

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
40V	1.2mΩ @ V _{GS} = 10V	225A

Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 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
- <1.1mm Package Profile – Ideal for Thin Applications
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- An automotive-compliant part is available under separate datasheet ([DMTH41M2SPSQ](#))**

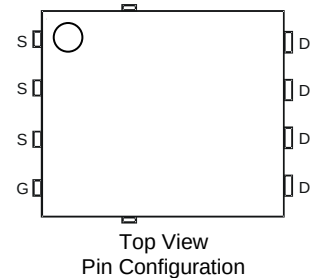
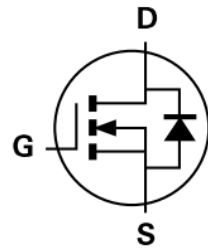
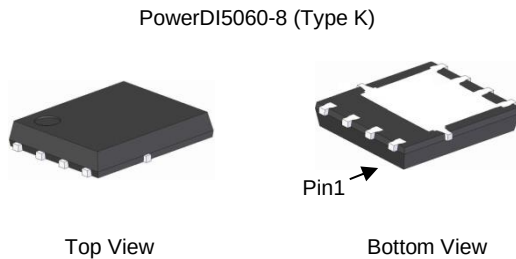
Description and Applications

This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Engine management systems
- Body control electronics
- DC-DC converters

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 ⁽³⁾
- Weight: 0.097 grams (Approximate)



Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH41M2SPS-13	PowerDI5060-8 (Type K)	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/>.

Marking Information



TH41M2SS = Manufacturer's Marking
TH41M2SS = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 24 = 2024)
WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	225	A
		160	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	900	A
Continuous Body Diode Forward Current (Note 6)	I _S	200	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	900	A
Avalanche Current, L = 0.1mH	I _{AS}	73	A
Avalanche Energy, L = 0.1mH	E _{AS}	266	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	3.4	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	44	°C/W
Total Power Dissipation (Note 6)	P _D	158	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	0.9	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	40	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 32V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	2	—	4	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	0.9	1.2	mΩ	V _{GS} = 10V, I _D = 30A
Diode Forward Voltage	V _{SD}	—	0.76	1.3	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	11085	—	pF	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	2793	—		
Reverse Transfer Capacitance	C _{rss}	—	163	—		
Gate Resistance	R _g	—	3.64	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	138	—	nC	V _{DD} = 20V, I _D = 50A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	53	—		
Gate-Drain Charge	Q _{gd}	—	10	—		
Turn-On Delay Time	t _{D(ON)}	—	14	—	ns	V _{DD} = 20V, V _{GS} = 10V, I _D = 50A, R _g = 2.5Ω
Turn-On Rise Time	t _r	—	19	—		
Turn-Off Delay Time	t _{D(OFF)}	—	90	—		
Turn-Off Fall Time	t _f	—	36	—	ns	I _f = 15A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	60	—		
Reverse Recovery Charge	Q _{RR}	—	90	—	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.

