

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _c = +25°C
-30V	15mΩ @ V _{GS} = -10V	-42A
	25mΩ @ V _{GS} = -5V	-32A

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:

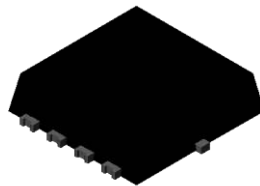
- Backlighting
- Power management functions
- DC-DC converters

Features and Benefits

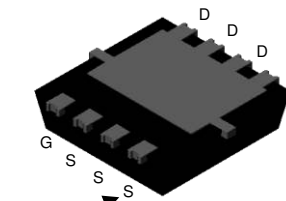
- Low R_{DS(ON)} – ensures on-state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DIODES™ DMP3021SFVWQ 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/>

Mechanical Data

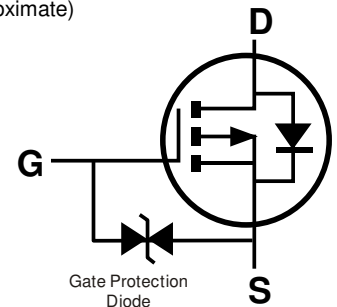
- Package: PowerDI[®]3333-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (Approximate)



Top View



Bottom View



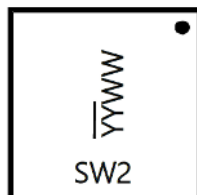
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP3021SFVWQ-7	PowerDI3333-8 (SWP) (Type UX)	2,000	Tape & Reel
DMP3021SFVWQ-13	PowerDI3333-8 (SWP) (Type UX)	3,000	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



SW2 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 22 = 2022)
 WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GSS}	±25	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-11	A
		T _A = +70°C		-9	
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _C = +25°C	I _D	-42	A
		T _C = +70°C		-34	
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	-42	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-128	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	-128	A
Avalanche Current (Note 8) L = 1mH			I _{AS}	-13	A
Avalanche Energy (Note 8) L = 1mH			E _{AS}	84	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	126.6	°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 _{θJA}	51.2	°C/W
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	3.6	°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 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} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±25V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	—	-2.5	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	10.3	15	mΩ	V _{GS} = -10V, I _D = -8A
		—	15.5	25		V _{GS} = -5V, I _D = -5A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	1799	—	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	259	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	225	—	pF	
Gate Resistance	R _g	—	2.1	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -5V)	Q _g	—	17.4	—	nC	V _{DS} = -15V, I _D = -10A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	34	—	nC	
Gate-Source Charge	Q _{gs}	—	5.1	—	nC	
Gate-Drain Charge	Q _{gd}	—	8.4	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	6.5	—	ns	
Turn-On Rise Time	t _r	—	18.3	—	ns	V _{DD} = -15V, V _{GS} = -10V, R _G = 3Ω, I _D = -10A
Turn-Off Delay Time	t _{D(OFF)}	—	35.8	—	ns	
Turn-Off Fall Time	t _f	—	23.7	—	ns	
Reverse Recovery Time	t _{RR}	—	14.9	—	ns	I _S = -8A, dI/dt = 500A/μs
Reverse Recovery Charge	Q _{RR}	—	15	—	nC	

- 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} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

