

## Product Summary

BV <sub>DSS</sub>	R <sub>Ds(ON) MAX</sub>	I <sub>D MAX</sub> T <sub>C</sub> = +25°C
60V	1.5mΩ @ V <sub>GS</sub> = 10V	215A

## Description and Applications

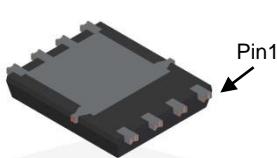
This new generation N-Channel enhancement mode MOSFET is designed to minimize R<sub>Ds(ON)</sub> yet maintain superior switching performance. This device is ideal for use in power management and load switch.

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

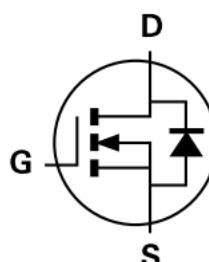
PowerDI5060-8 (SWP) (Standard)



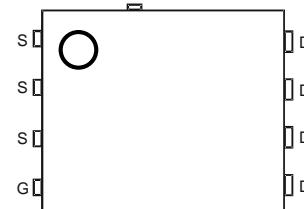
Top View



Bottom View



Internal Schematic



Top View  
Pin Configuration

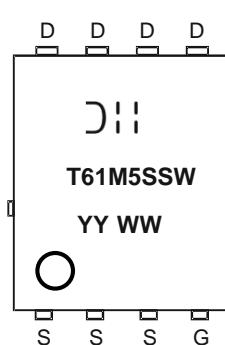
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT61M5SPSW-13	PowerDI5060-8 (SWP) (Standard)	2,500 / Tape & Reel

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 [http://www.diodes.com/quality/lead\\_free/](http://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.
4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



PowerDI5060-8 (SWP) (Standard)

DII = Manufacturer's Marking  
 T61M5SSW = Product Type Marking Code  
 YYWW or YYWW = Date Code Marking  
 YY or YY = Year (ex: 20 = 2020)  
 WW = Week (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	$T_C = +25^\circ\text{C}$	215	A
	$T_C = +70^\circ\text{C}$	170	
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	215	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	860	A
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{SM}$	860	A
Avalanche Current, $L=1\text{mH}$	$I_{AS}$	35.8	A
Avalanche Energy, $L=1\text{mH}$	$E_{AS}$	640.8	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	2.7	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	47	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$P_D$	139	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	0.9	$^\circ\text{C}/\text{W}$
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
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.1	1.5	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 30\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	8306	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	2735	—		
Reverse Transfer Capacitance	$C_{rss}$	—	184	—		
Gate Resistance	$R_g$	—	3.0	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	—	130.6	—	nC	$V_{DS} = 30\text{V}, I_D = 30\text{A}, V_{GS} = 10\text{V}$
Gate-Source Charge	$Q_{gs}$	—	30.4	—		
Gate-Drain Charge	$Q_{gd}$	—	28.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	11.3	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, I_D = 30\text{A}, R_g = 3\Omega$
Turn-On Rise Time	$t_R$	—	28.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	86.2	—		
Turn-Off Fall Time	$t_F$	—	47.6	—	ns	$I_F = 30\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Time	$t_{RR}$	—	70.4	—		
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	127	—	nC	

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. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to product testing.

