DMTH3002LPS-13 Datasheet

https://www.DiGi-Electronics.com

DiGi Electronics Part Number	DMTH3002LPS-13-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DMTH3002LPS-13
Description	MOSFET N-CH 30V 100A PWRDI5060-8
Detailed Description	N-Channel 30 V 100A (Tc) 1.2W (Ta), 136W (Tc) Surface Mount PowerDI5060-8

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
DMTH3002LPS-13	Diodes Incorporated
Series:	Product Status:
-	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
30 V	100A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
4.5V, 10V	1.6mOhm @ 25A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
2V @ 1mA	77 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±16V	5000 pF @ 15 V
FET Feature:	Power Dissipation (Max):
-	1.2W (Ta), 136W (Tc)
Operating Temperature:	Grade:
-55°C ~ 175°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q101	Surface Mount
Supplier Device Package:	Package / Case:
PowerDI5060-8	8-PowerTDFN
Base Product Number:	
DMTH3002	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

Green

DMTH3002LPS

30V +175°C N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI

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.

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**

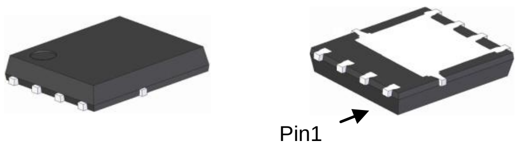
Applications

- DC-DC Converters
- Load Switch

Mechanical Data

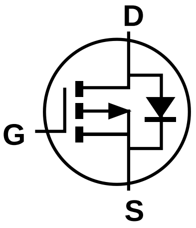
- Case: PowerDI5060-8 (Type K)
- Case Material: Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 ⓔ3
- Weight: 0.097 grams (Approximate)

PowerDI5060-8 (Type K)

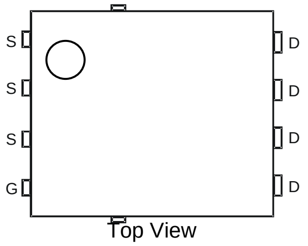


Top View

Bottom View



Internal Schematic



Top View
Pin Configuration

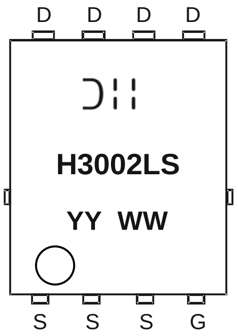
Ordering Information (Note 4)

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

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. 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.
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 http://www.diodes.com/products/packages.html.

Marking Information

PowerDI5060-8 (Type K)



⊃¦¦= 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)

PowerDI is a registered trademark of Diodes Incorporated.

Maximum Ratings (@T_C = +25°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} = 10V (Note 7)	Steady State	T_C = +25°C T_C = +100°C	I_D	240 240	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	100	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I_{DM}	400	A
Pulsed Continuous Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)			I_{SM}	400	A
Avalanche Current, L=3mH (Note 8)			I_{AS}	15	A
Avalanche Energy, L=3mH (Note 8)			E_{AS}	700	mJ

Thermal Characteristics (@T_C = +25°C, unless otherwise specified.)

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

Electrical Characteristics (@T_C = +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} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	2	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.25	1.6	mΩ	V_{GS} = 10V, I_D = 25A
		—	2	2.5		V_{GS} = 4.5V, I_D = 25A
Diode Forward Voltage	V_{SD}	—	0.8	1.1	V	V_{GS} = 0V, I_S = 25A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{ISS}	—	5,000	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{OSS}	—	2,660	—		
Reverse Transfer Capacitance	C_{RSS}	—	300	—		
Gate Resistance	R_G	—	0.75	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_G	—	37	—	nC	V_{DS} = 15V, I_D = 25A
Total Gate Charge (V_{GS} = 10V)	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} = 15V, V_{GS} = 4.5V, I_D = 25A, R_G = 4.7Ω
Turn-On Rise Time	t_R	—	45	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	32	—		
Turn-Off Fall Time	t_F	—	26	—		
Body Diode Reverse Recovery Time	t_{RR}	—	44	—	ns	I_S = 15A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	52	—	nC	

