

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _c = +25°C
100V	14.5mΩ @ V _{GS} = 10V	53A
	19.5mΩ @ V _{GS} = 6V	47A

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 notebook battery power management and load switch.

Applications

- Motor controls
- DC-DC converters
- Power managements

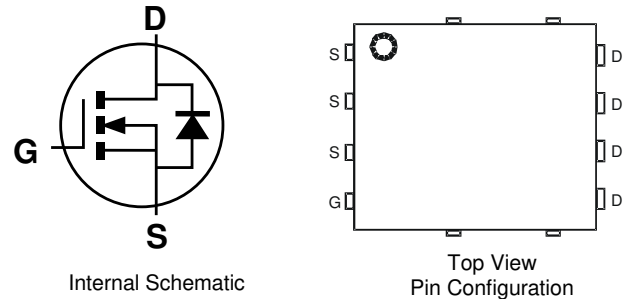
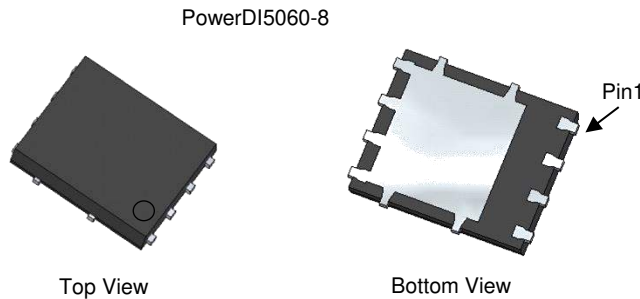
Features

- 100% Unclamped Inductive Switching (UIS) Test in Production—Ensures More Reliable and Robust End Application
- Thermally Efficient Package—Cooler Running 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)**
- **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/>**

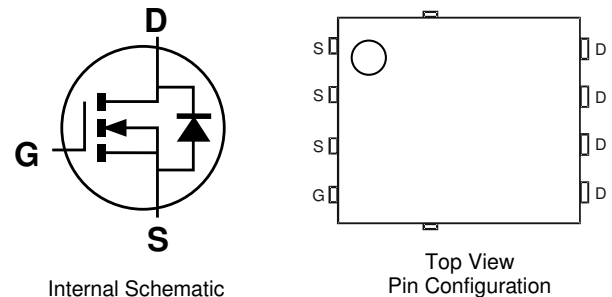
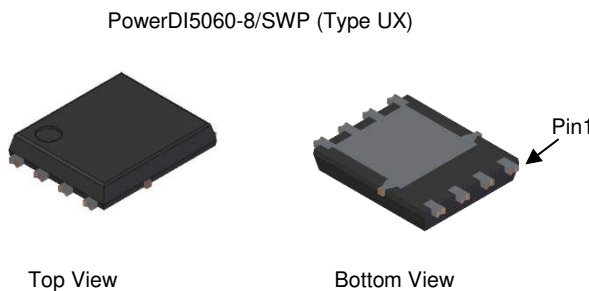
Mechanical Data

- Package: PowerDI[®]5060-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208^③
- Weight: 0.097 grams (Approximate)

Site 1:



Site 2:



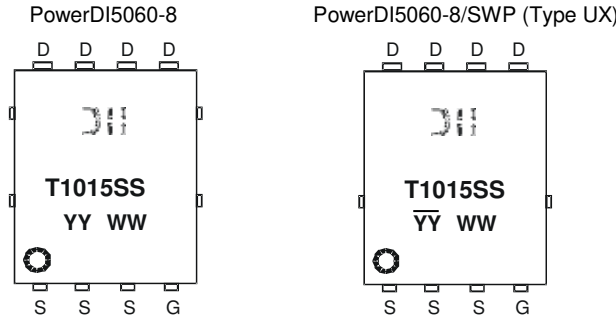
Notes: 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.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

