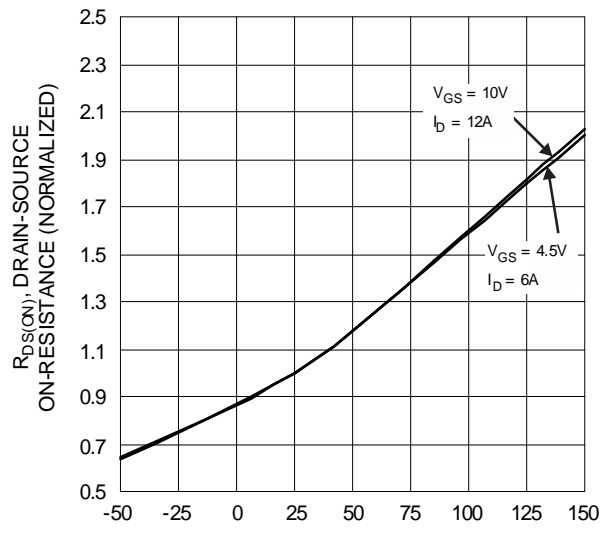


Figure 6 On-Resistance Variation with Temperature

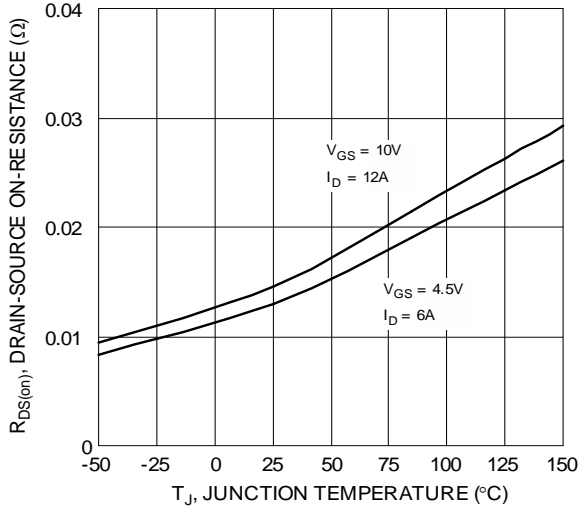


Figure 7 On-Resistance Variation with Temperature

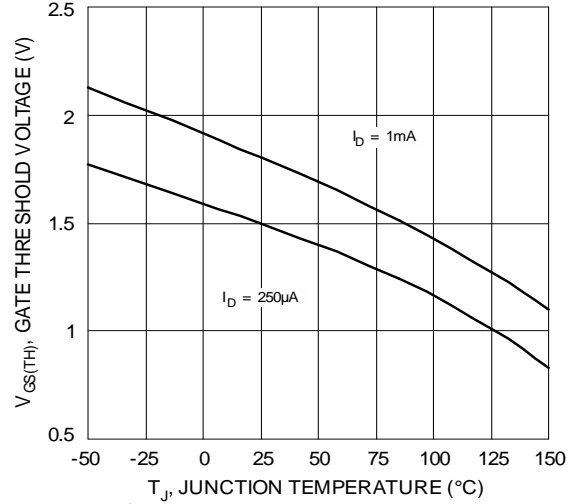