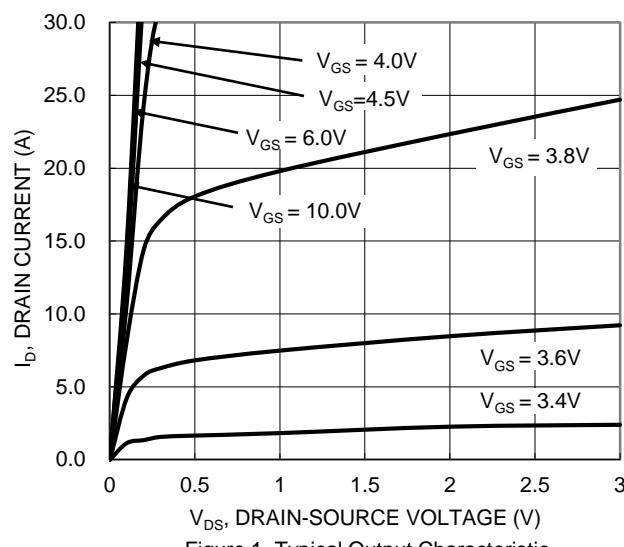


Figure 1. Typical Output Characteristic

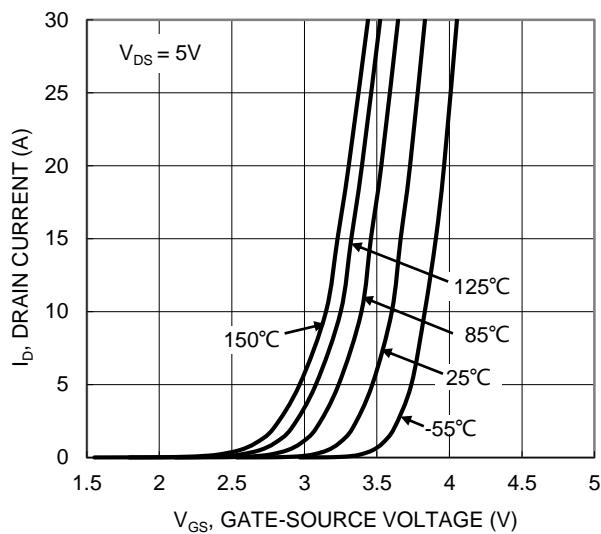


Figure 2. Typical Transfer Characteristic

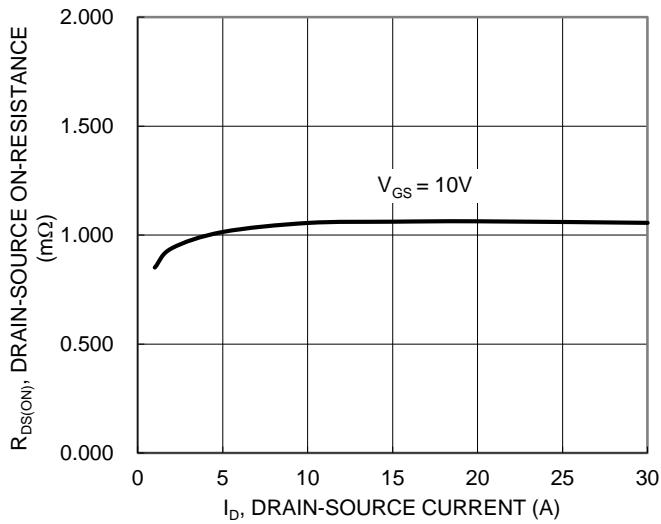


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