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

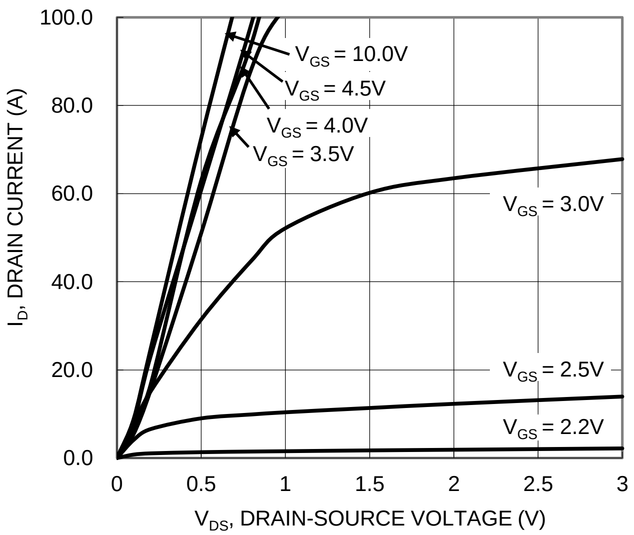


Figure 1. Typical Output Characteristic

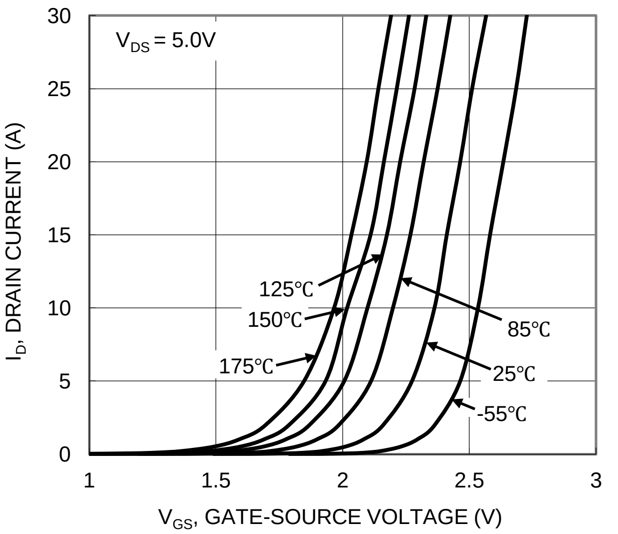


Figure 2. Typical Transfer Characteristic

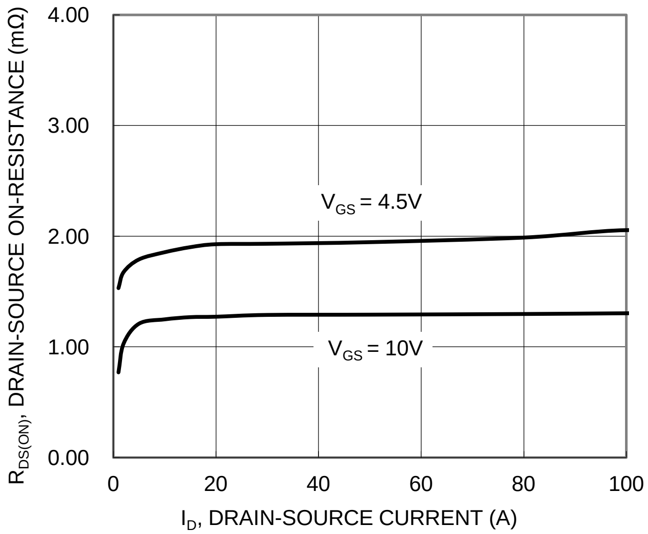


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

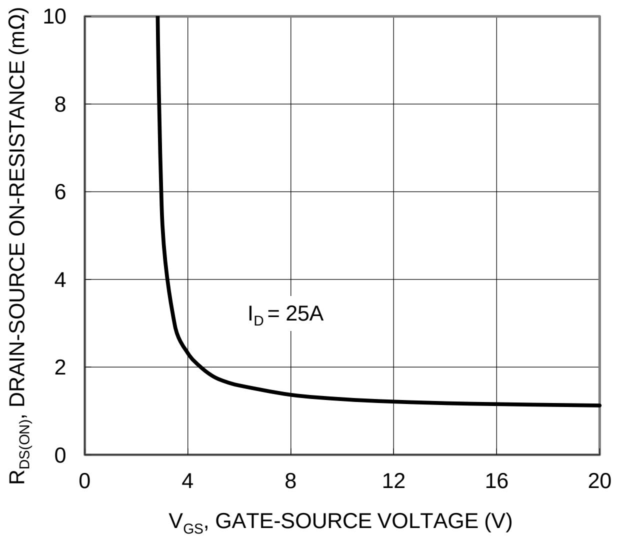