Part Number	Package	Packing	
		Qty.	Carrier
DMT10H015SPS-13	PowerDI5060-8	2,500	Tape & Reel
DMT10H015SPS-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
 T1015SS = Product Type Marking Code
 YYWW or YYWW = Date Code Marking
 YY or YY = Last Two Digits of Year (ex: 23 = 2023)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°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 (Note 6) V _{GS} = 10V	Steady State	T _C = +25°C	53	A
		T _C = +70°C	43	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	120	A	
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	53	A	
Avalanche Current (Note 7), L = 3mH	I _{AS}	7.5	A	
Avalanche Energy (Note 7), L = 3mH	E _{AS}	85	mJ	
Avalanche Current, L = 0.1mH	I _{AS}	15.8	A	
Avalanche Energy, L = 0.1mH	E _{AS}	12.5	mJ	

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	2.3	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	55	°C/W
Total Power Dissipation (Note 6)	P _D	78	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	1.6	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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. Guaranteed by design. Not subject to product testing.

Electrical Characteristics (@T_A = +25°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} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 80V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	2	—	4	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	11.3	14.5	mΩ	V _{GS} = 10V, I _D = 20A
		—	14.7	19.5		V _{GS} = 6V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.9	1.3	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	2343	—	pF	V _{DS} = 50V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	487	—		
Reverse Transfer Capacitance	C _{rss}	—	26	—		
Gate Resistance	R _g	—	0.69	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	30.1	—	nC	V _{DD} = 50V, I _D = 10A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	7.5	—		
Gate-Drain Charge	Q _{gd}	—	6.5	—		
Turn-On Delay Time	t _{D(ON)}	—	9.8	—	ns	V _{DD} = 50V, V _{GS} = 10V, I _D = 10A, R _g = 6Ω
Turn-On Rise Time	t _r	—	7.8	—		
Turn-Off Delay Time	t _{D(OFF)}	—	22.5	—		
Turn-Off Fall Time	t _f	—	9.6	—		
Reverse Recovery Time	t _{RR}	—	43.1	—	ns	I _F = 10A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	65.1	—	nC	

Notes: 7. Guaranteed by design. Not subject to product testing.
8. Short duration pulse test used to minimize self-heating effect.

