

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
60V	3.1mΩ @ V _{GS} = 10V	100A

Features


- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Minimizes Power Losses
- Low Q_g – Minimizes Switching Losses
- **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 [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

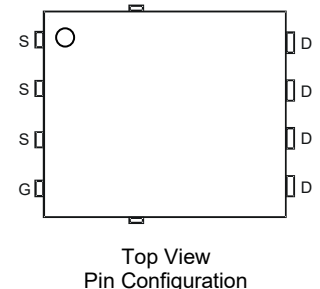
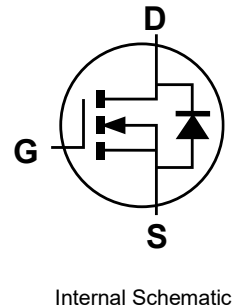
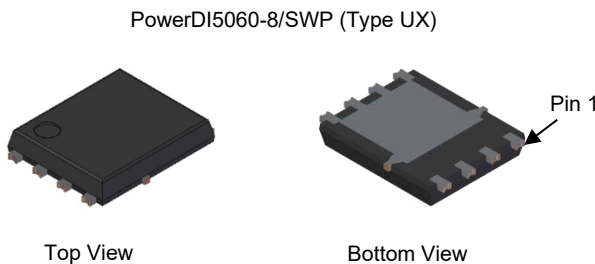
Description and Applications

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.

- Switching
- Synchronous rectification
- 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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 
- Weight: 0.097 grams (Approximate)

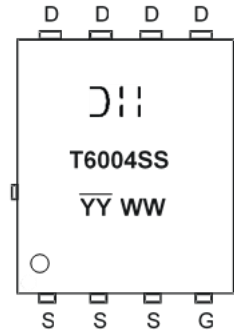


Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT6004SPSW-13	PowerDI5060-8/SWP (Type UX)	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 <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.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



D = Manufacturer's Marking
 T6004SS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 25 = 2025)
 WW = Week (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 5)	Steady State	T _A = +25°C T _A = +70°C	I _D	23 18	A
Continuous Drain Current (Note 6)		T _C = +25°C T _C = +70°C	I _D	100 100	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	100	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	400	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	400	A
Avalanche Current, L = 0.2mH			I _{AS}	45	A
Avalanche Energy, L = 0.2mH			E _{AS}	200	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	2.6	W
Thermal Resistance, Junction to Ambient	Steady State	R _{θJA}	47	°C/W
Total Power Dissipation (Note 6)	T _C = +25°C	P _D	139	W
Thermal Resistance, Junction to Case		R _{θJC}	0.9	°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).

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}	60	—	—	V	V _{GS} = 0, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 48V, V _{GS} = 0
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	2	2.5	4	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	3.1	mΩ	V _{GS} = 10V, I _D = 50A
Diode Forward Voltage	V _{SD}	—	0.9	1.2	V	V _{GS} = 0, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	4,556	—	pF	V _{DS} = 30V, V _{GS} = 0 f = 1MHz
Output Capacitance	C _{oss}	—	1,383	—		
Reverse Transfer Capacitance	C _{rss}	—	105.2	—		
Gate Resistance	R _g	—	0.7	—	Ω	V _{DS} = 0, V _{GS} = 0, f = 1MHz
Total Gate Charge	Q _g	—	95.4	—	nC	V _{DD} = 30V, I _D = 90A V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	21.6	—		
Gate-Drain Charge	Q _{gd}	—	20.4	—		
Turn-On Delay Time	t _{D(ON)}	—	13.2	—	ns	V _{DD} = 30V, V _{GS} = 10V I _D = 90A, R _g = 3.5Ω
Turn-On Rise Time	t _R	—	11.7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	31	—		
Turn-Off Fall Time	t _F	—	12	—	ns	I _F = 50A, di/dt = 100A/μs
Body Diode Reverse-Recovery Time	t _{RR}	—	50.5	—		
Body Diode Reverse-Recovery Charge	Q _{RR}	—	80.8	—	nC	

