

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _C = +25°C
-30V	3.8mΩ @ V _{GS} = -10V	-87A
	6.0mΩ @ V _{GS} = -5V	-71A

Description

This new generation MOSFET is designed to minimize R_{DS(ON)} yet maintain superior switching performance. This device is ideal for use in notebook battery power managements and load switches.

Applications

- Switches

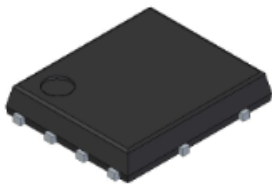
Features

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On-State Losses
- <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 [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>

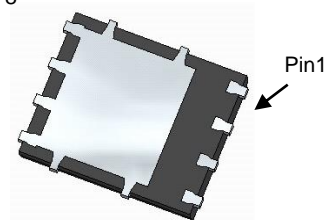
Mechanical Data

- Package: PowerDI[®]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 (e3)
- Weight: 0.097 grams (Approximate)

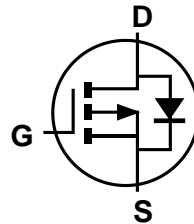
Site 1: PowerDI5060-8



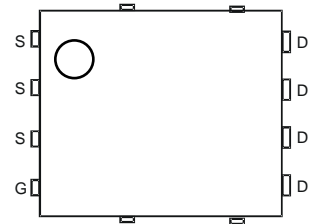
Top View



Bottom View

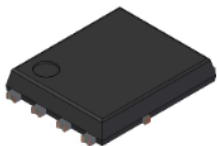


Internal Schematic

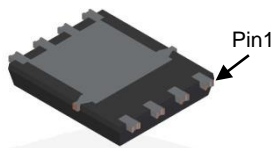


Top View
Pin Configuration

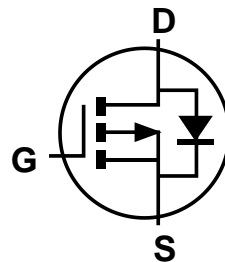
Site 2: PowerDI5060-8 (SWP) (Type UX)



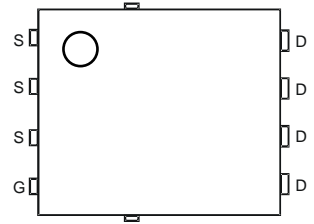
Top View



Bottom View



Internal Schematic



Top View
Pin Configuration

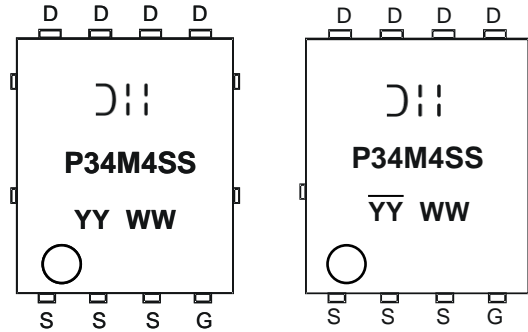
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP34M4SPS-13	PowerDI5060-8	2,500	Tape & Reel
DMP34M4SPS-13	PowerDI5060-8 (SWP) (Type UX)	2,500	Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

PowerDI is a registered trademark of Diodes Incorporated.

Marking Information



= Manufacturer's Marking
 P34M4SS = Product Type Marking Code
 $\overline{YY}WW$ or $YY\overline{WW}$ = Date Code Marking
 \overline{YY} or YY = Last Two Digits of Year (ex: 22 = 2022)
 \overline{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}	-30	V	
Gate-Source Voltage	V_{GSS}	± 25	V	
Continuous Drain Current, $V_{GS} = -10\text{V}$ (Note 5) (Package Limited)	I_D	$T_C = +25^\circ\text{C}$	-87	A
		$T_C = +70^\circ\text{C}$	-71	
Continuous Drain Current, $V_{GS} = -10\text{V}$ (Note 6)	I_D	$T_A = +25^\circ\text{C}$	-21	A
		$T_A = +70^\circ\text{C}$	-17	
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)	I_{DM}	-350	A	
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	-2.9	A	
Pulsed Body Diode Forward Current (380 μs Pulse, Duty Cycle = 1%)	I_{SM}	-350	A	
Avalanche Current, $L = 0.1\text{mH}$ (Note 7)	I_{AS}	-60	A	
Avalanche Energy, $L = 0.1\text{mH}$ (Note 7)	E_{AS}	180	mJ	