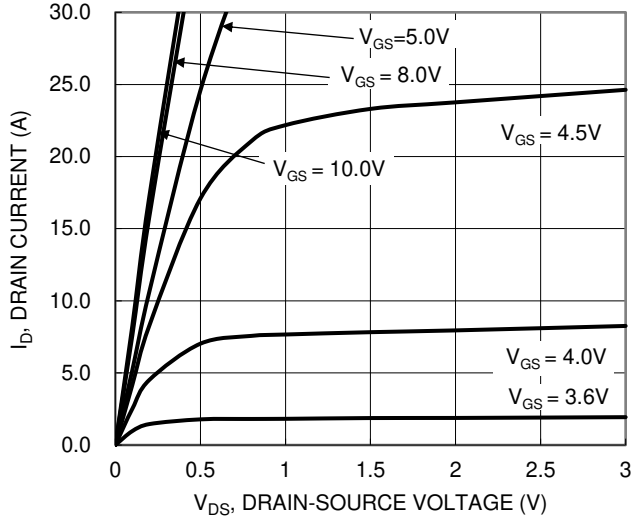


Figure 1. Typical Output Characteristic

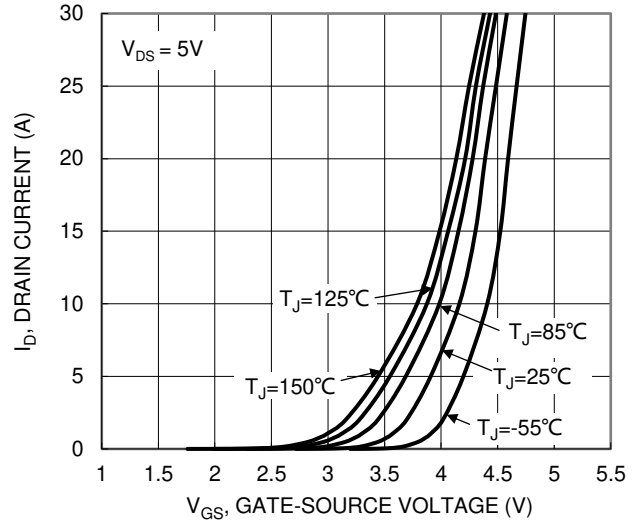


Figure 2. Typical Transfer Characteristic

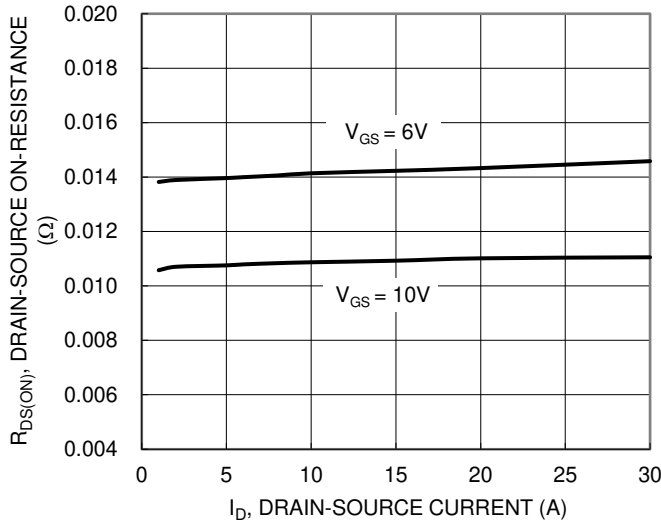


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

