

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _C = +25°C
30V	1.6mΩ @ V _{GS} = 10V	240A

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 power management and load switch.

Applications

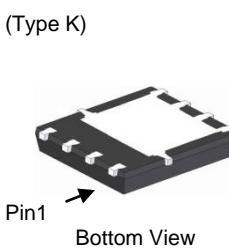
- DC-DC Converters
- Load Switch

Features

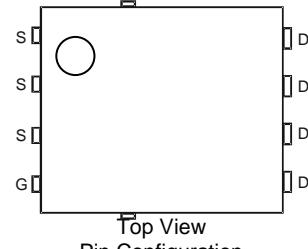
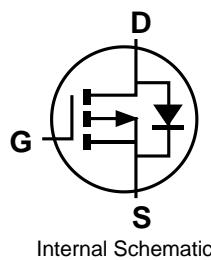
- Thermally Efficient Package – Cooler Running Applications
- <1.1mm Package Profile – Ideal for Thin Applications
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: PowerDI5060-8 (Type K)
- Case 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)



Top View Bottom View



Ordering Information (Note 4)

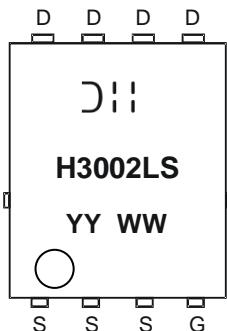
Part Number	Case	Packaging
DMTH3002LPS-13	PowerDI5060-8 (Type K)	2,500/Tape & Reel

Notes:

- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- See http://www.diodes.com/quality/lead_free.html 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 <http://www.diodes.com/products/packages.html>.

Marking Information

PowerDI5060-8 (Type K)



D11 = Manufacturer's Marking
 H3002LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 17 = 2017)
 WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	± 16	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 7)	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	I_D	240 240	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	100	A
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)			I_{DM}	400	A
Pulsed Continuous Body Diode Forward Current (380 μs Pulse, Duty Cycle = 1%)			I_{SM}	400	A
Avalanche Current, $L=3\text{mH}$ (Note 8)			I_{AS}	15	A
Avalanche Energy, $L=3\text{mH}$ (Note 8)			E_{AS}	700	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	103	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	51	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 7)	$T_C = +25^\circ\text{C}$	P_D	136	W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	1.1	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	2	V	$V_{DS} = V_{GS}, I_D = 1\text{mA}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.25	1.6	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 25\text{A}$
		—	2	2.5		$V_{GS} = 4.5\text{V}, I_D = 25\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.1	V	$V_{GS} = 0\text{V}, I_S = 25\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{ISS}	—	5,000	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{OSS}	—	2,660	—		
Reverse Transfer Capacitance	C_{RSS}	—	300	—		
Gate Resistance	R_G	—	0.75	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_G	—	37	—	nC	$V_{DS} = 15\text{V}, I_D = 25\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_G	—	77	—		
Gate-Source Charge	Q_{GS}	—	10	—		
Gate-Drain Charge	Q_{GD}	—	14	—		
Turn-On Delay Time	$t_{D(ON)}$	—	21	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 4.5\text{V}, I_D = 25\text{A}, R_G = 4.7\Omega$
Turn-On Rise Time	t_R	—	45	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	32	—		
Turn-Off Fall Time	t_F	—	26	—	nC	$I_S = 15\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Time	t_{RR}	—	44	—		
Body Diode Reverse Recovery Charge	Q_{RR}	—	52	—		

Notes:

- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
- Thermal resistance from junction to soldering point (on the exposed drain pad).
- I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to product testing.