Thermal Characteristics

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 8)	P_D	1.5	W	
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JA}$	Steady State	94	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)		P_D	3.0	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	Steady State	47	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 5)		P_D	100	W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	1.4	$^\circ\text{C}/\text{W}$	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$	

- Notes:
5. Thermal resistance from junction to soldering point (on the exposed drain pad).
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
 8. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Electrical Characteristics (@T_A = +25°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} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-1.6	—	-2.6	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	2.9	3.8	mΩ	V _{GS} = -10V, I _D = -20A
		—	4.9	6.0		V _{GS} = -5V, I _D = -20A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	3,775	—	pF	V _{DS} = -15V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	932	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	500	—	pF	
Gate Resistance	R _g	—	21	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	127	—	nC	V _{DS} = -15V, V _{GS} = -10V I _D = -20A
Gate-Source Charge	Q _{gs}	—	24.5	—	nC	
Gate-Drain Charge	Q _{gd}	—	28.5	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	6.9	—	ns	V _{DD} = -15V, V _{GEN} = -10V R _{GEN} = 3Ω, I _D = -20A
Turn-On Rise Time	t _R	—	4.0	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	372	—	ns	
Turn-Off Fall Time	t _F	—	160	—	ns	
Reverse Recovery Time	t _{RR}	—	26.5	—	ns	
Reverse Recovery Charge	Q _{RR}	—	37.3	—	nC	I _F = -20A, dI/dt = 500A/μs