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

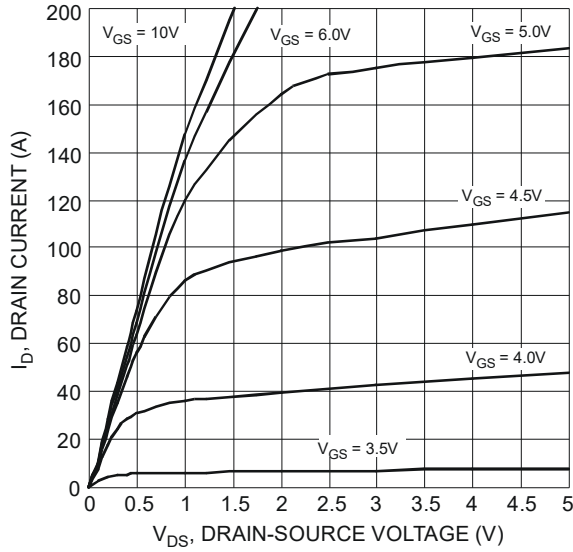


Figure 1 Typical Output Characteristics

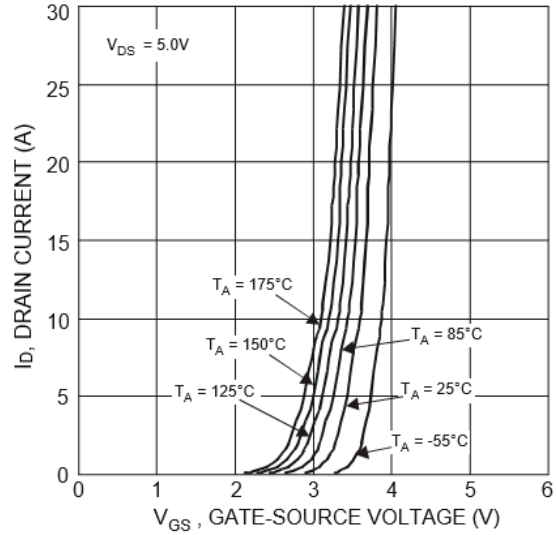