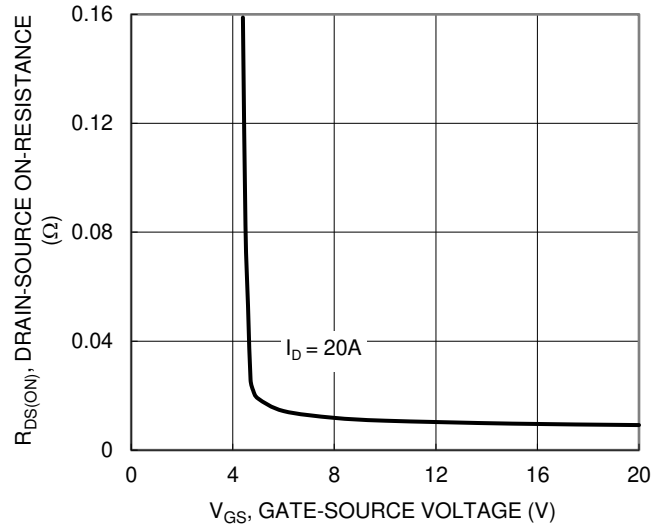


Figure 4. Typical Transfer Characteristic

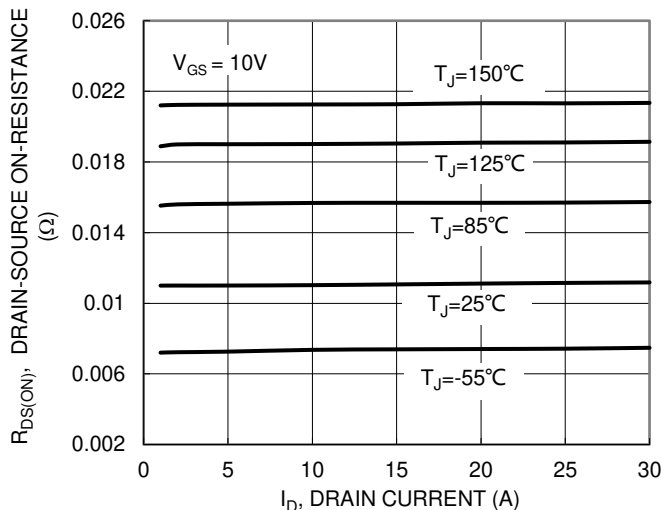


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

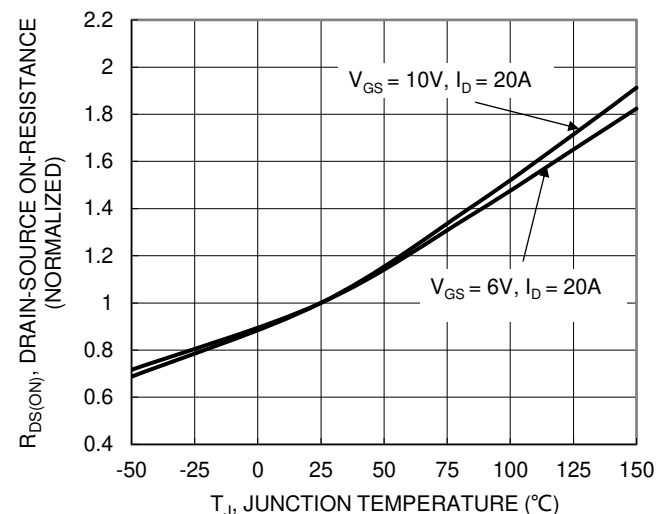