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

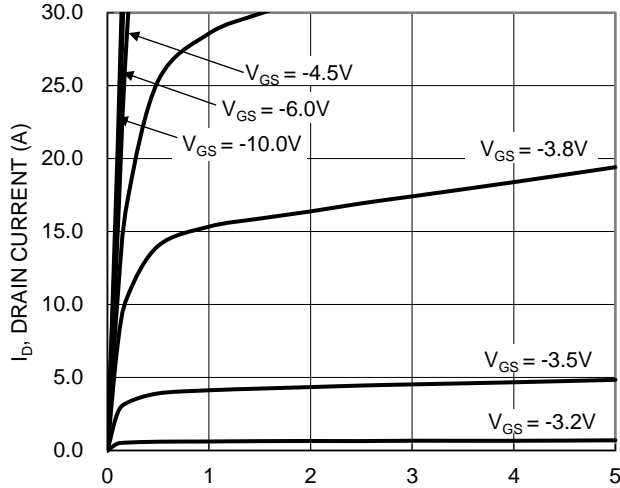


Figure 1. Typical Output Characteristic

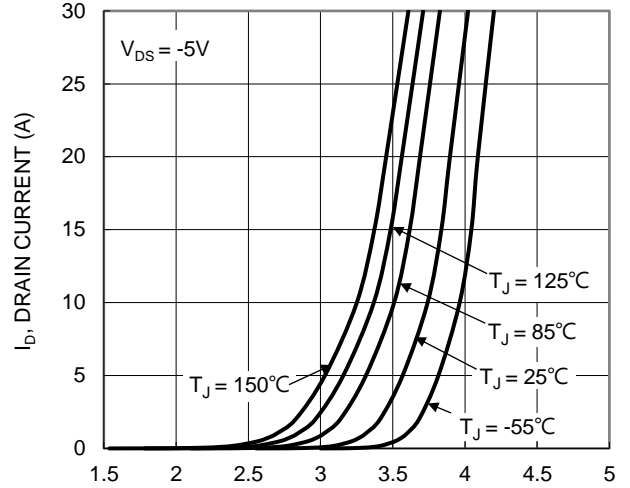


Figure 2. Typical Transfer Characteristic

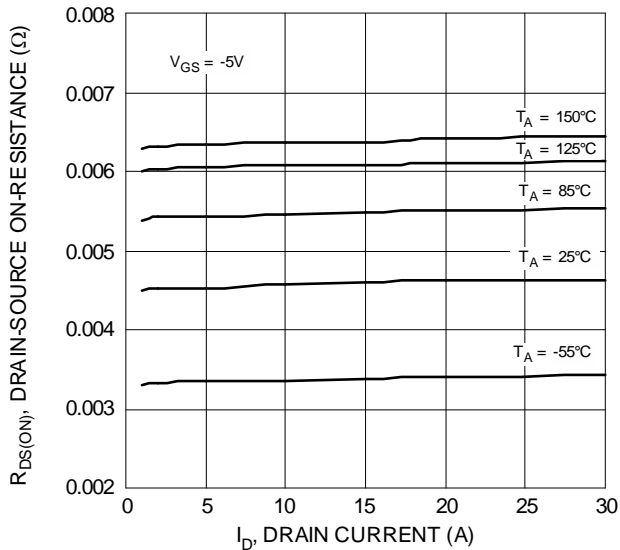


Figure 3 Typical On-Resistance vs. Drain Current and Junction Temperature