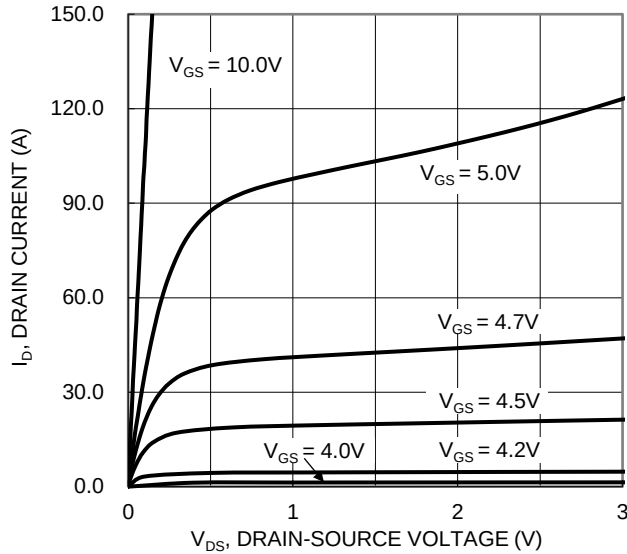


Figure 1. Typical Output Characteristic

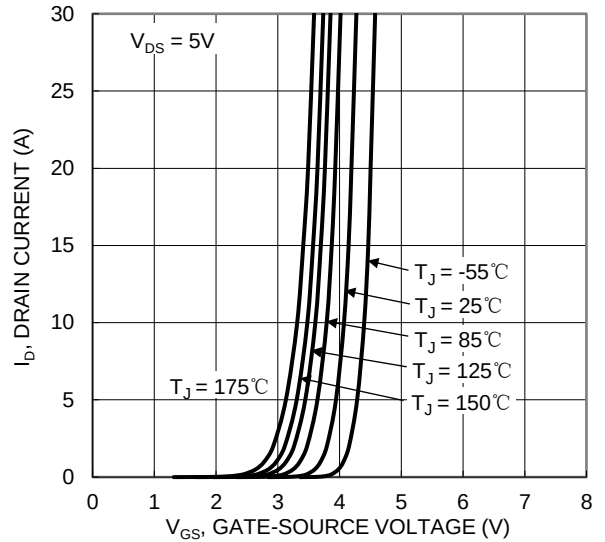


Figure 2. Typical Transfer Characteristic

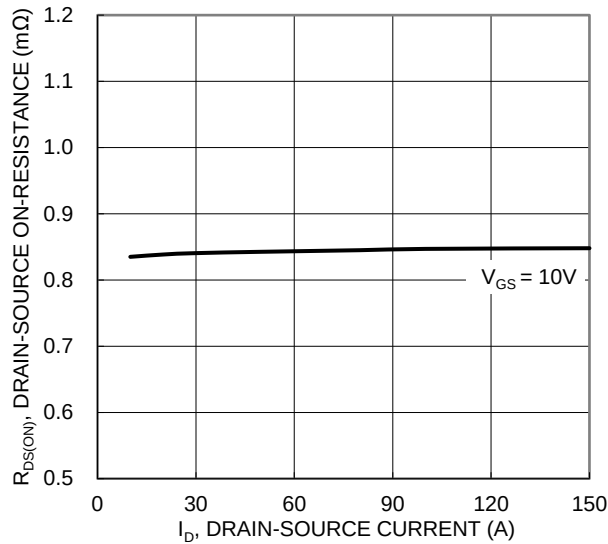


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