Figure 4. Typical Transfer Characteristic

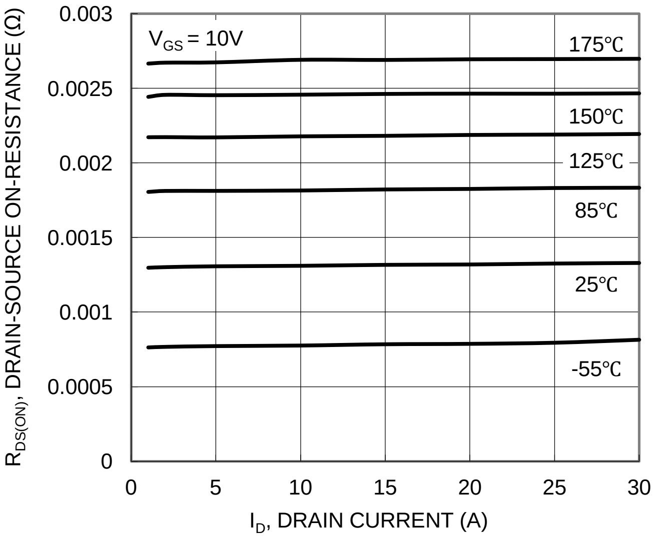


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

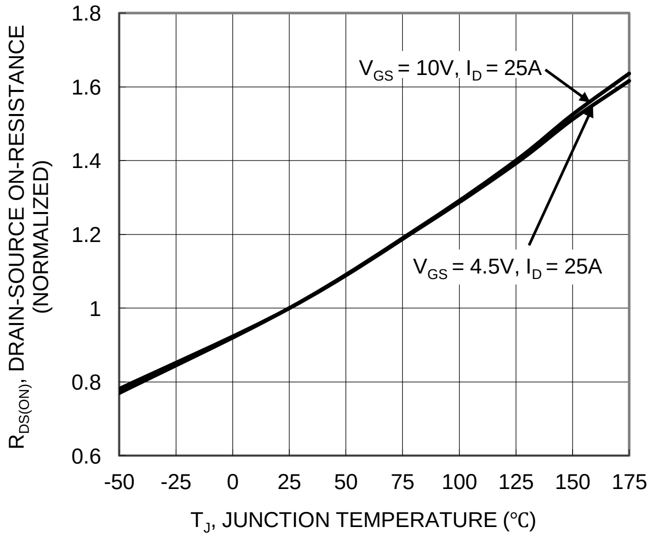


Figure 6. On-Resistance Variation with Temperature

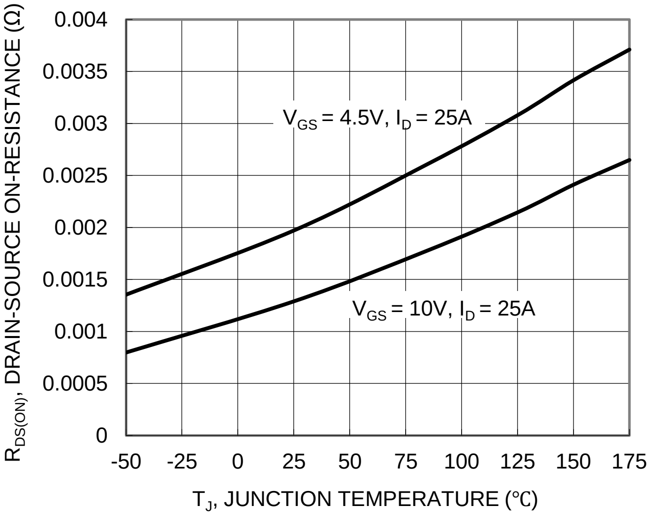


Figure 7. On-Resistance Variation with Temperature