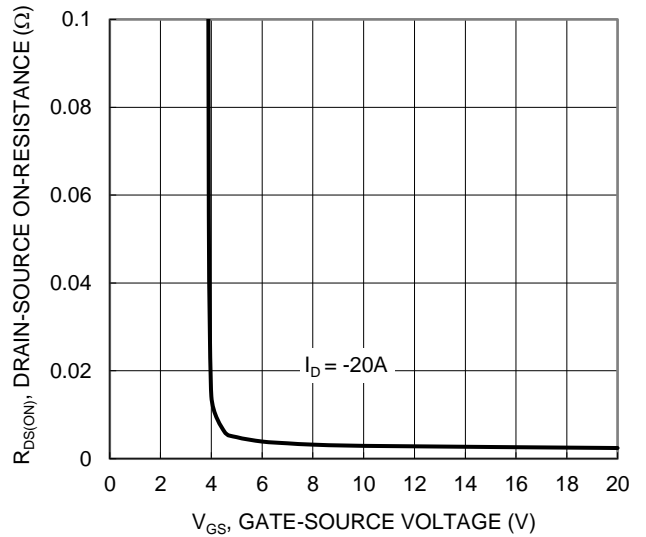


Figure 4. Typical Transfer Characteristic

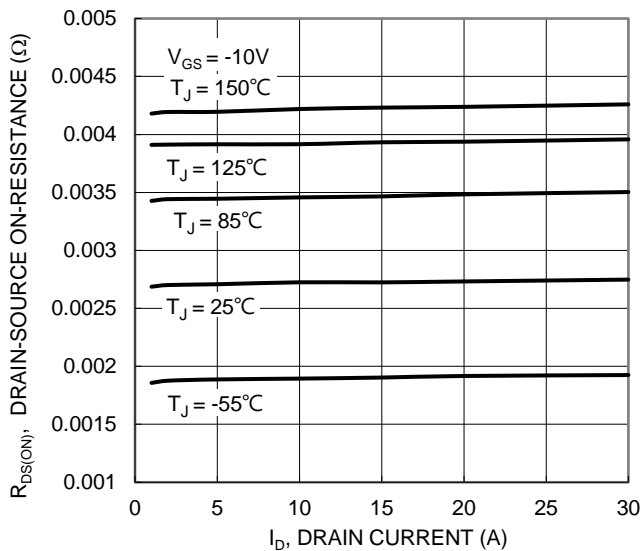


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

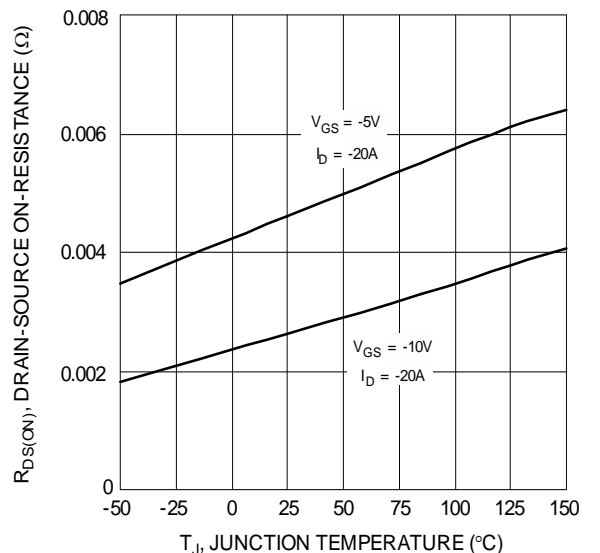


Figure 6 On-Resistance Variation with Junction Temperature

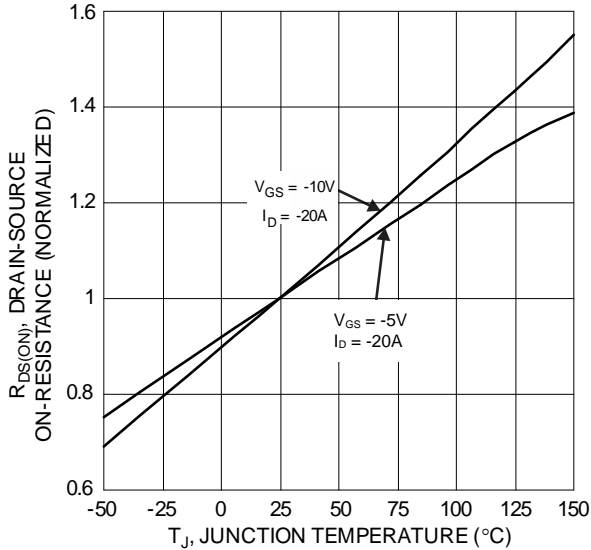


