

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
-60V	60mΩ @ V _{GS} = -10V	-18.8A
	80mΩ @ V _{GS} = -4.5V	-16.8A

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low R_{DS(ON)} — Ensures Minimal On-State Losses
- Wettable Flank for Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP6051SFVWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

Description and Applications

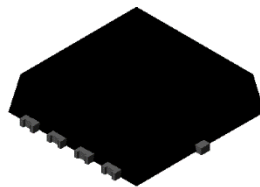
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- Motor controls
- Power-management functions
- DC-DC converters

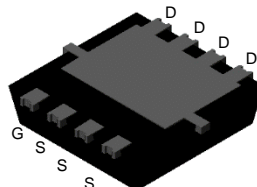
Mechanical Data

- Package: PowerDI[®]3333-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.03 grams (Approximate)

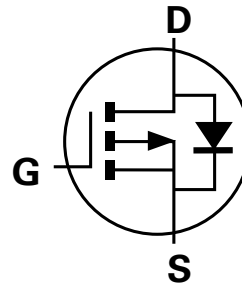
PowerDI3333-8/SWP (Type UX)



Top View



Pin 1 Bottom View



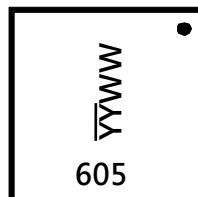
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMP6051SFVWQ-7	PowerDI3333-8/SWP (Type UX)	2000	Tape & Reel
DMP6051SFVWQ-13	PowerDI3333-8/SWP (Type UX)	3000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 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



605 = 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}	-60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = -10V	I _D	T _C = +25°C -18.8	A
		T _C = +70°C -15.1	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-75	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	-20.6	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	-75	A
Avalanche Current, L = 0.1mH	I _{AS}	-27	A
Avalanche Energy, L = 0.1mH	E _{AS}	36	mJ

Thermal Characteristics (@T_A = +25°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 _{θJA}	47	°C/W
Total Power Dissipation (Note 6)	P _D	43	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	2.9	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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}	-60	—	—	V	V _{GS} = 0, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	µA	V _{DS} = -60V, 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)}	-1	—	-3	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	48	60	mΩ	V _{GS} = -10V, I _D = -7A
		—	62	80		V _{GS} = -4.5V, I _D = -7A
Diode Forward Voltage	V _{SD}	—	-0.8	-1.2	V	V _{GS} = 0, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	2087	—	pF	V _{DS} = -30V, V _{GS} = 0, f = 1MHz
Output Capacitance	C _{oss}	—	94	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	78	—	pF	
Gate Resistance	R _g	—	3.5	—	Ω	V _{DS} = 0, V _{GS} = 0, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	17	—	nC	V _{DS} = -30V, I _D = -5A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	36	—	nC	
Gate-Source Charge	Q _{gs}	—	3.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	5.6	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	6.5	—	ns	V _{DD} = -30V, V _{GS} = -10V, R _G = 3Ω, I _D = -5A
Turn-On Rise Time	t _r	—	19	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	40	—	ns	
Turn-Off Fall Time	t _f	—	24	—	ns	
Body Diode Reverse-Recovery Time	t _{RR}	—	23	—	ns	I _F = -5A, di/dt = 100A/µs
Body Diode Reverse-Recovery Charge	Q _{RR}	—	21	—	nC	

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1 inch 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.