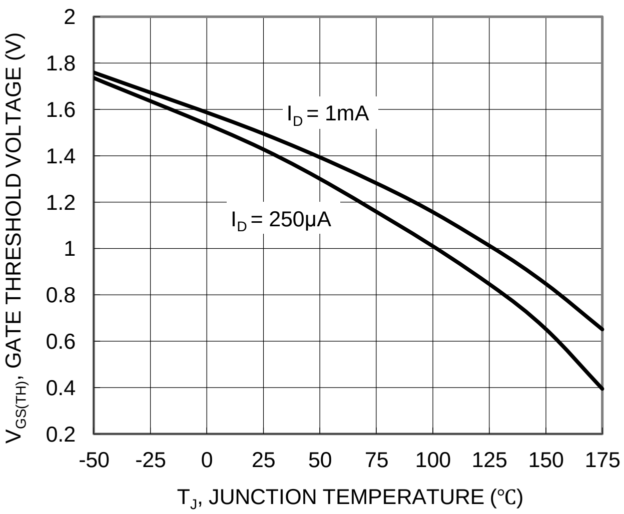


Figure 8. Gate Threshold Variation vs. JunctionTemperature

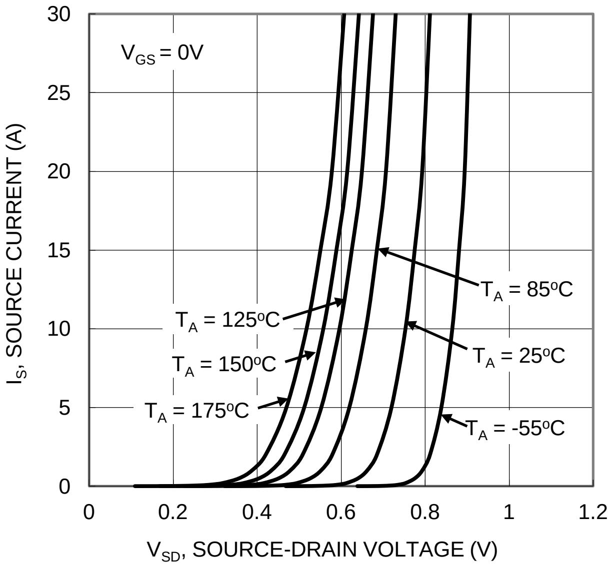


Figure 9. Diode Forward Voltage vs. Current

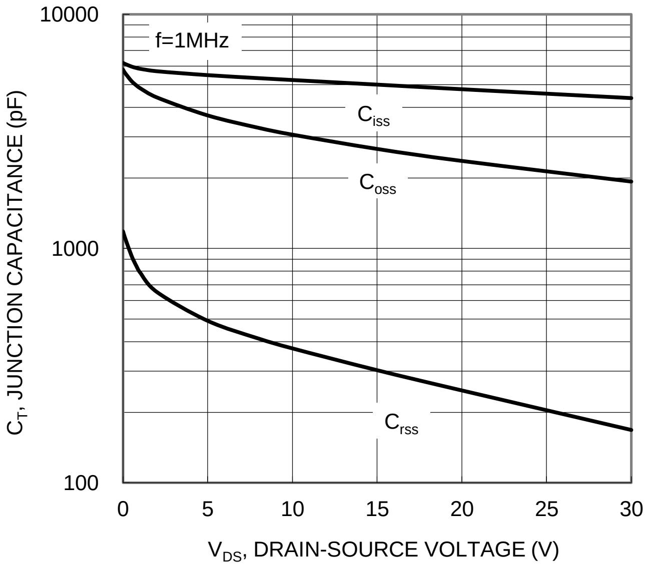


Figure 10. Typical Junction Capacitance

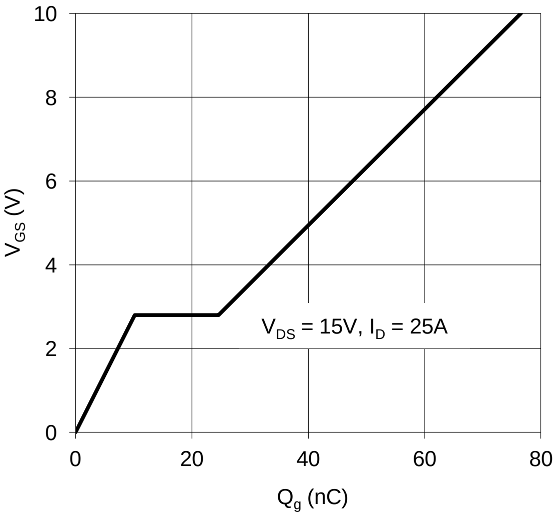


Figure 11. Gate Charge

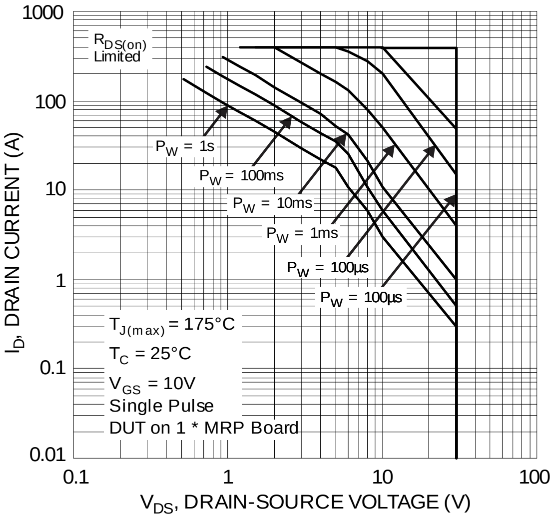