Figure 7 On-Resistance Variation with Junction Temperature

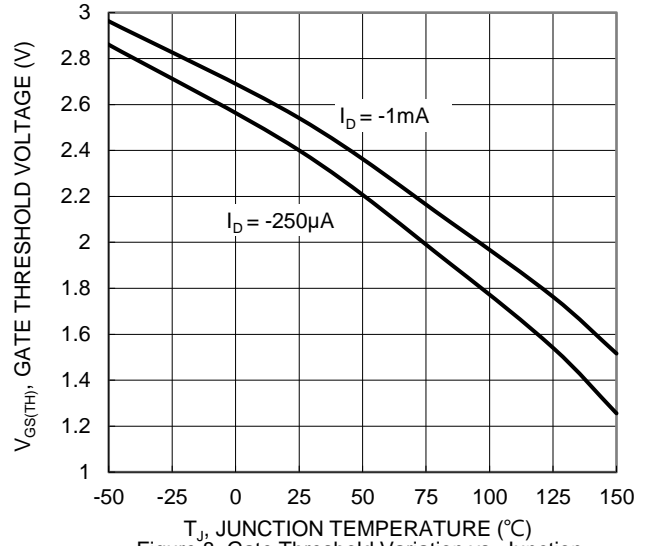


Figure 8. Gate Threshold Variation vs. Junction Temperature

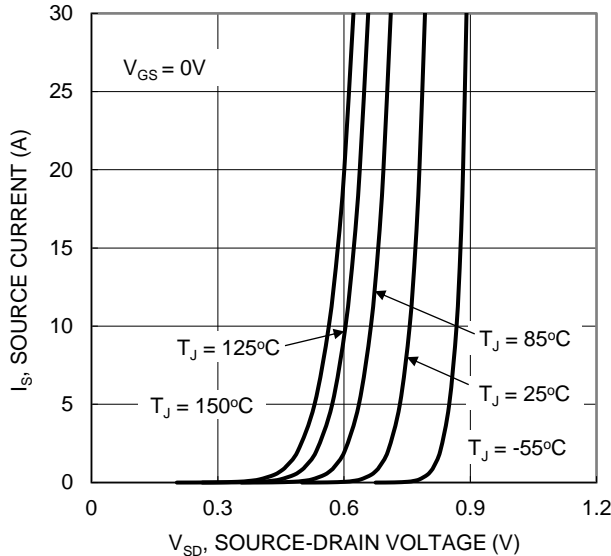


Figure 9. Diode Forward Voltage vs. Current

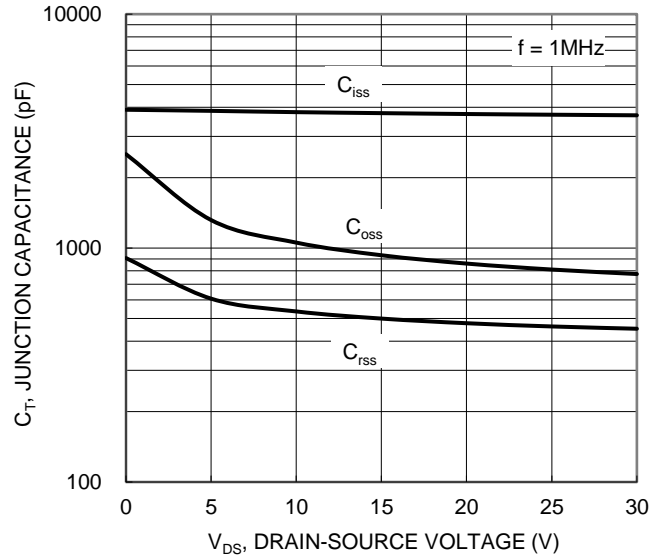