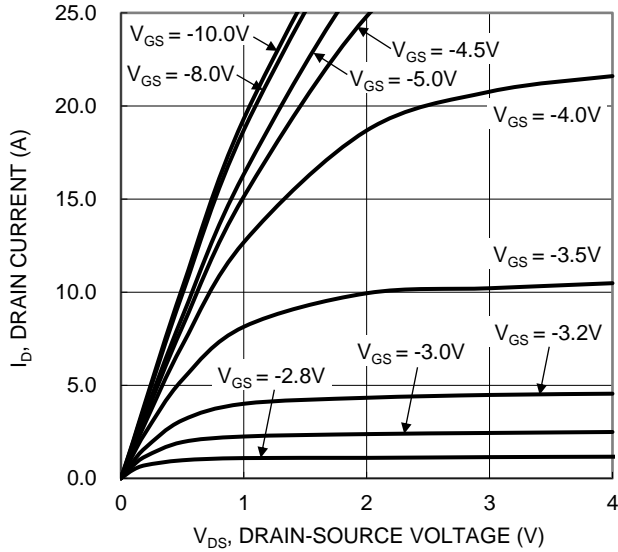


Figure 1. Typical Output Characteristic

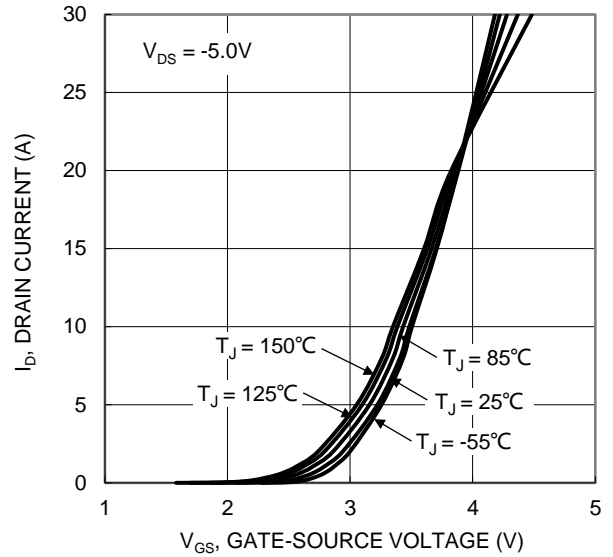


Figure 2. Typical Transfer Characteristic

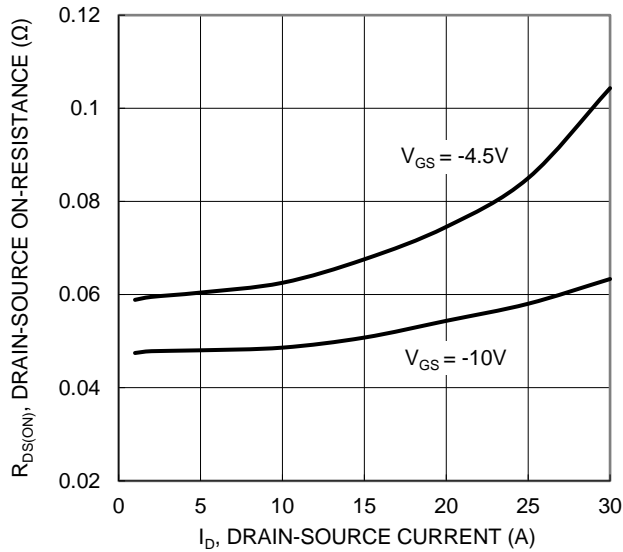


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