Figure 12 SOA, Safe Operation Area

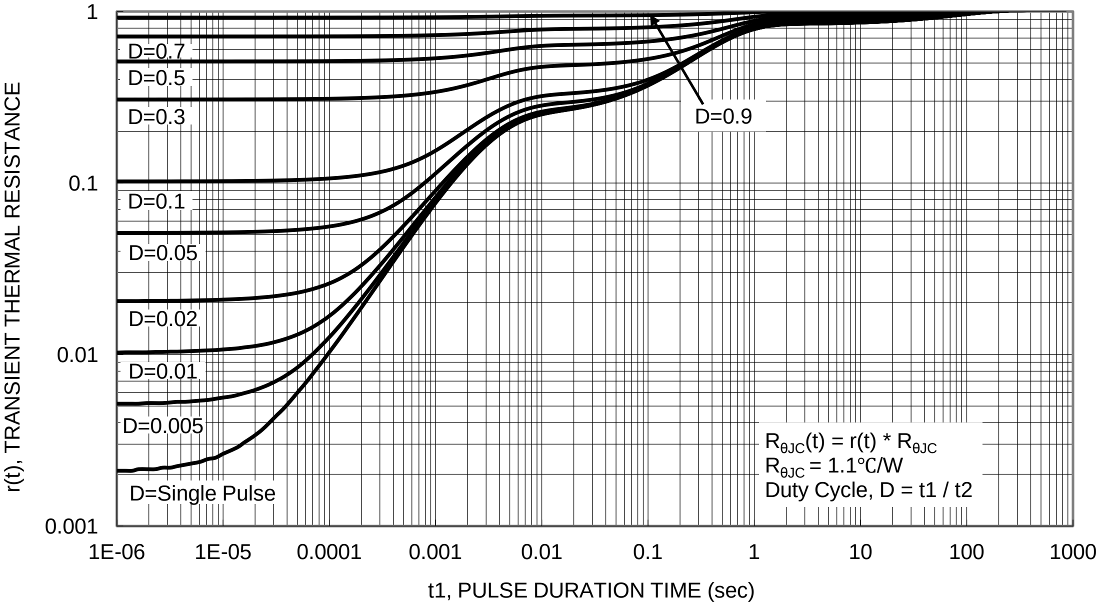
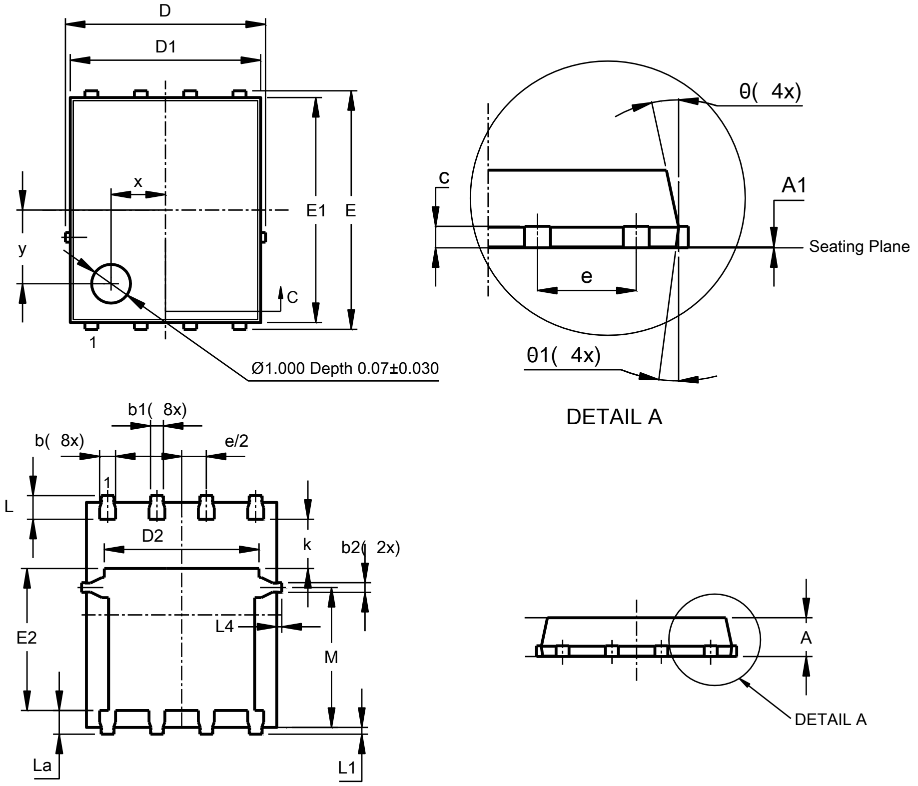


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI5060-8 (Type K)

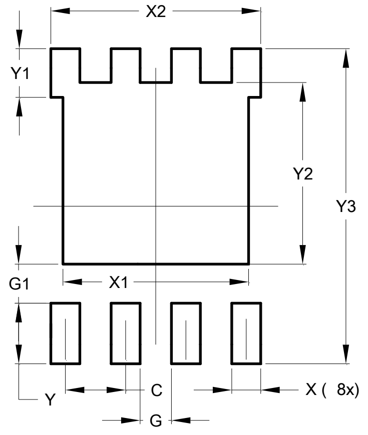


PowerDI5060-8 (Type K)			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.10	1.00
A1	0	0.05	0.02
b	0.33	0.51	0.41
b1	0.300	0.366	0.333
b2	0.20	0.35	0.25
c	0.23	0.33	0.277
D	5.15 BSC		
D1	4.85	4.95	4.90
D2	-	-	3.98
E	6.15 BSC		
E1	5.75	5.85	5.80
E2	3.56	3.725	3.66
E	1.27BSC		
k	-	-	1.27
L	0.51	0.71	0.61
La	0.51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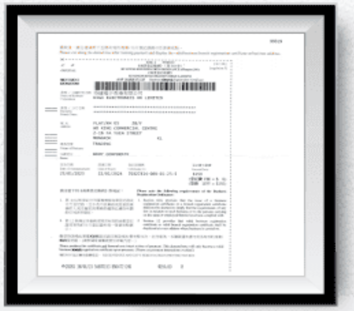

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