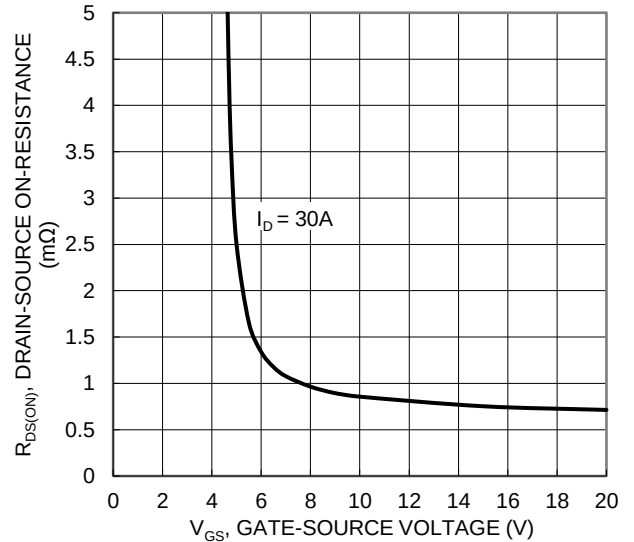


Figure 4. Typical Transfer Characteristic

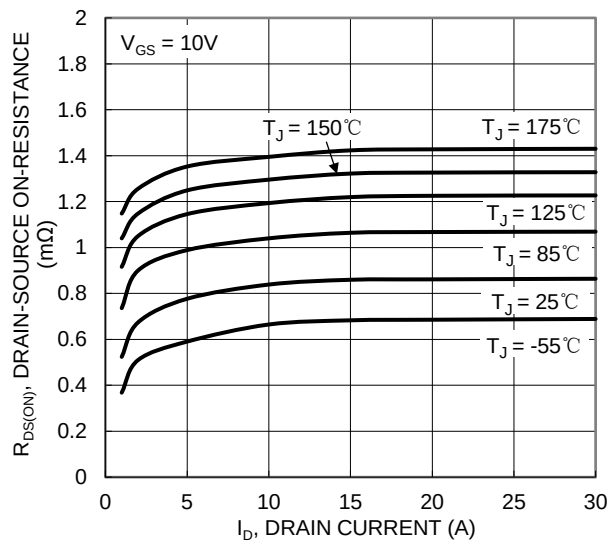


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

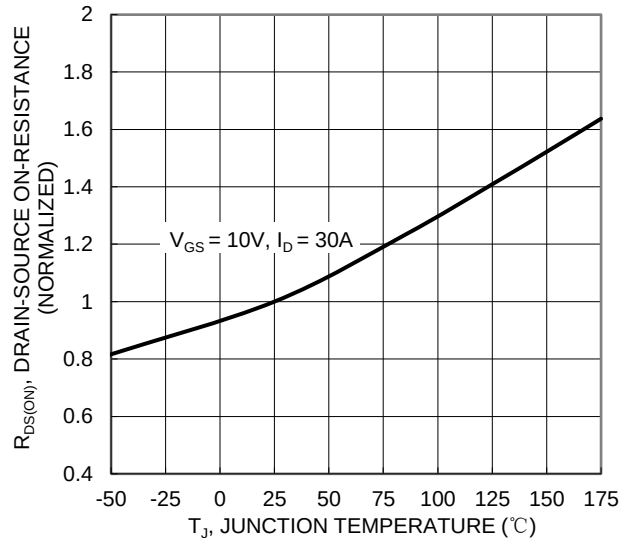