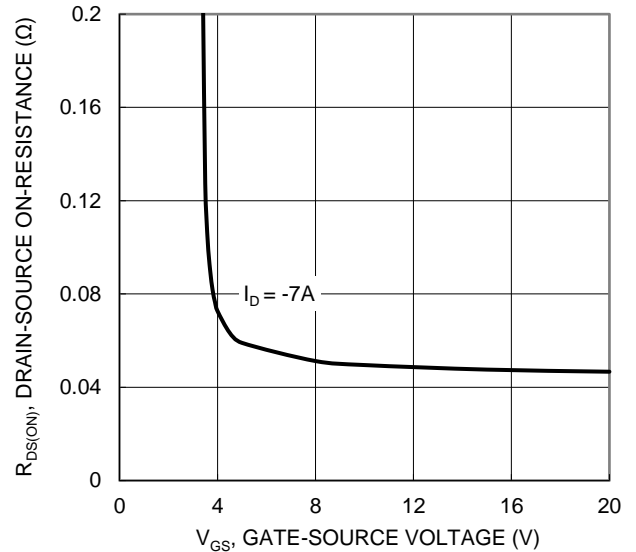


Figure 4. Typical Transfer Characteristic

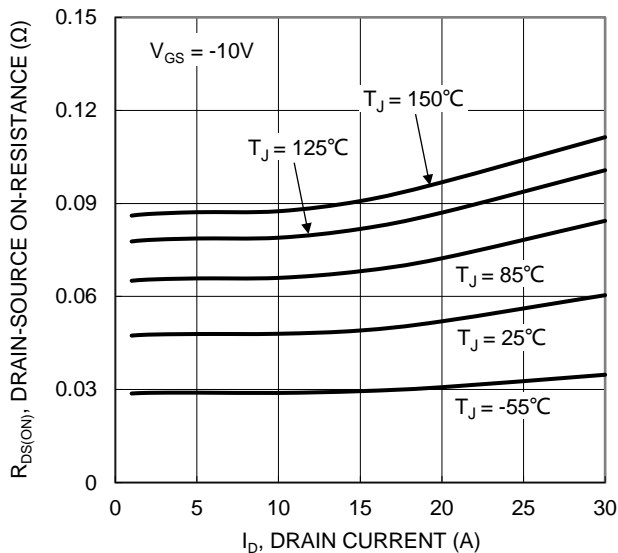


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

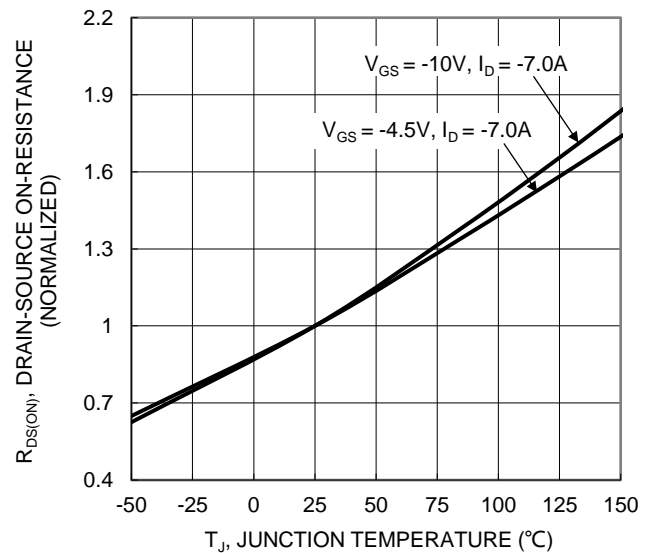