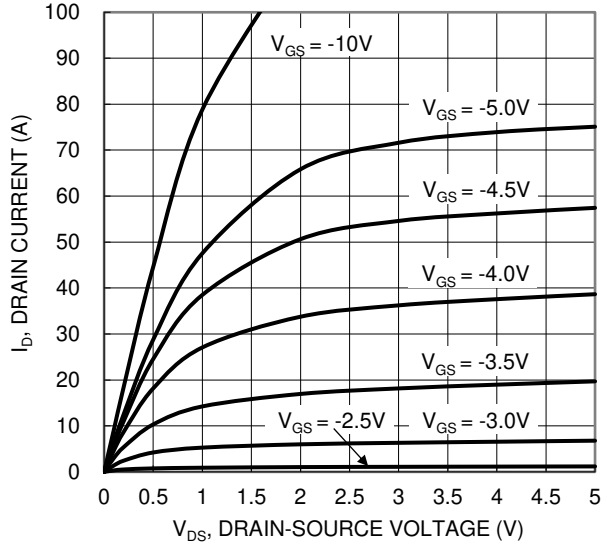


Figure 1. Typical Output Characteristic

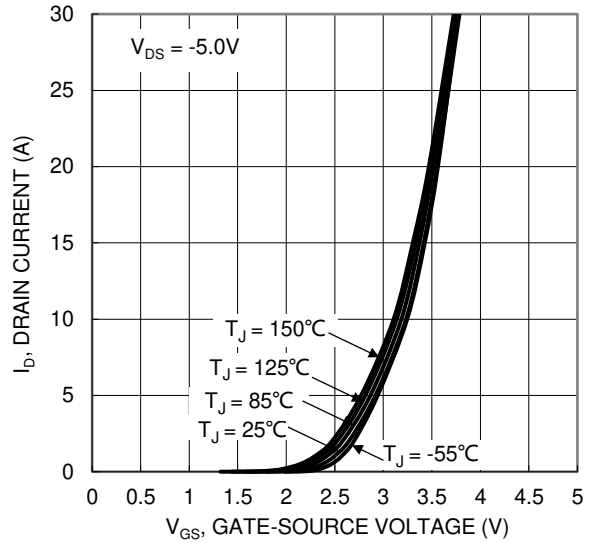


Figure 2. Typical Transfer Characteristic

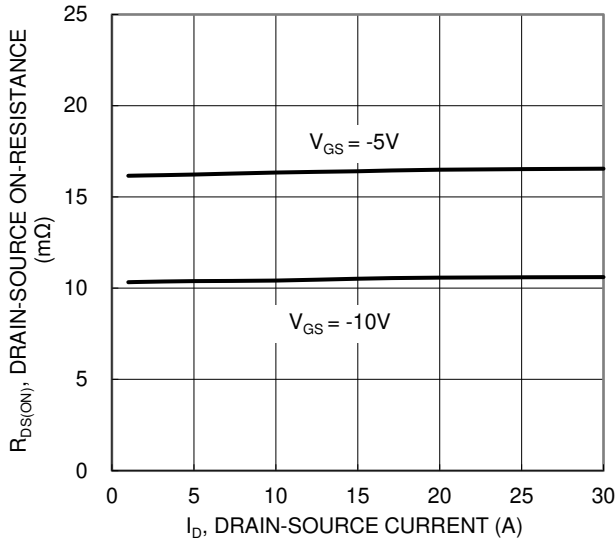


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

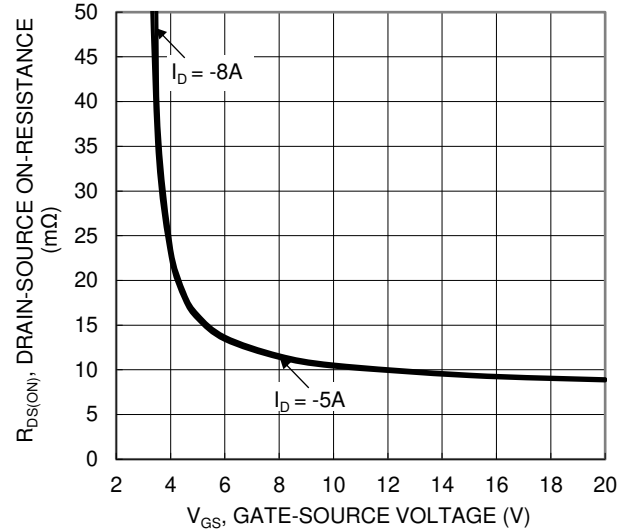