Figure 2 Typical Transfer Characteristics

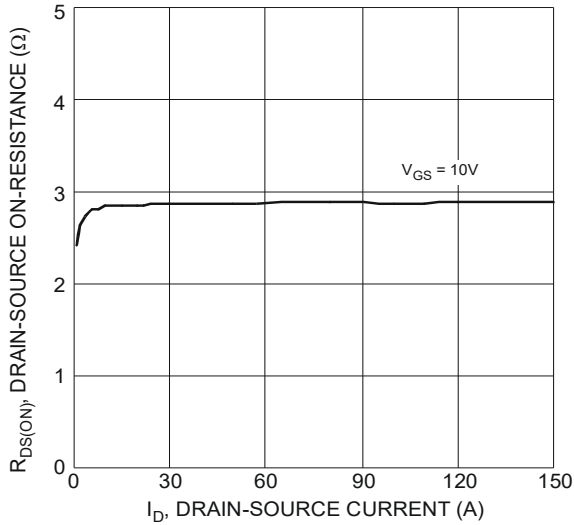


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

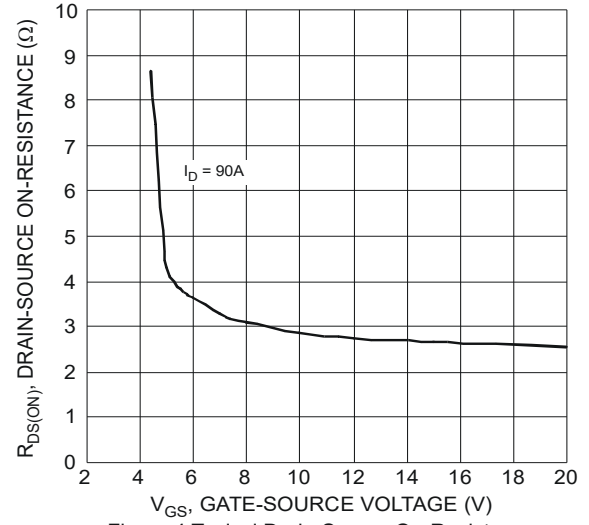


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