Figure 8 Gate Threshold Variation vs. Junction Temperature

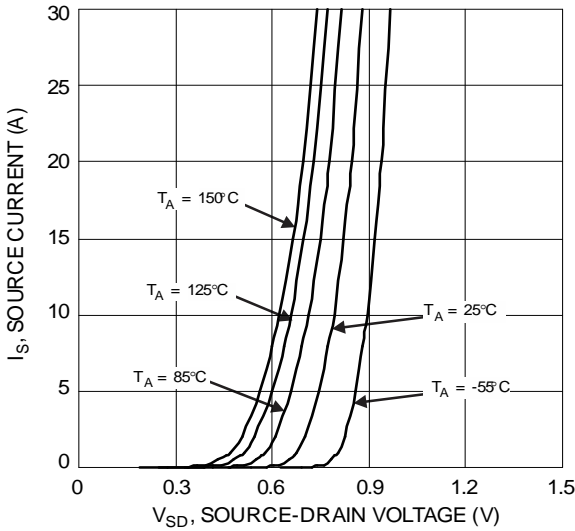


Figure 9 Diode Forward Voltage vs. Current

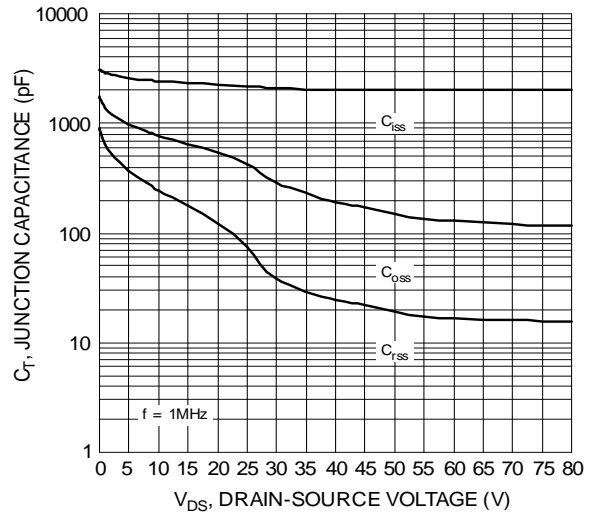


Figure 10 Typical Junction Capacitance