Figure 4. Typical Transfer Characteristic

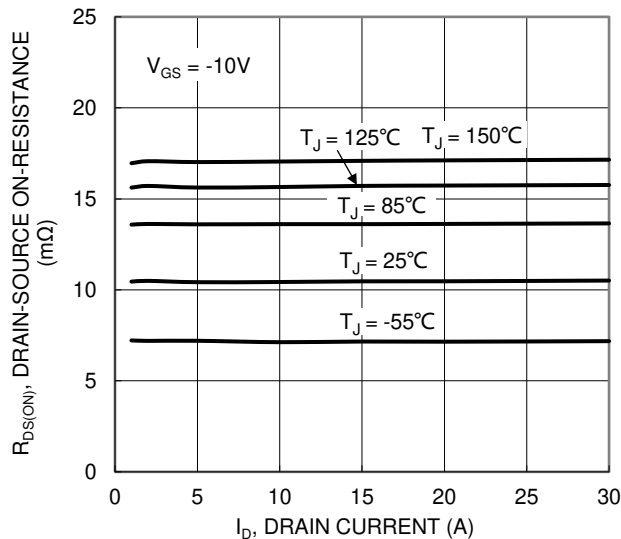


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

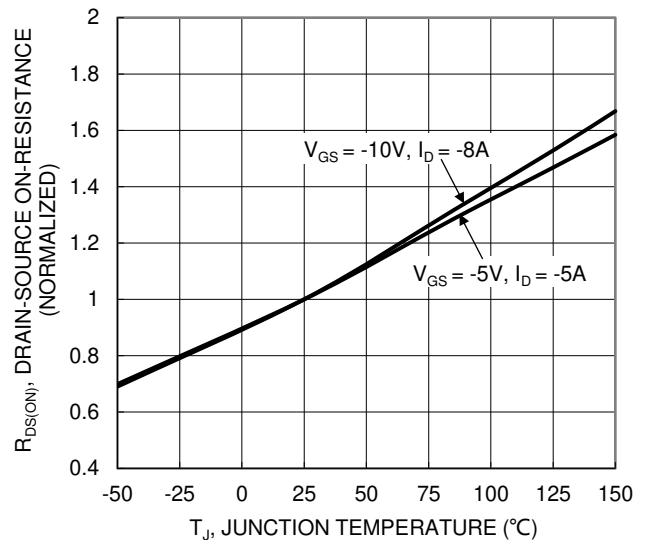


Figure 6. On-Resistance Variation with Temperature

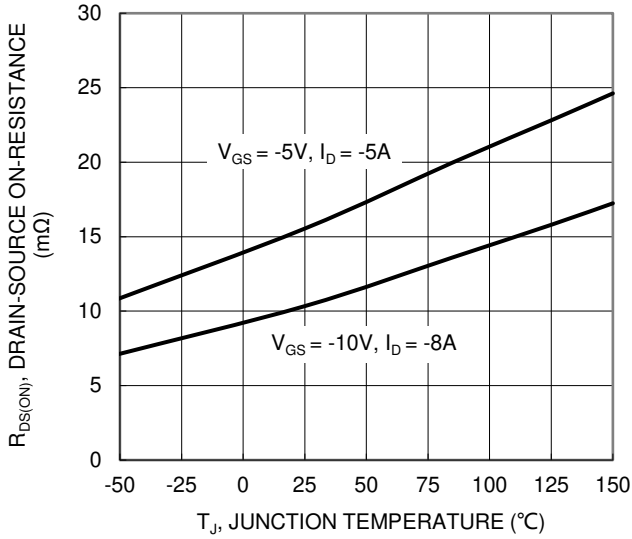