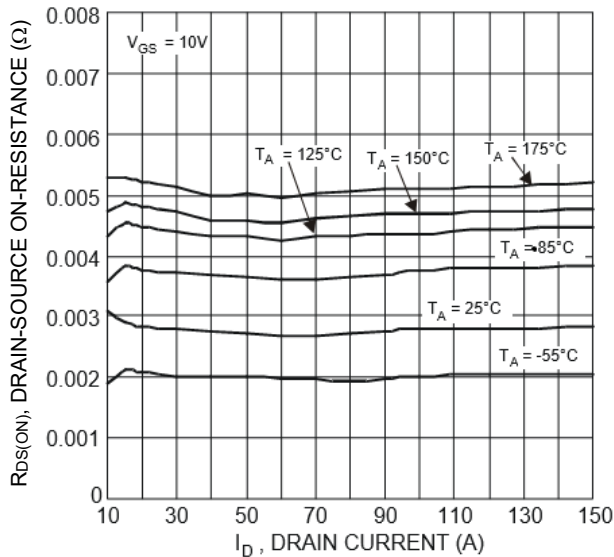


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

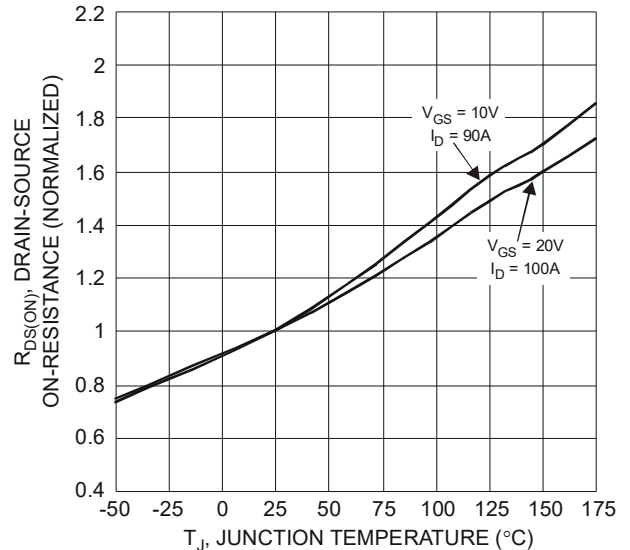
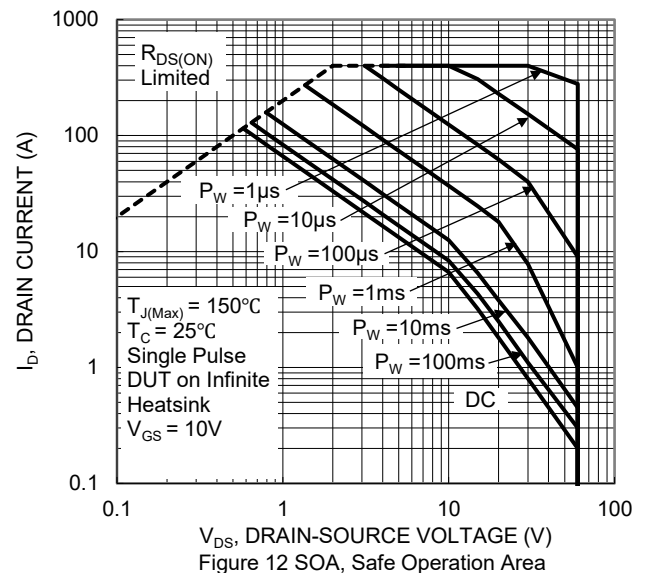