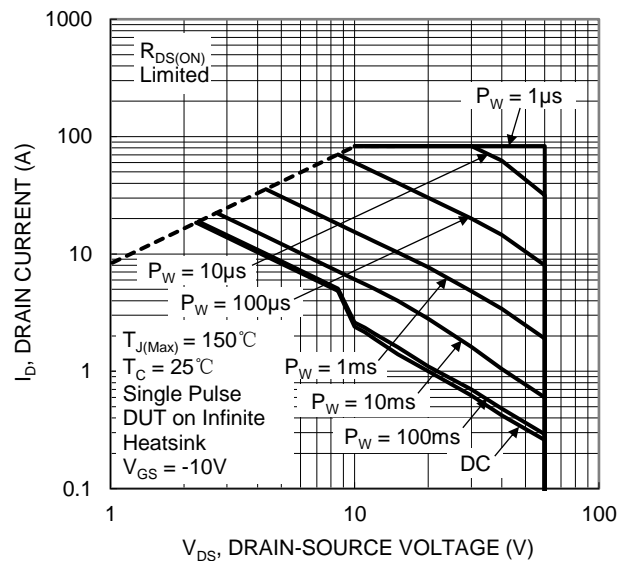
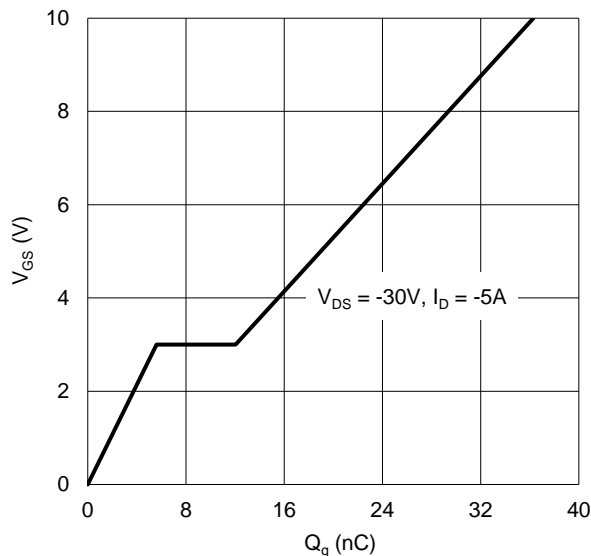
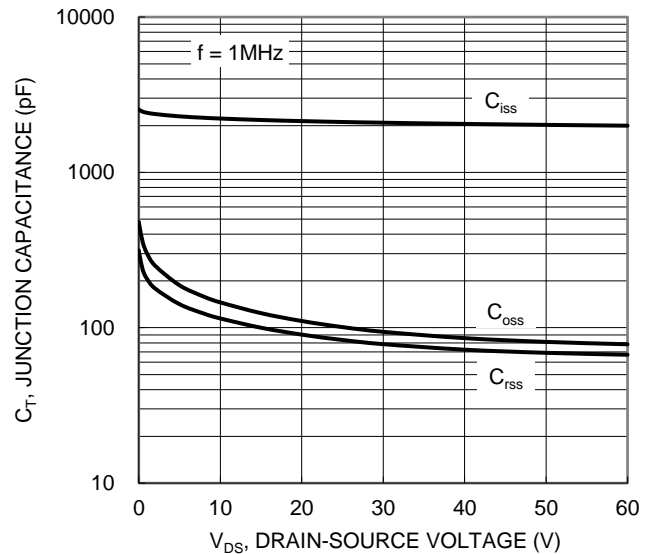
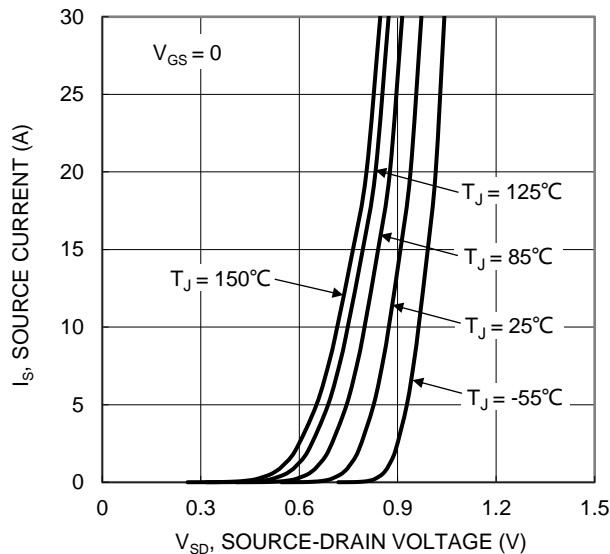
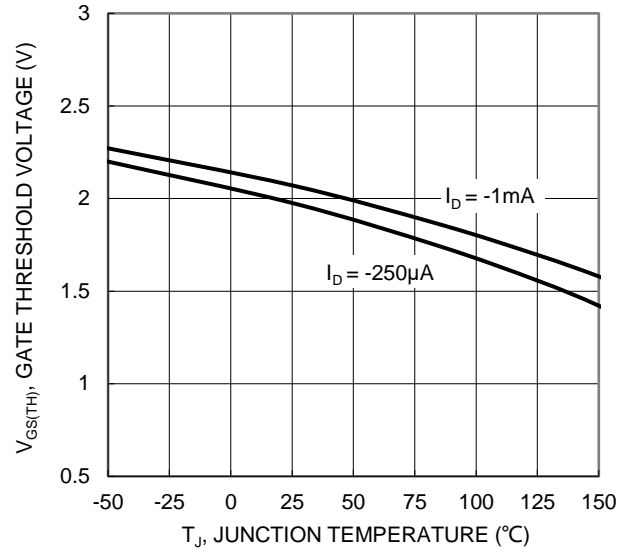
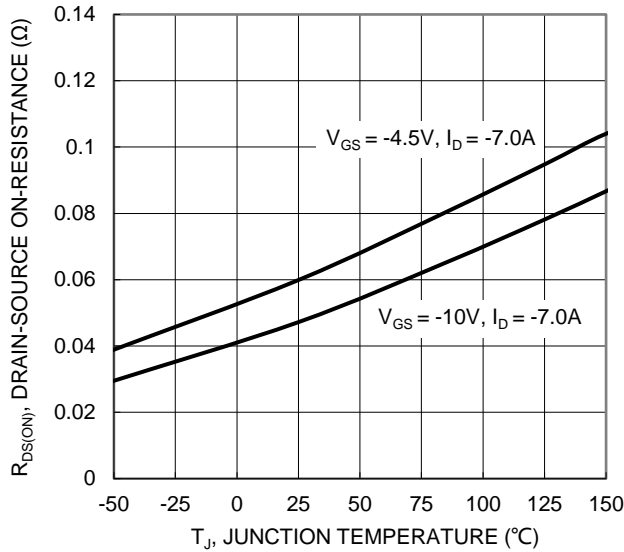