Figure 7. On-Resistance Variation with Temperature

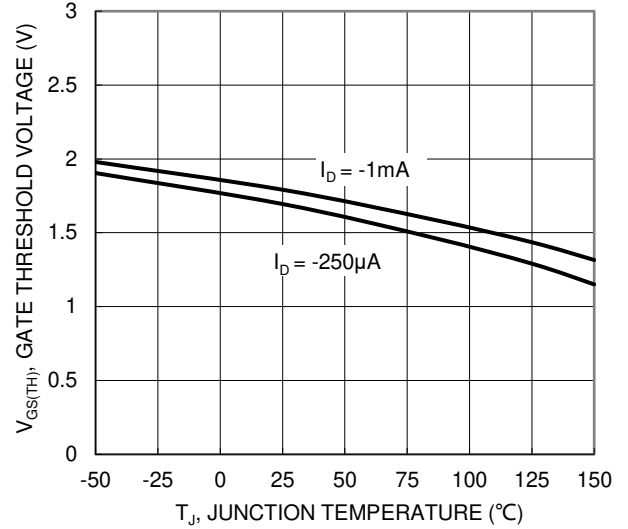


Figure 8. Gate Threshold Variation vs. Temperature

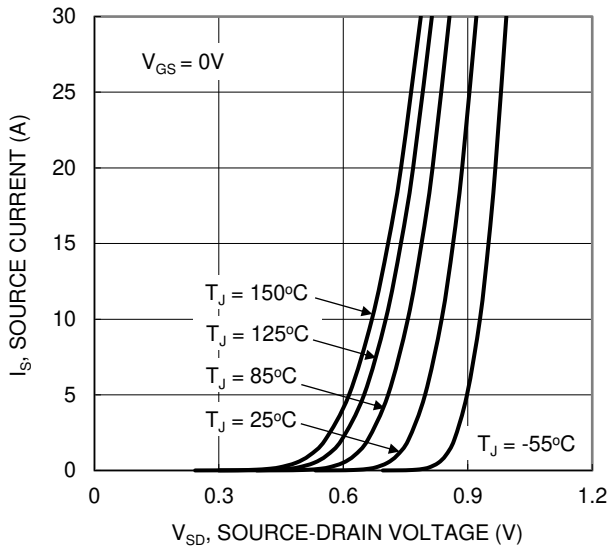


Figure 9. Diode Forward Voltage vs. Current

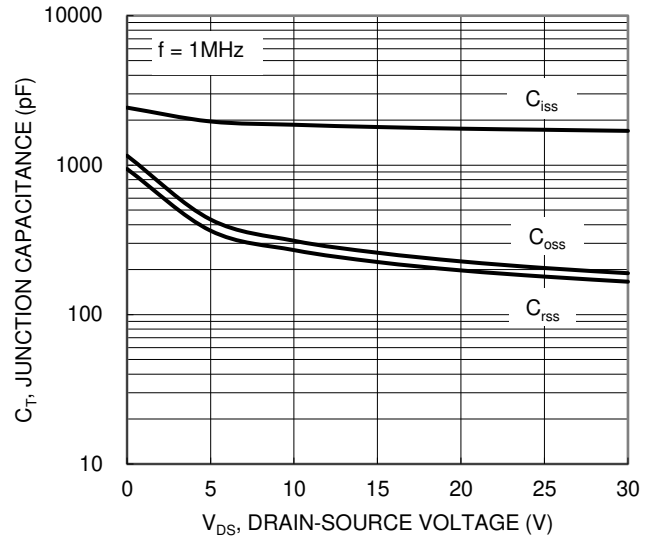


Figure 10. Typical Junction Capacitance