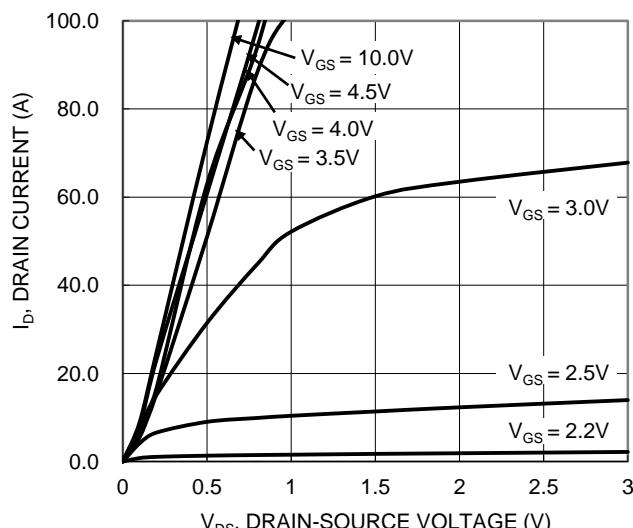


Figure 1. Typical Output Characteristic

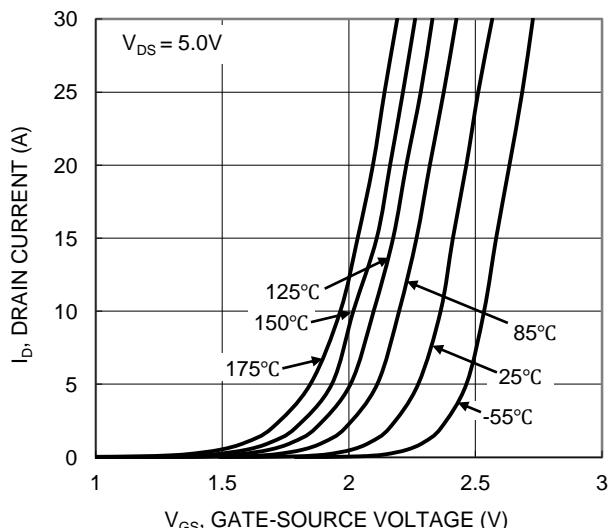


Figure 2. Typical Transfer Characteristic

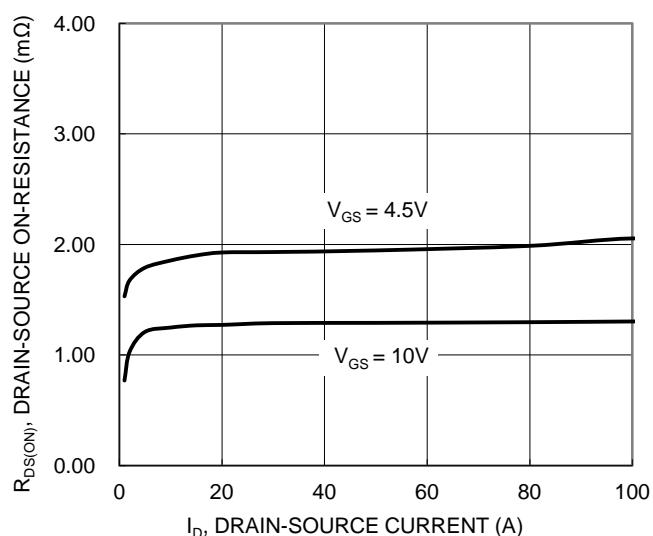


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