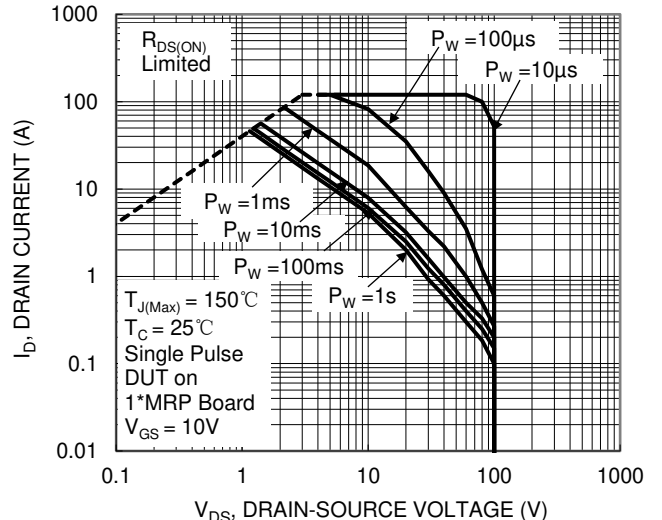
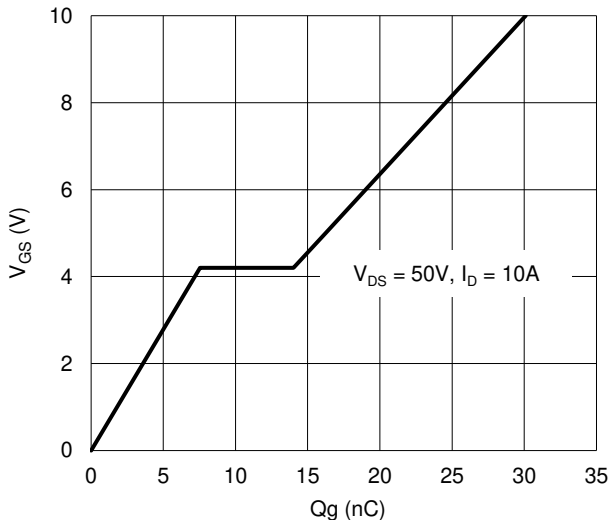
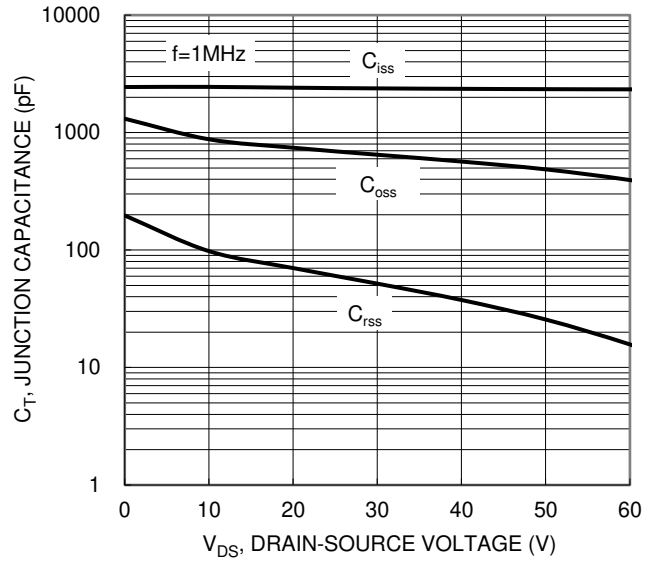
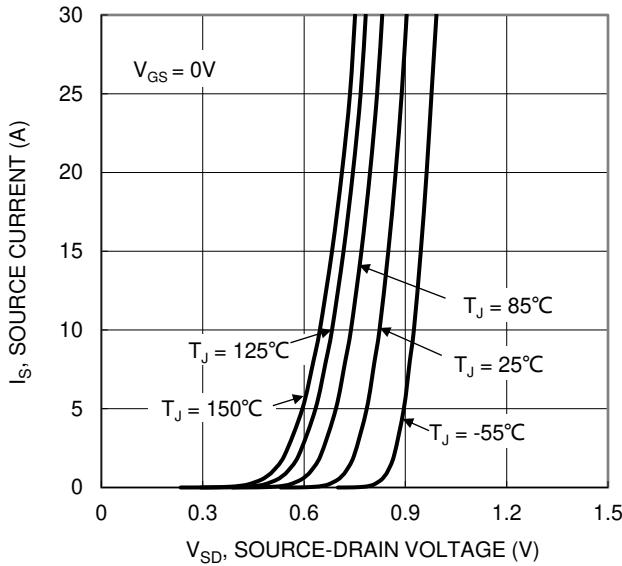
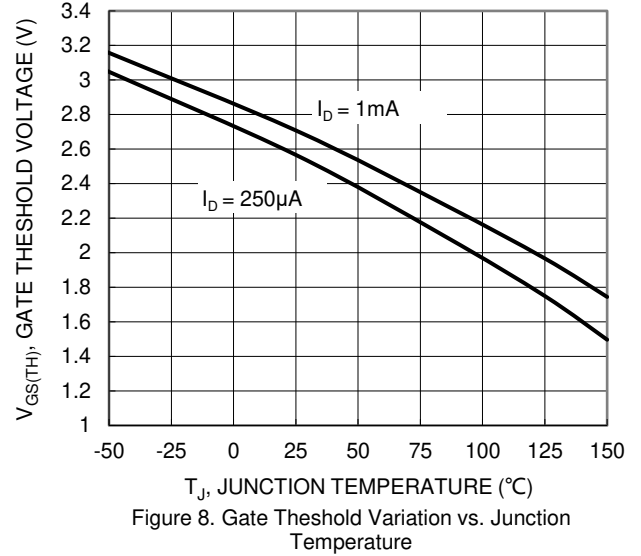
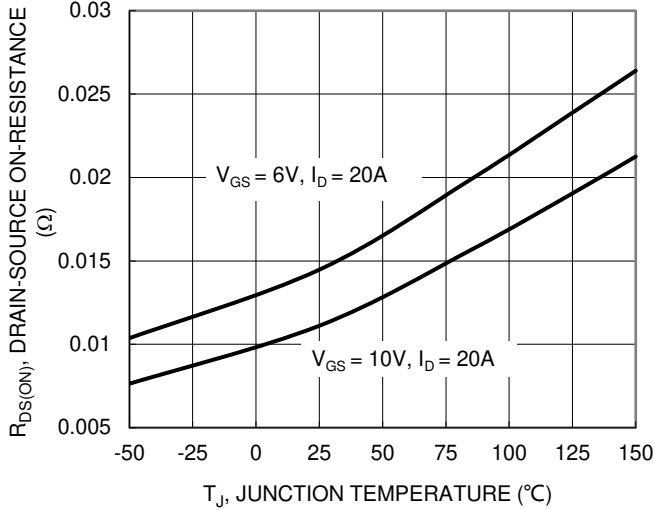