Figure 6. On-Resistance Variation with Junction Temperature



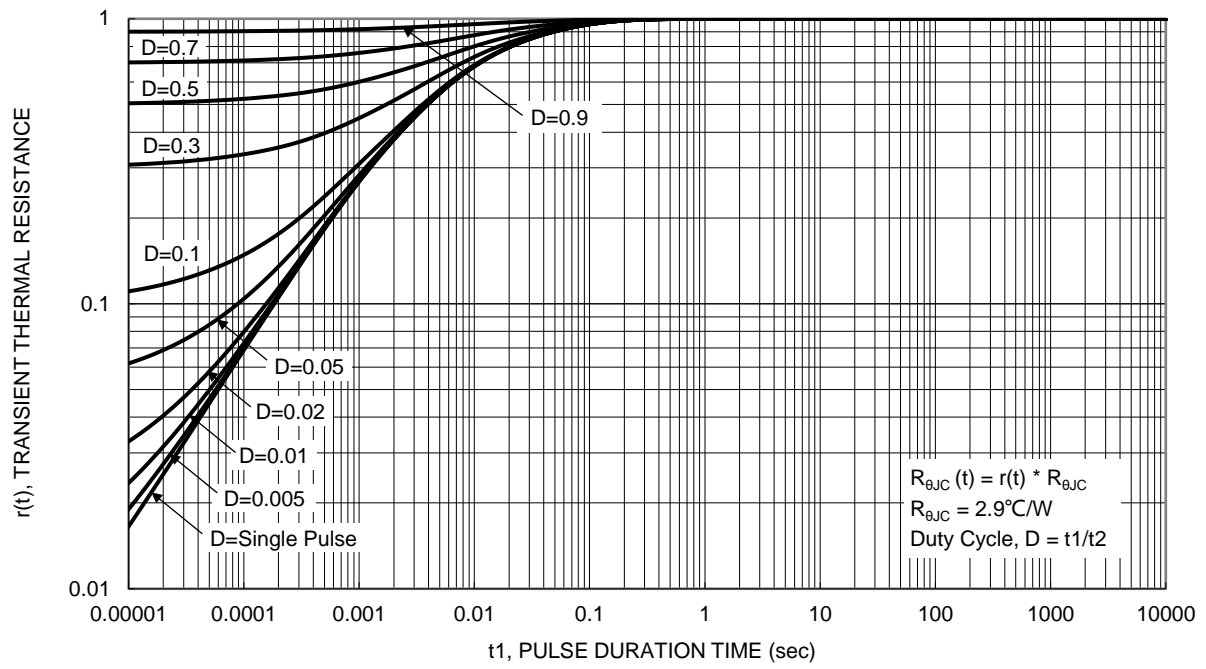
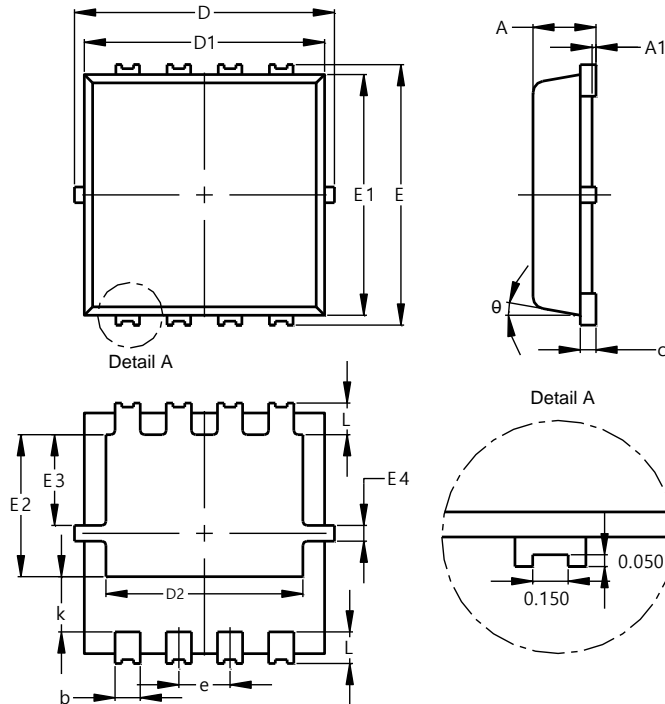


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

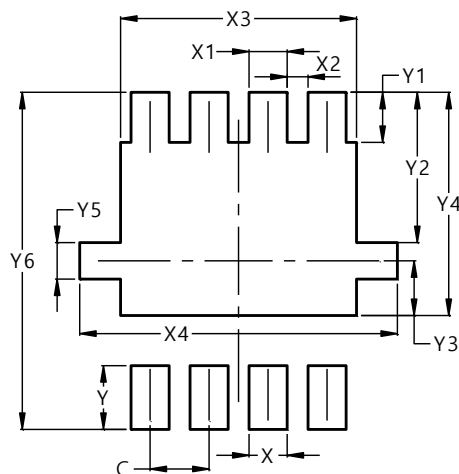


PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40
θ	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI3333-8/SWP (Type UX)



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.600
X4	3.500
Y	0.700
Y1	0.550
Y2	1.650
Y3	0.600
Y4	2.450
Y5	0.400
Y6	3.700

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