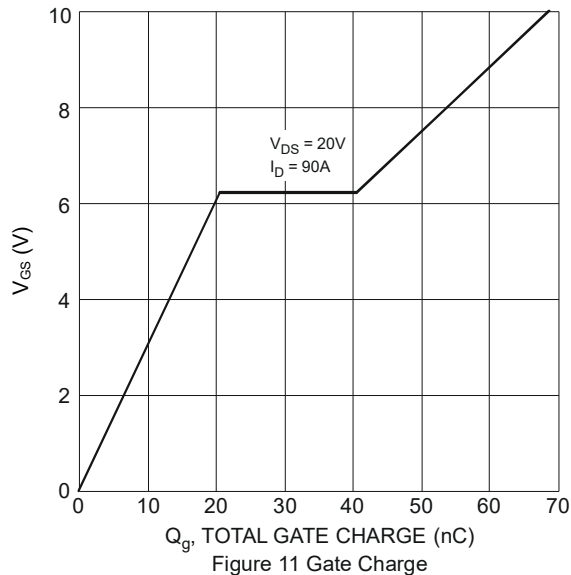
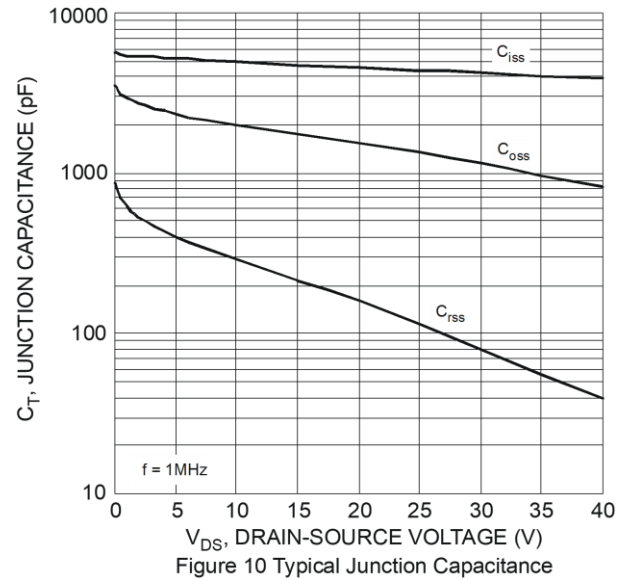
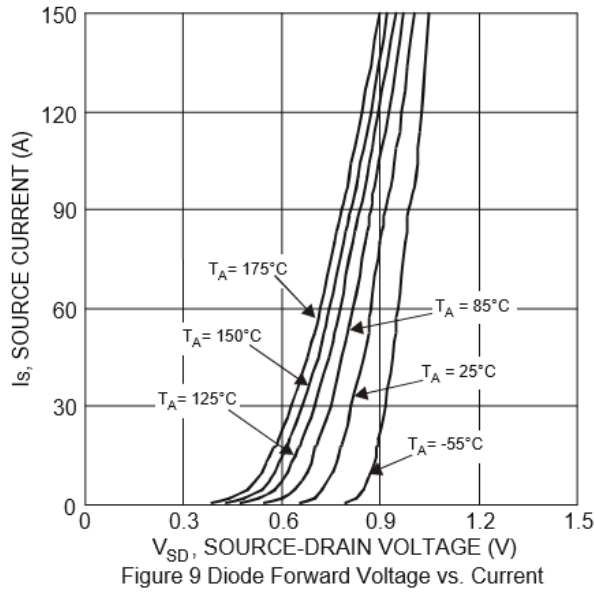
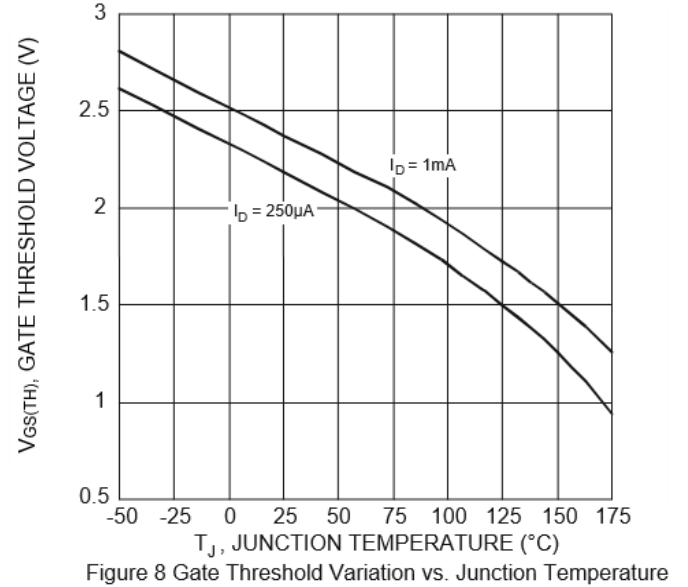
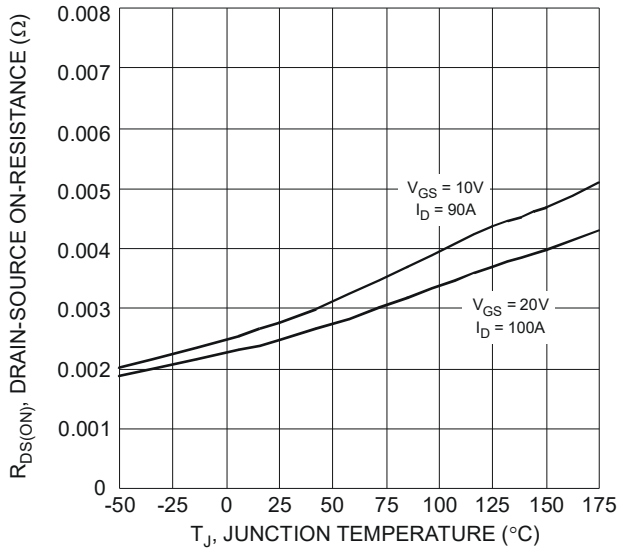