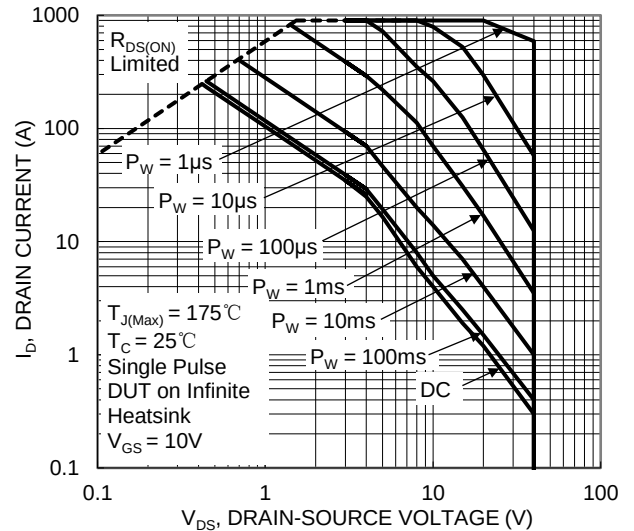
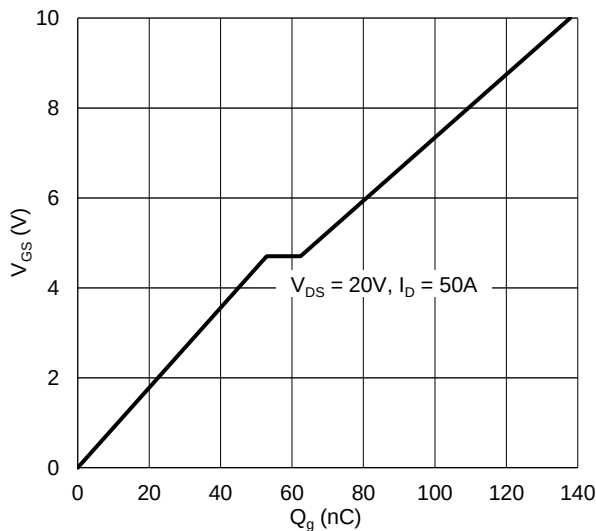
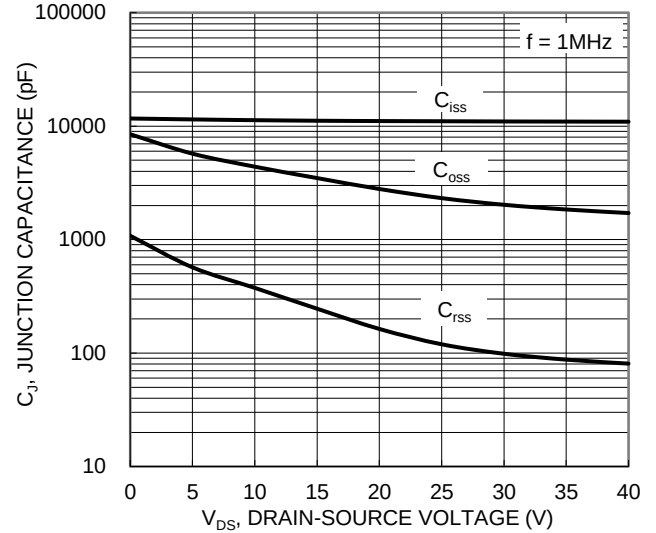
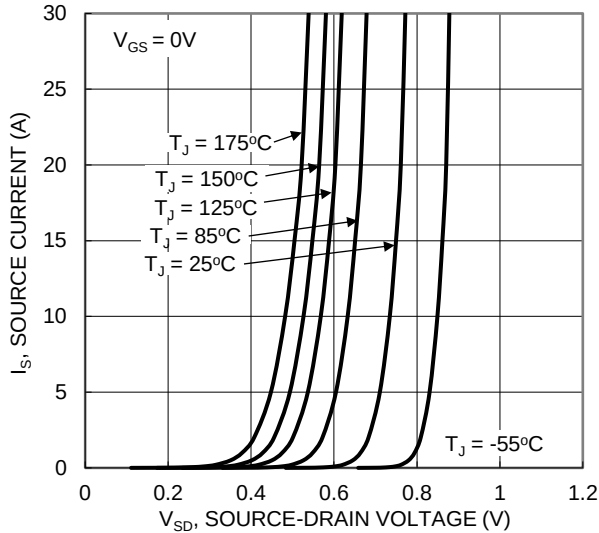
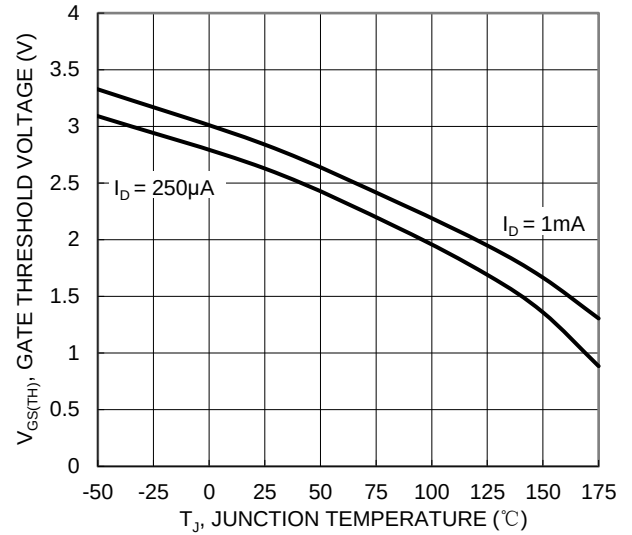
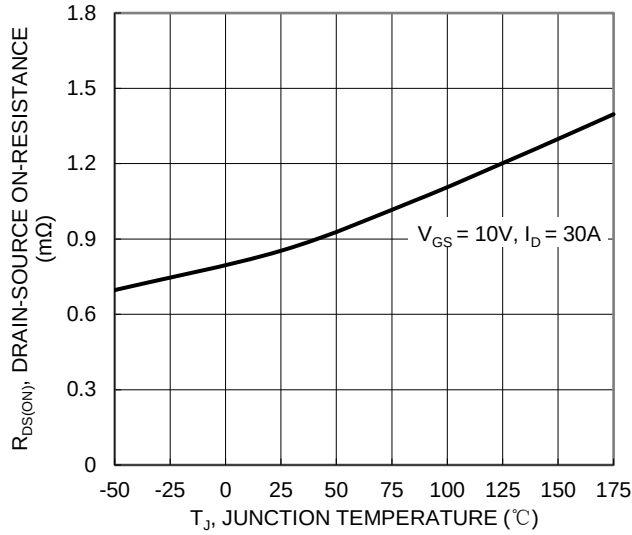