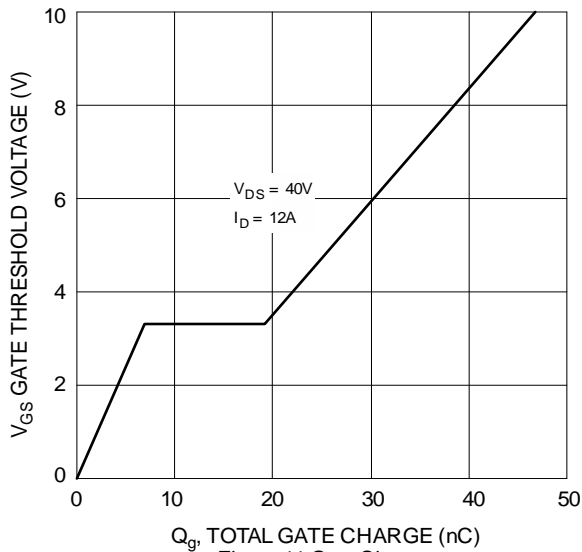


Figure 11 Gate Charge

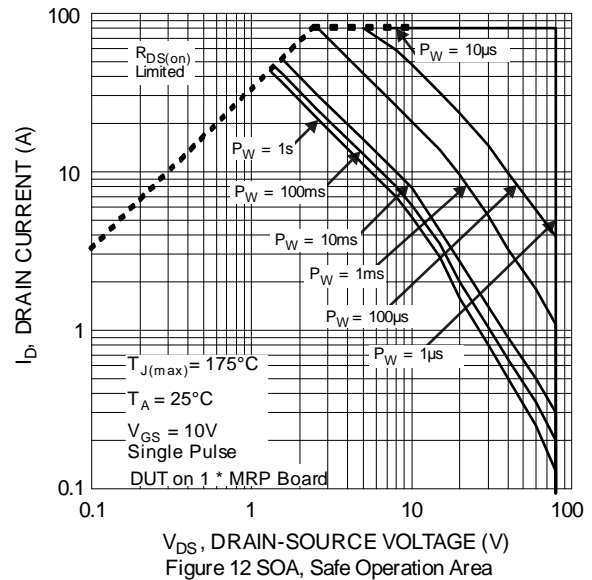


Figure 12 SOA, Safe Operation Area

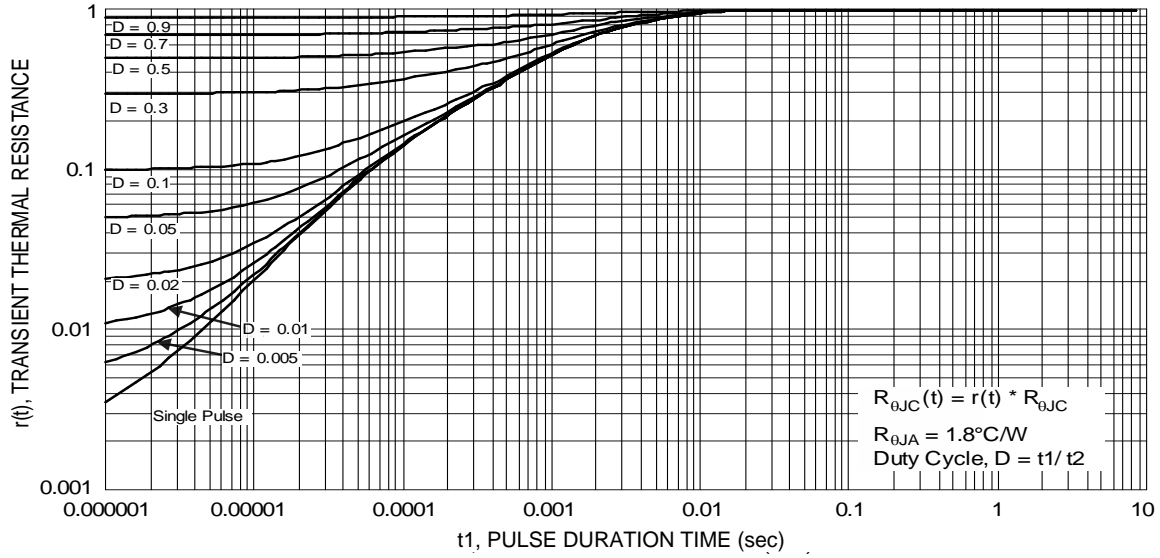
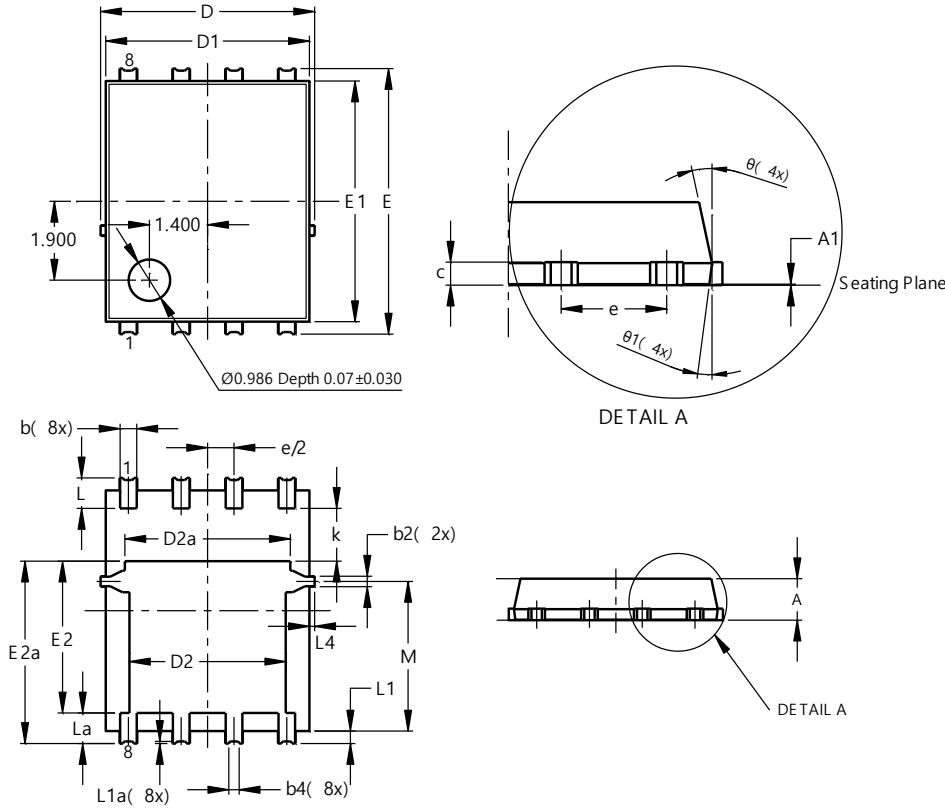