Figure 6. On-Resistance Variation with Temperature



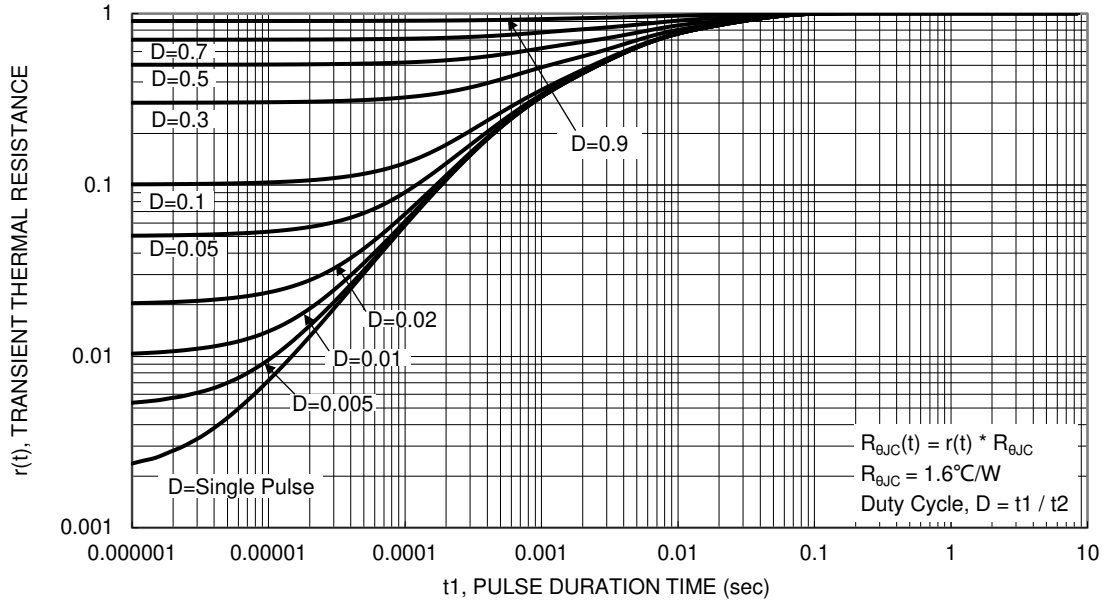


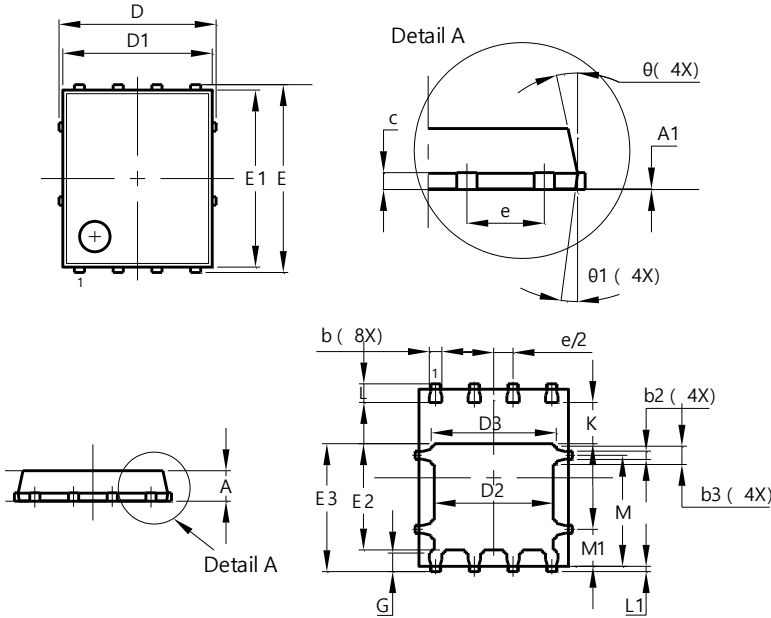
Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

Site 1:

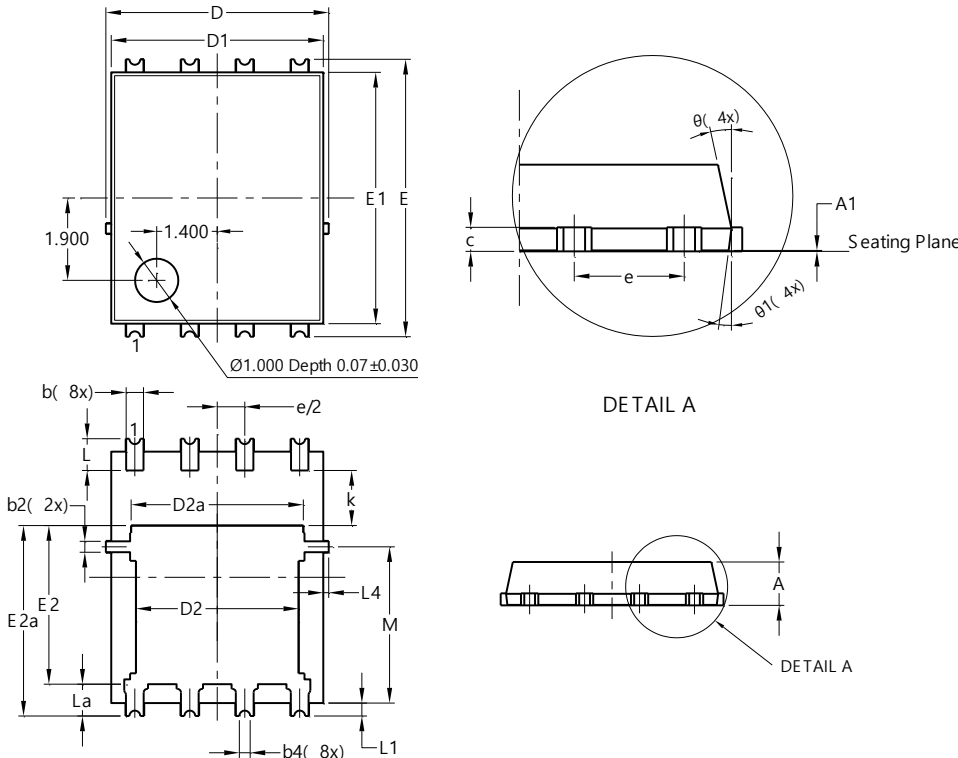
PowerDI5060-8



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°
All Dimensions in mm			

Site 2:

PowerDI5060-8/SWP (Type UX)



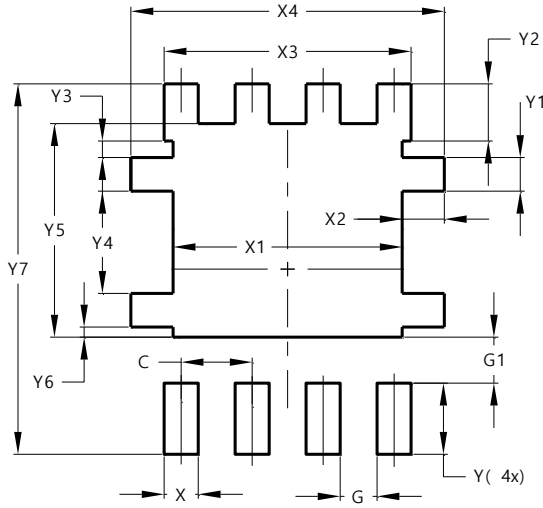
PowerDI5060-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	--	--
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
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.

Site 1:

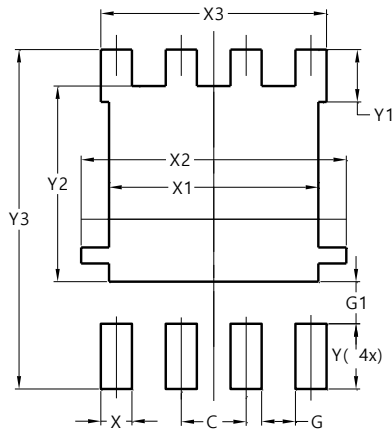
PowerDI5060-8



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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