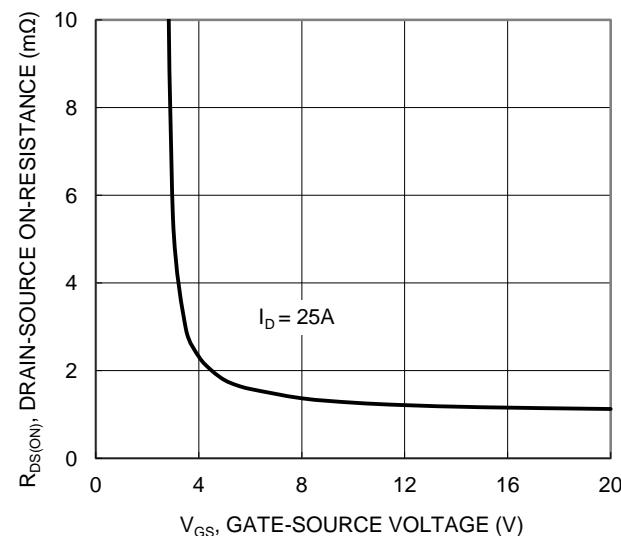


Figure 4. Typical Transfer Characteristic

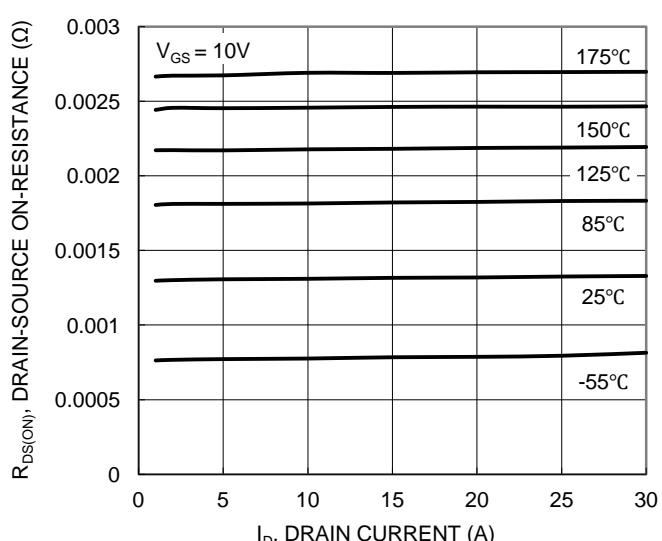


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

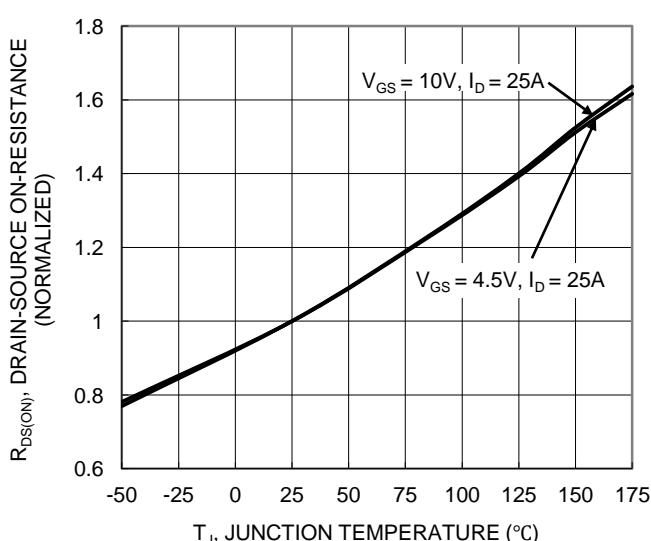