Figure 6 On-Resistance Variation with Temperature



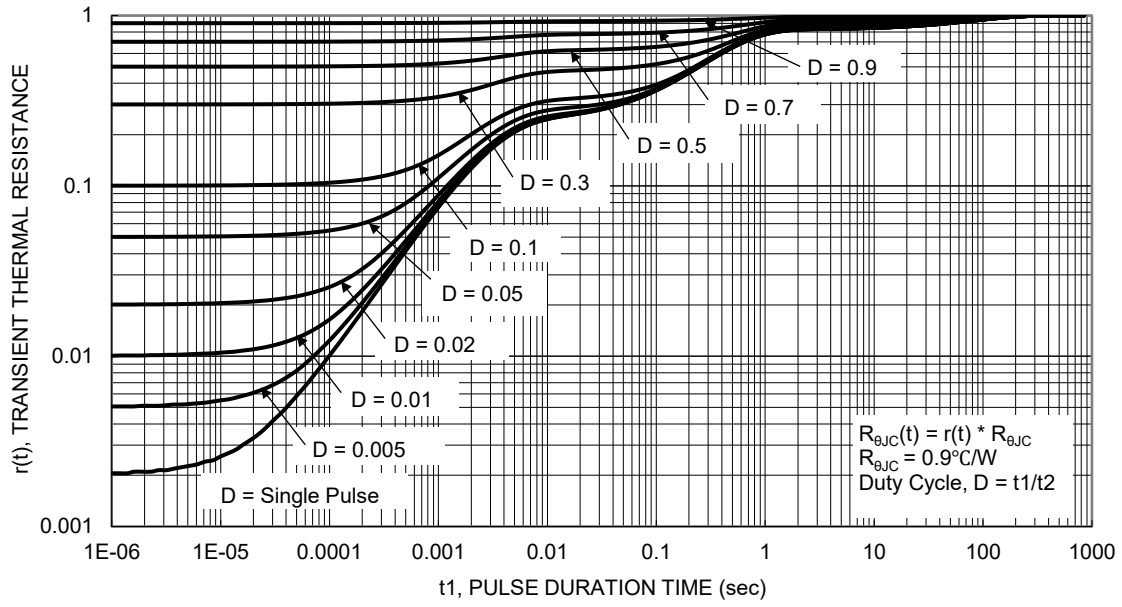
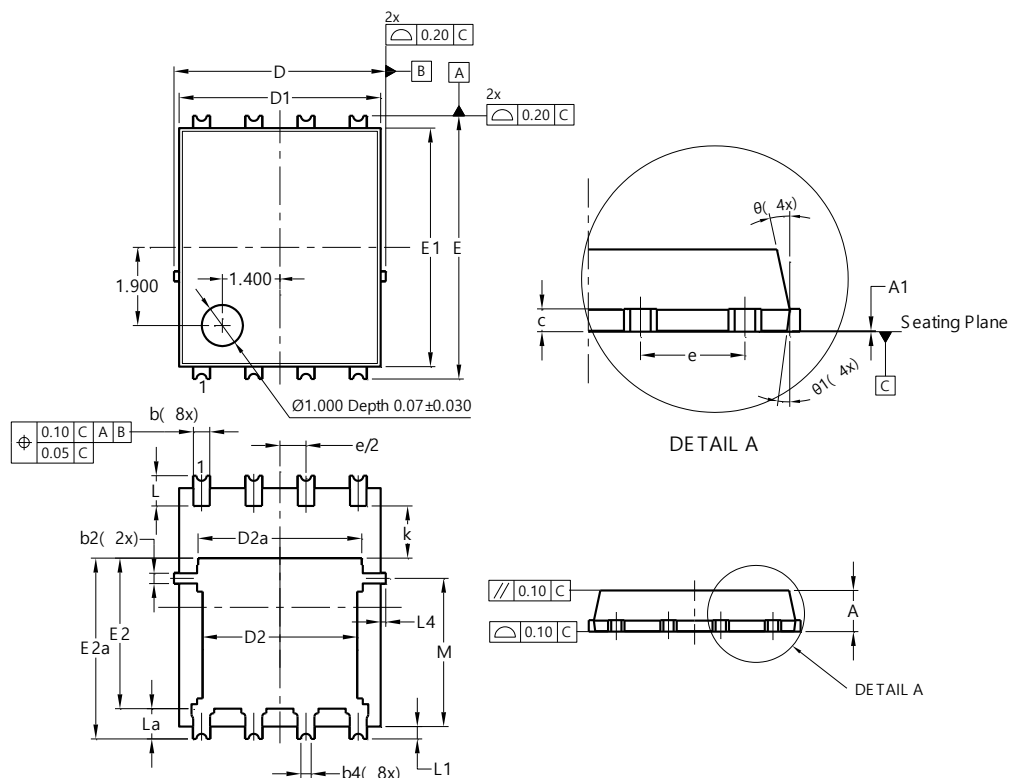


Figure 13. Transient Thermal Resistance

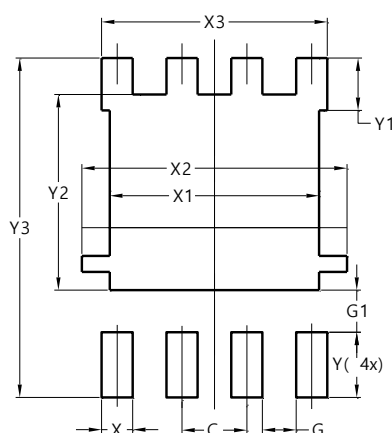
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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
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			

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

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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