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

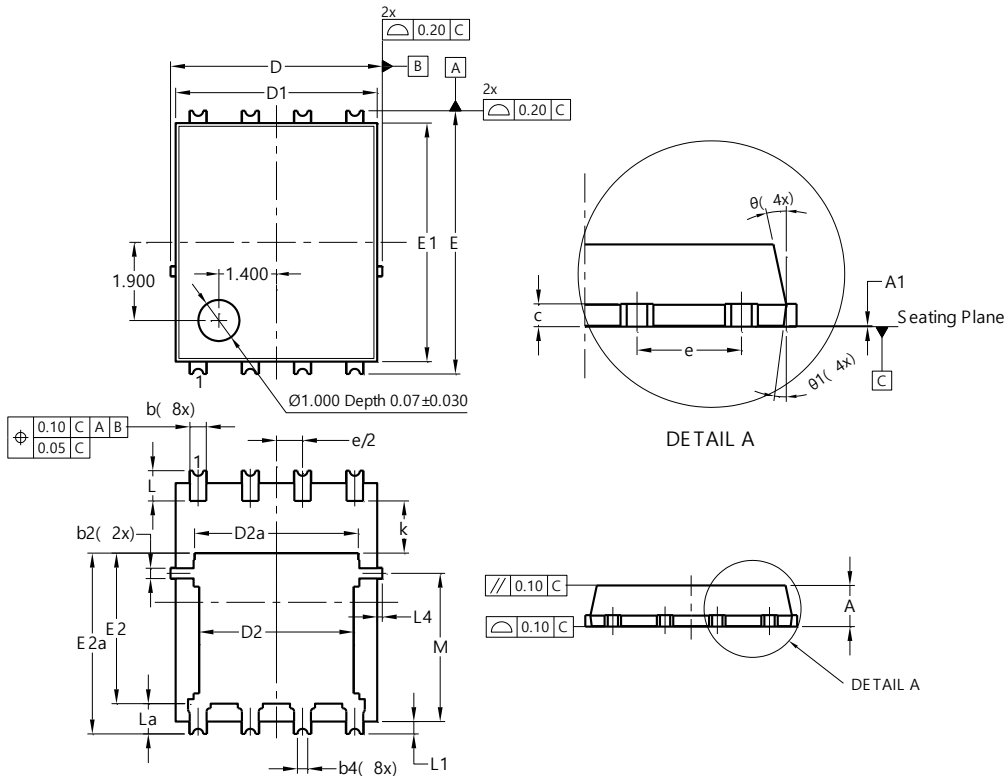
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI5060-8 (SWP) (Type Q)**



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

**PowerDI5060-8/SWP (Type UX)**

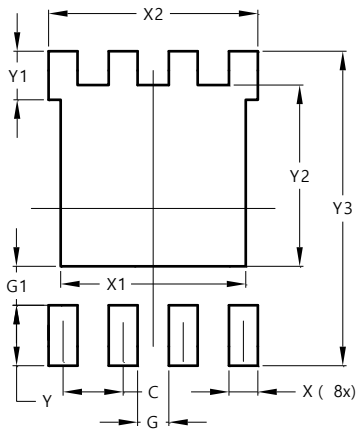


PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05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

**Suggested Pad Layout**

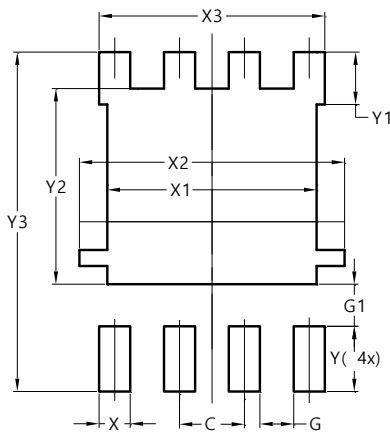
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**PowerDI5060-8 (SWP) (Type Q)**



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

**PowerDI5060-8/SWP (Type UX)**



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

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