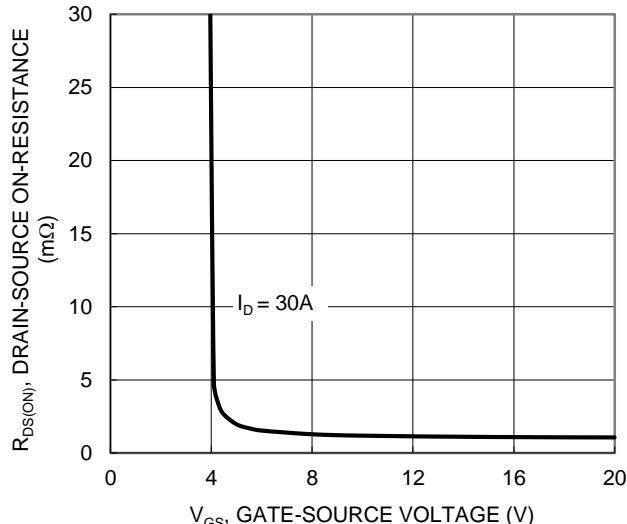


Figure 4. Typical Transfer Characteristic

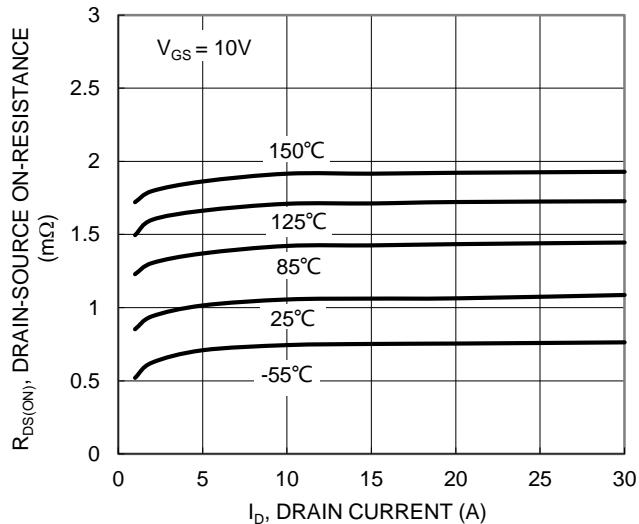


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

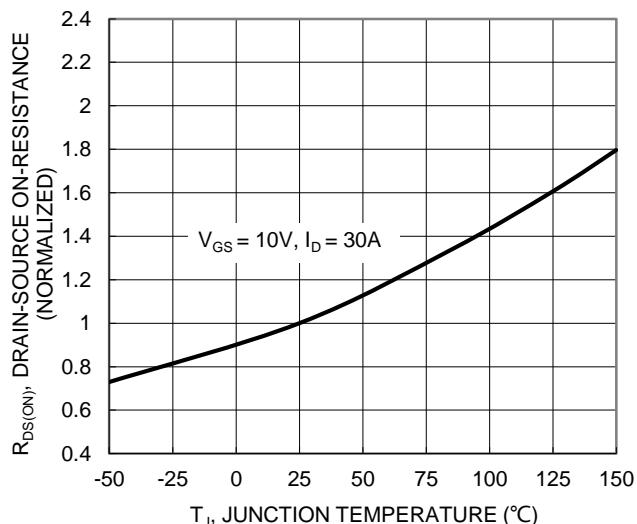