Figure 6. On-Resistance Variation with Temperature



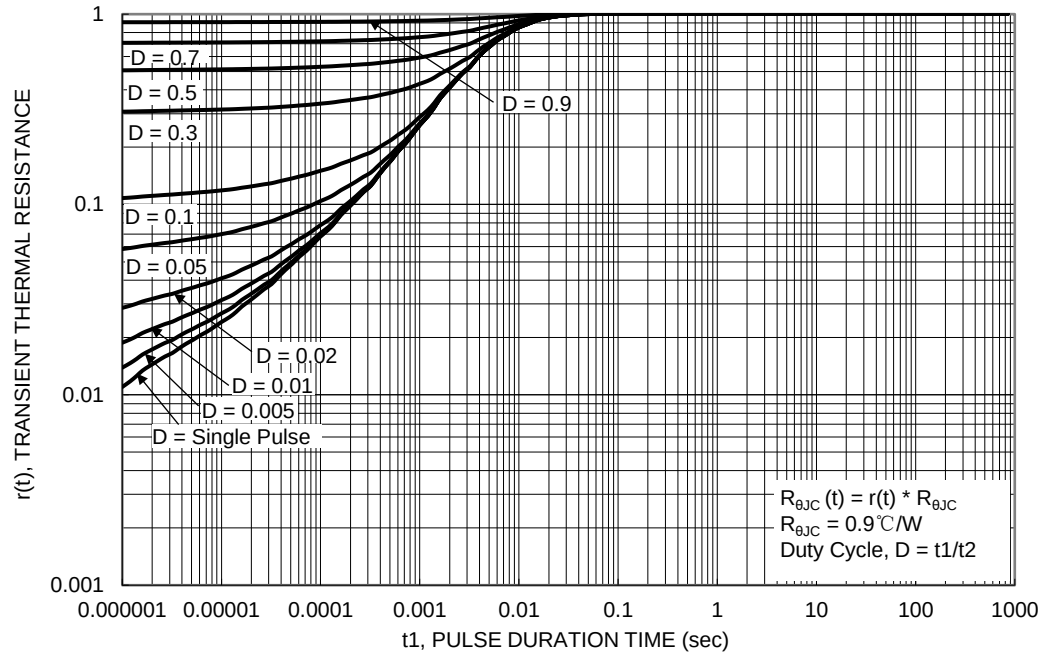
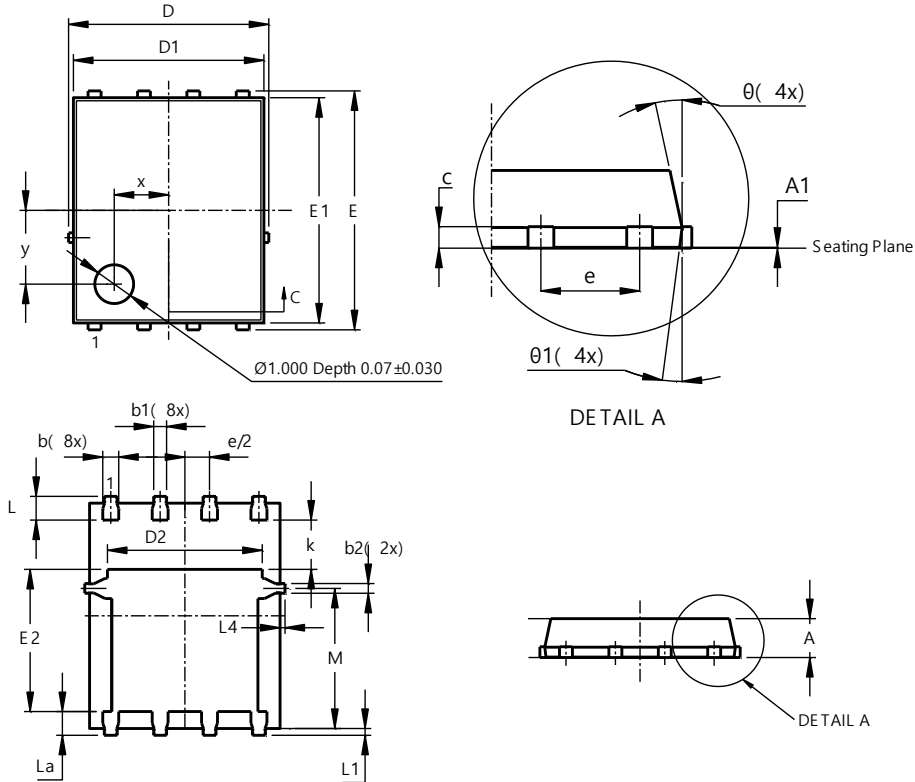


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (Type K)

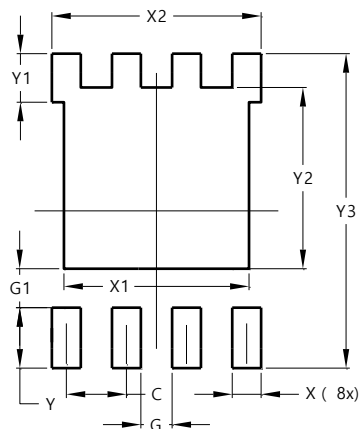


PowerDI5060-8 (Type K)			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.725	3.66
e	1.27BSC		
k	-	-	1.27
L	0.51	0.71	0.61
La	0.51	0.675	0.61
L1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