Figure 10. Typical Junction Capacitance

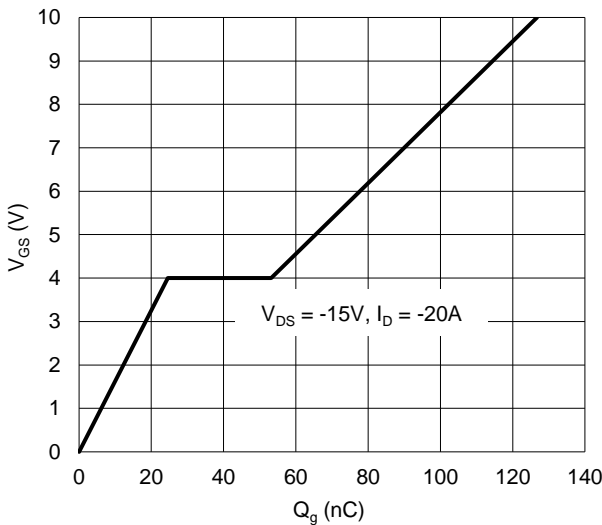


Figure 11. Gate Charge

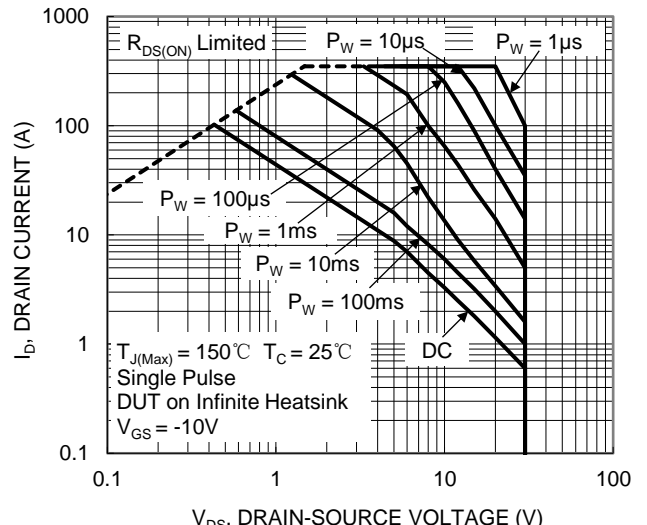


Figure 12. SOA, Safe Operation Area

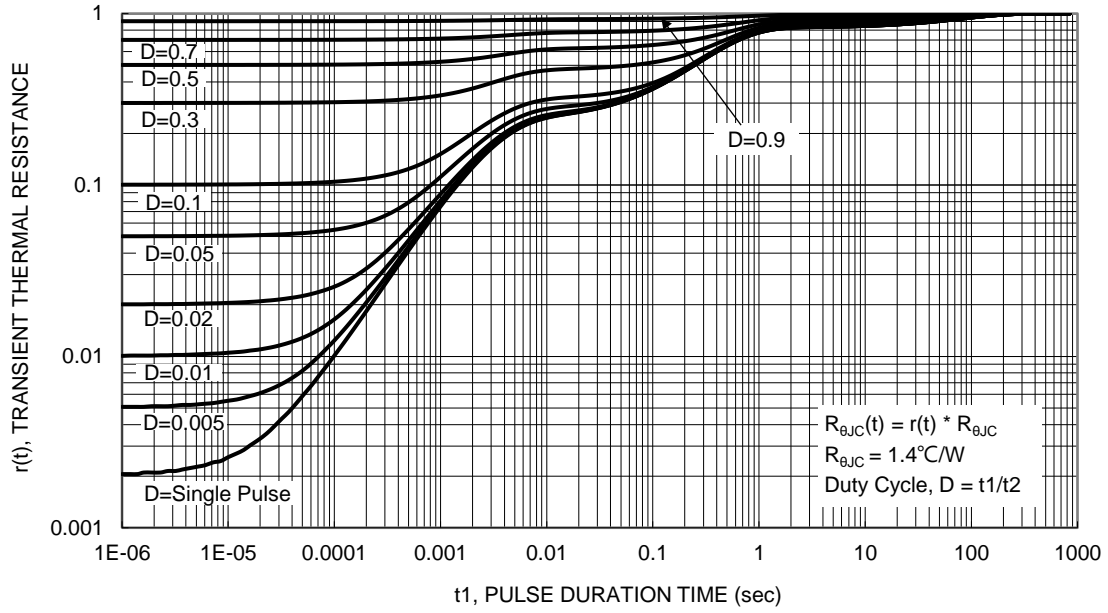


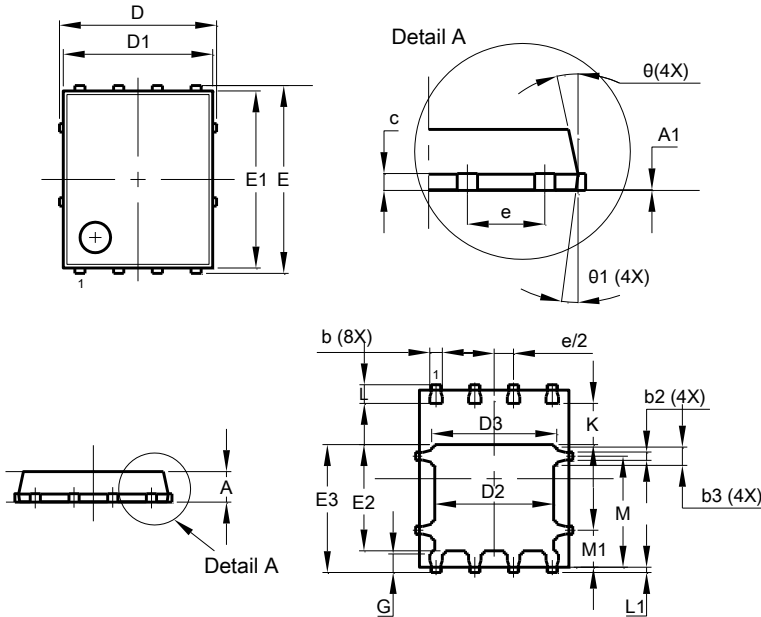
Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

Site 1:

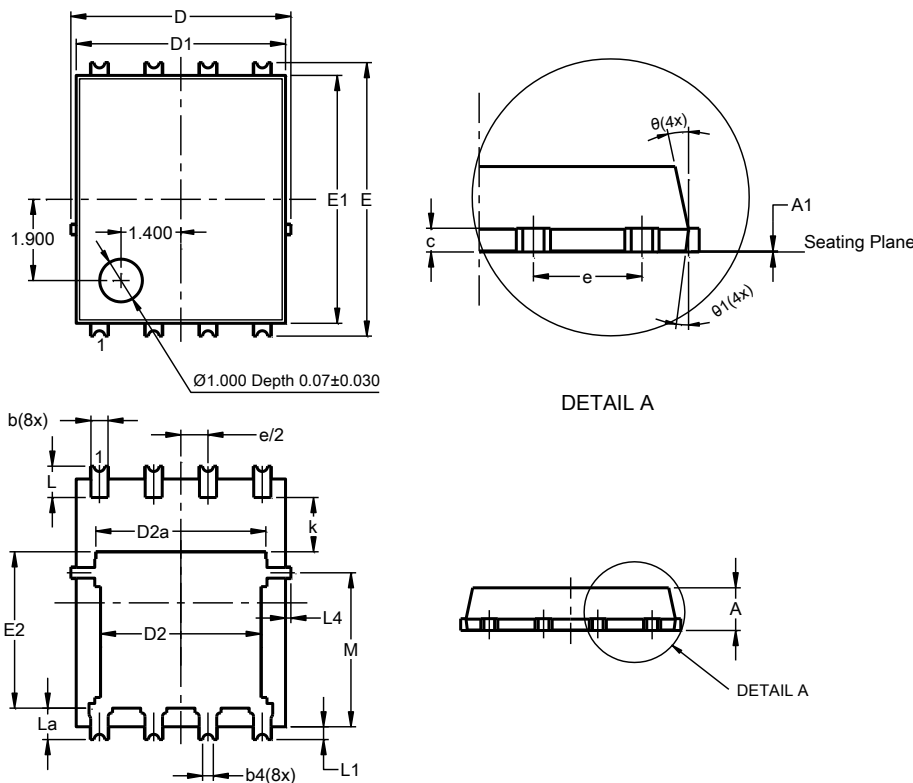
PowerDI5060-8



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
theta	10°	12°	11°
theta1	6°	8°	7°
All Dimensions in mm			

Site 2:

PowerDI5060-8 (SWP) (Type UX)



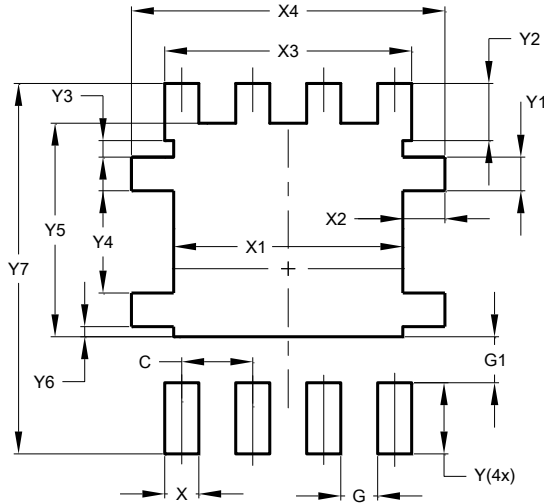
PowerDI5060-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05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

Site 1:

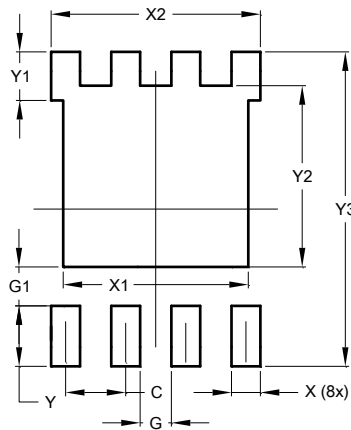
PowerDI5060-8



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	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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