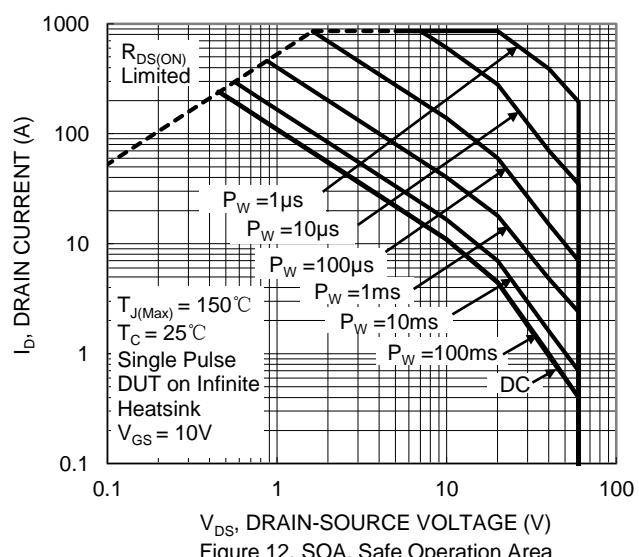
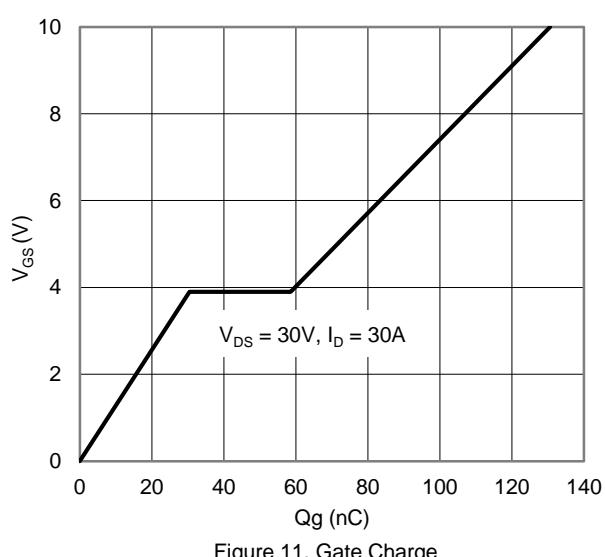
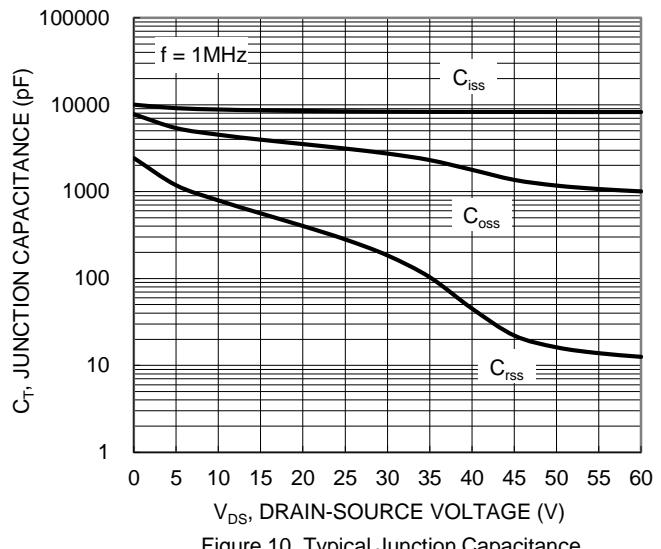
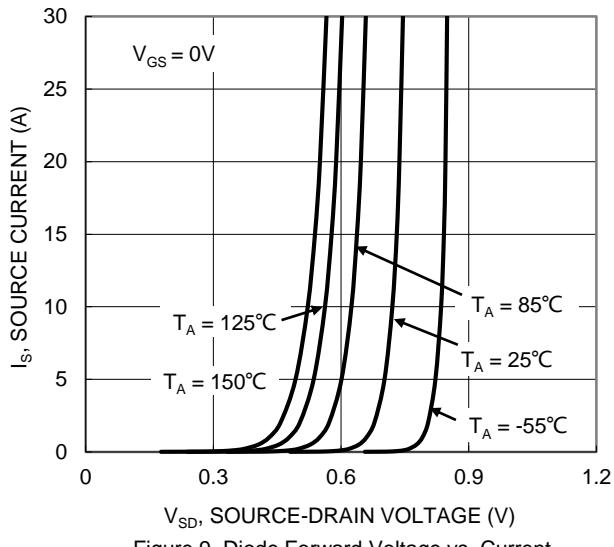
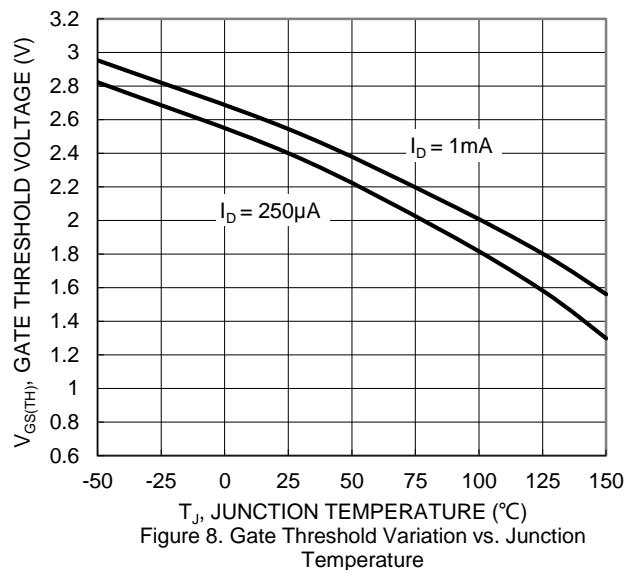
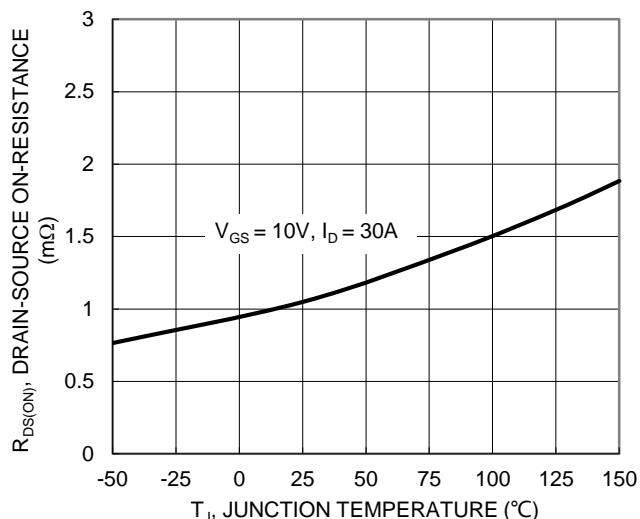