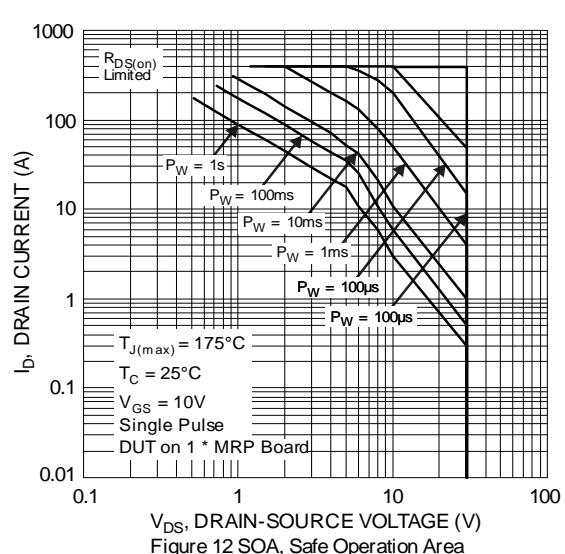
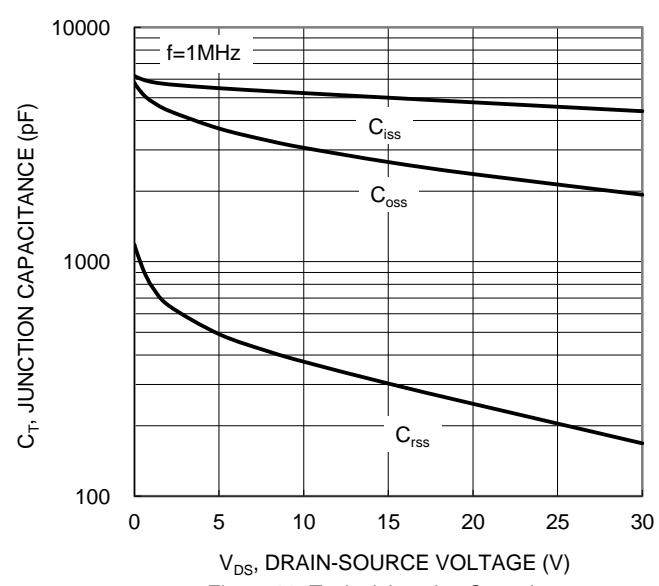
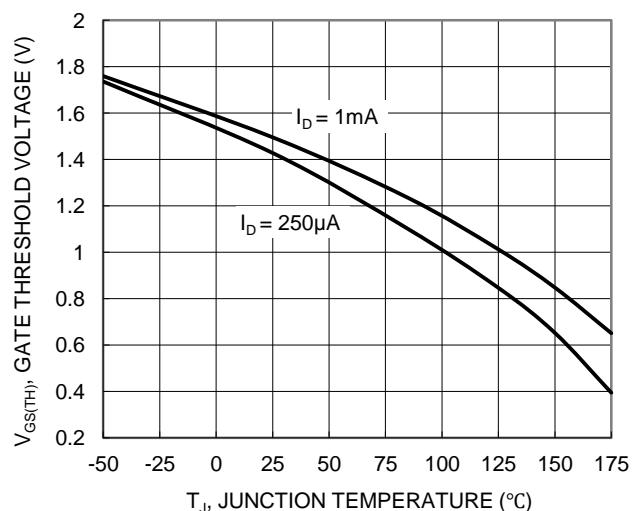
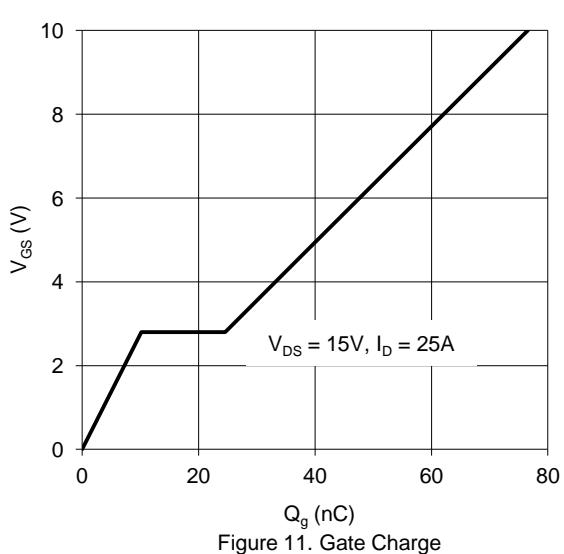
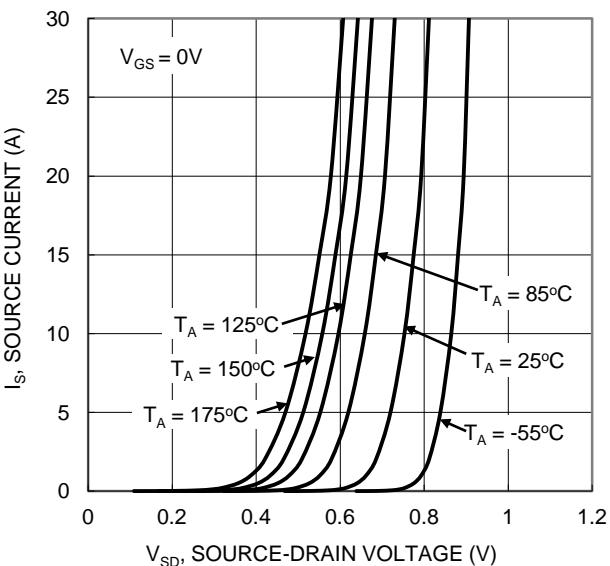
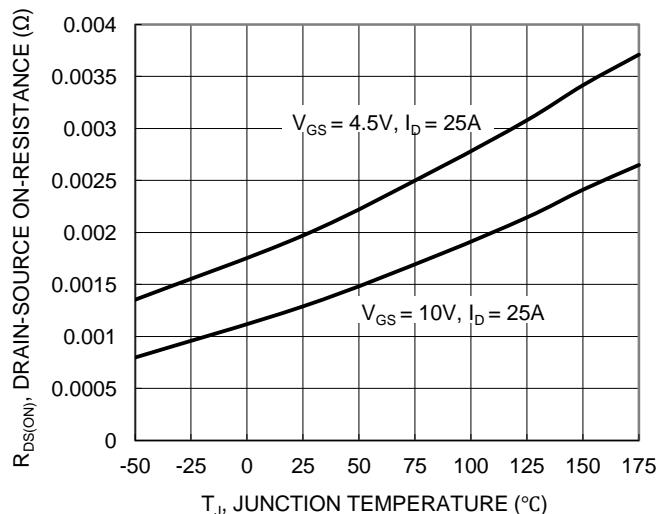