Figure 6. On-Resistance Variation with Temperature



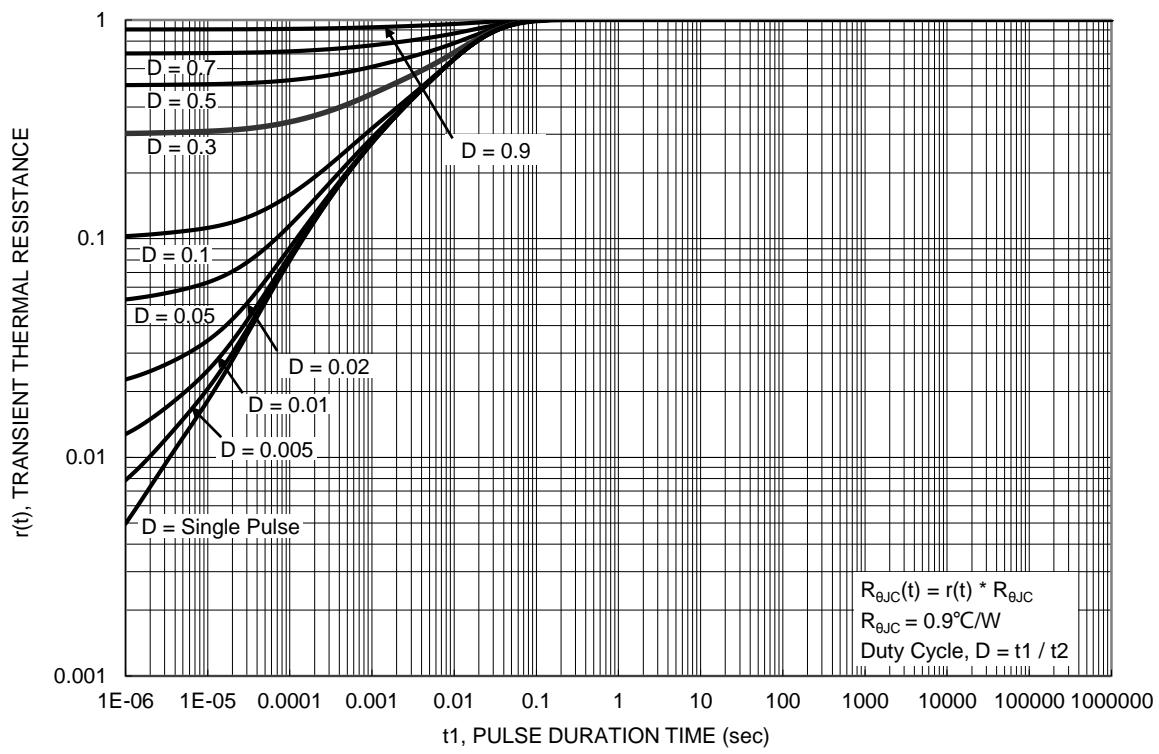
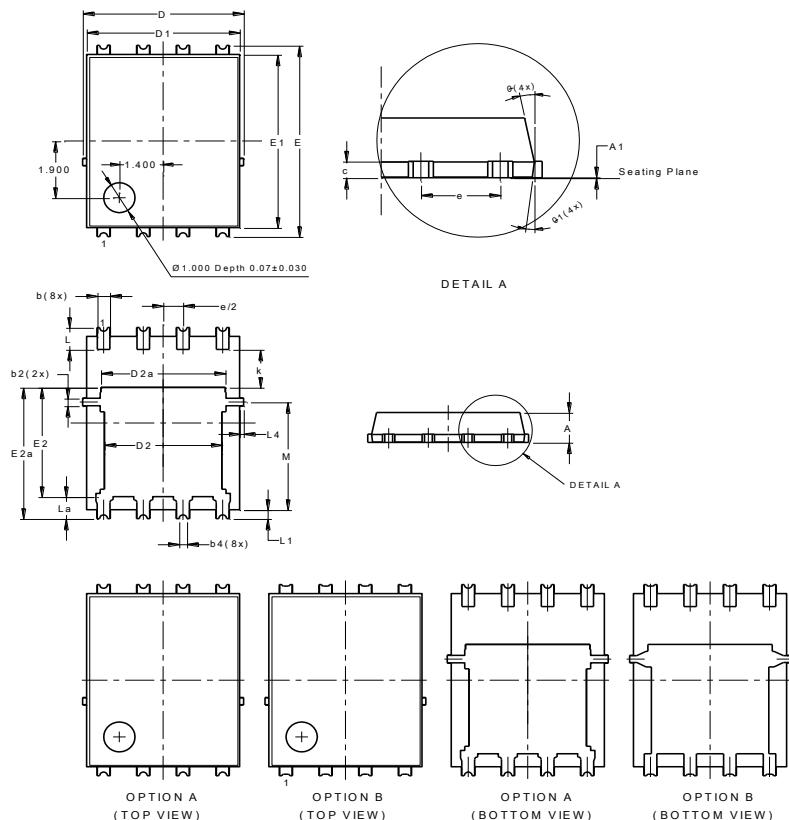


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI5060-8 (SWP) (Standard)

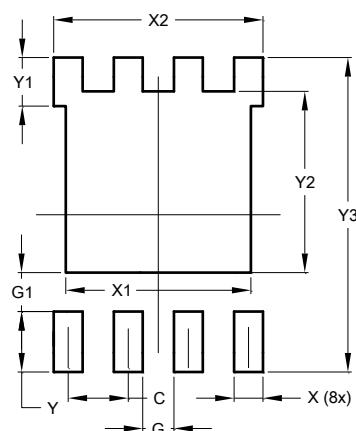


PowerDI5060-8 (SWP) (Standard)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	--
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25	REF	
c	0.230	0.330	0.277
D	5.15	BSC	
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40	BSC	
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27	BSC	
k	1.05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



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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