Figure 6. On-Resistance Variation with Temperature



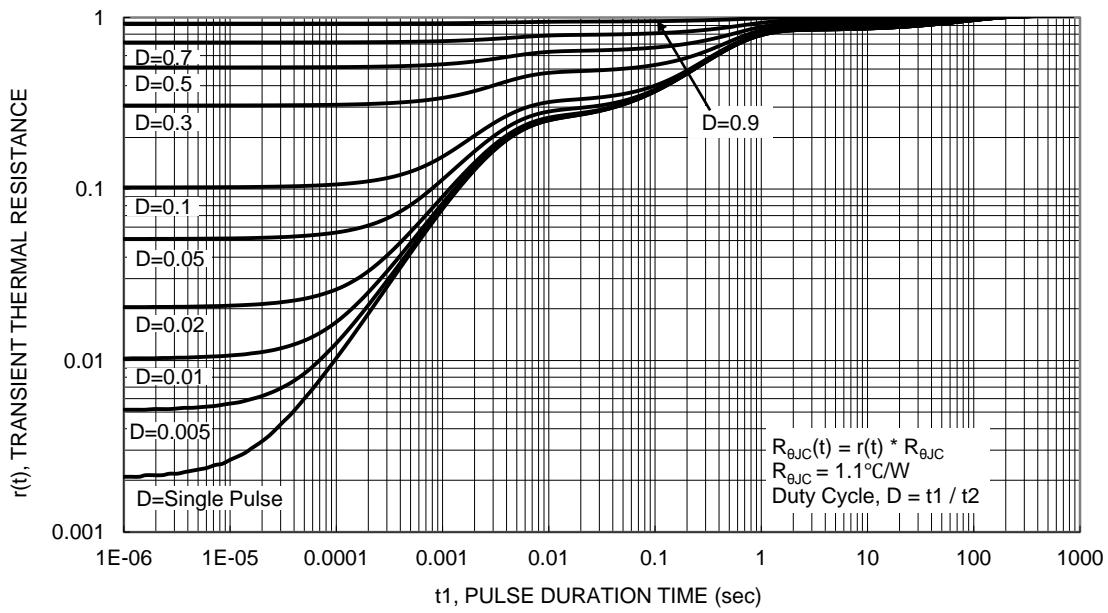
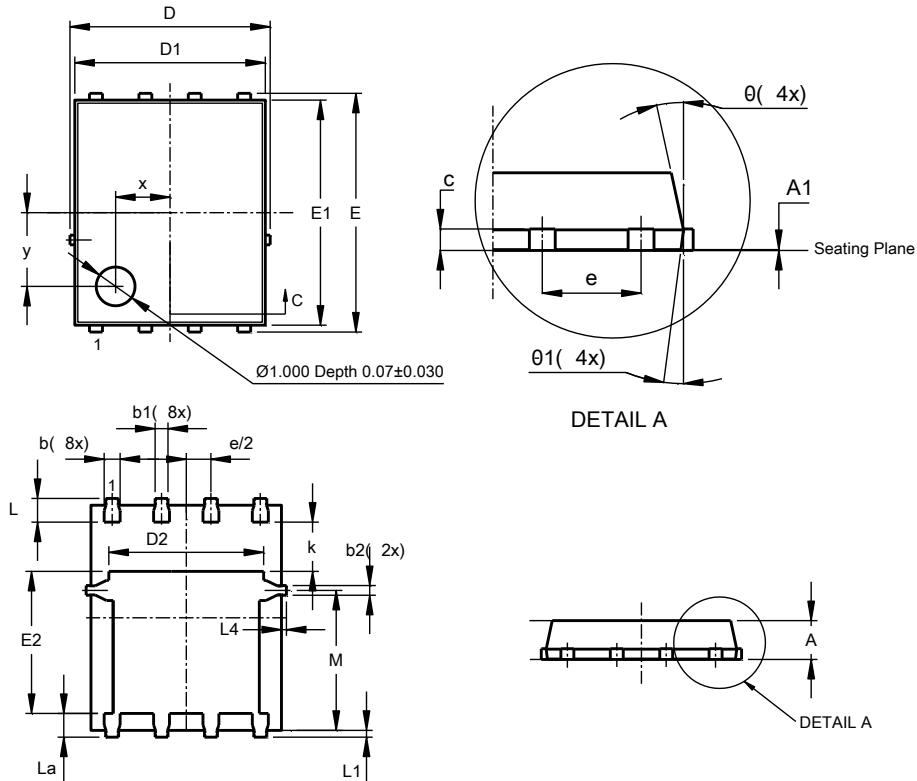


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (Type K)

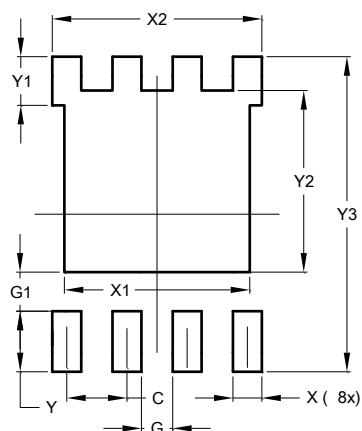


PowerDI5060-8 (Type K)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.725	3.66
E	1.27BSC		
k	-	-	1.27
L	0.51	0.71	0.61
La	0.51	0.675	0.61
L1	0.05	0.20	0.175
L4	-	-	0.125
M	3.50	3.71	3.605
x	-	-	1.400
y	-	-	1.900
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 (Type K)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	3.910
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610

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