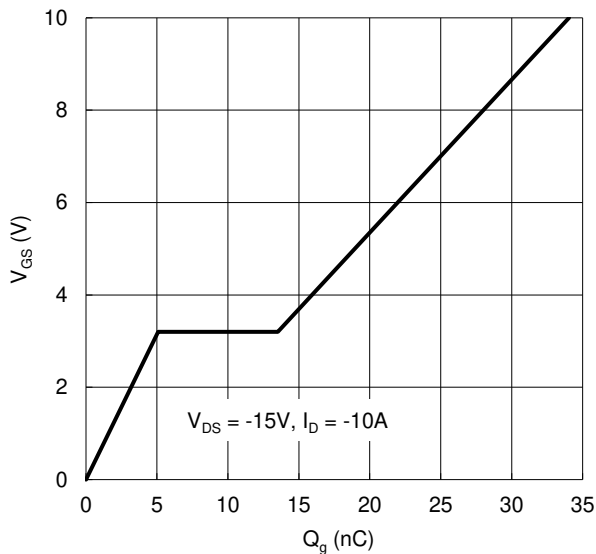


Figure 11. Gate Charge

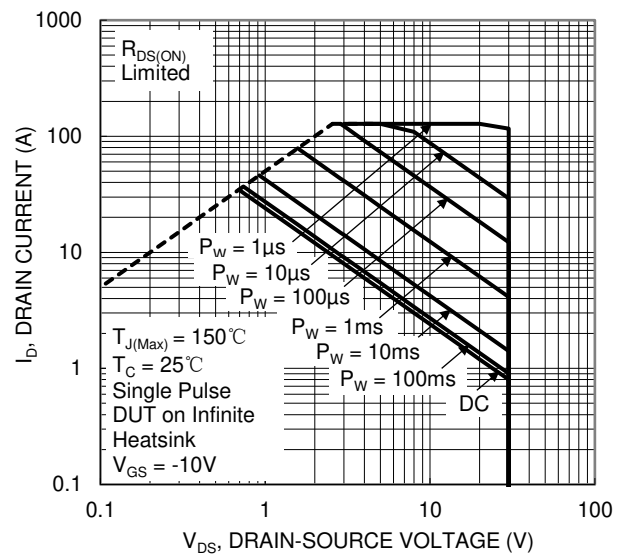


Figure 12. SOA, Safe Operation Area

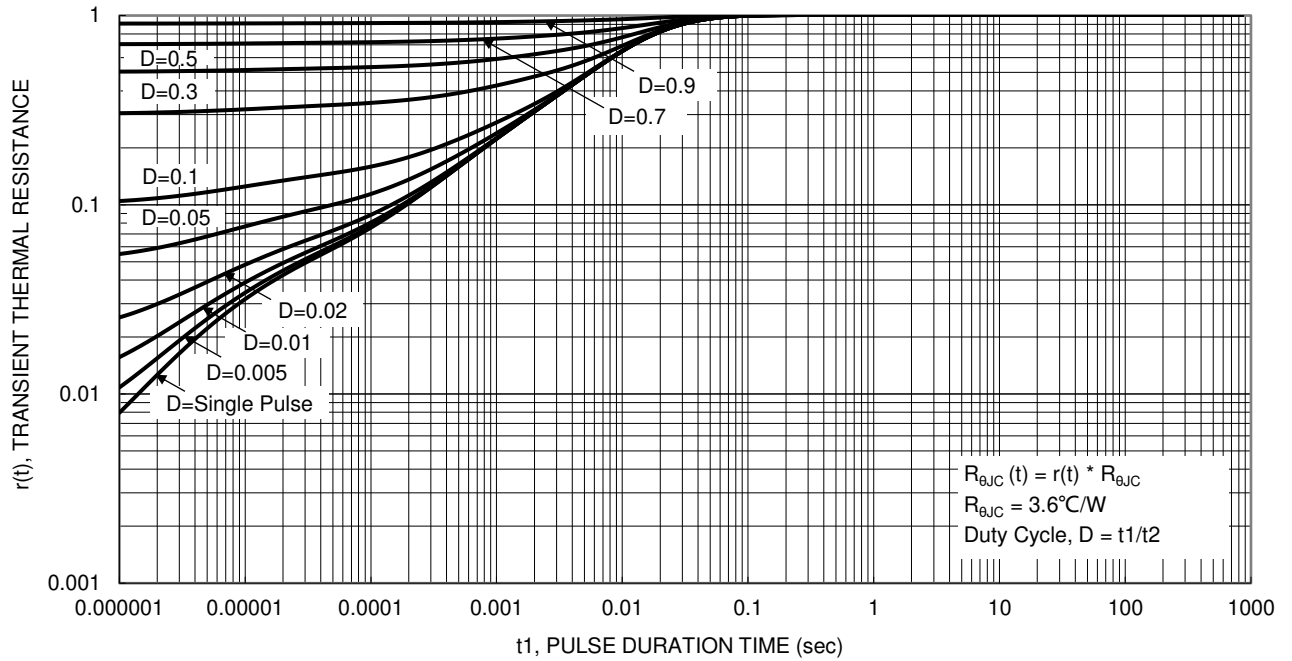
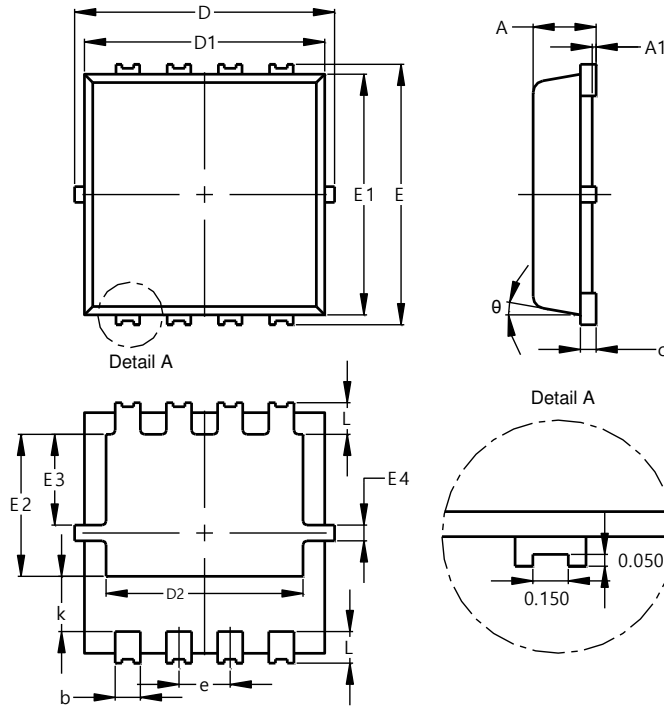


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (SWP) (Type UX)

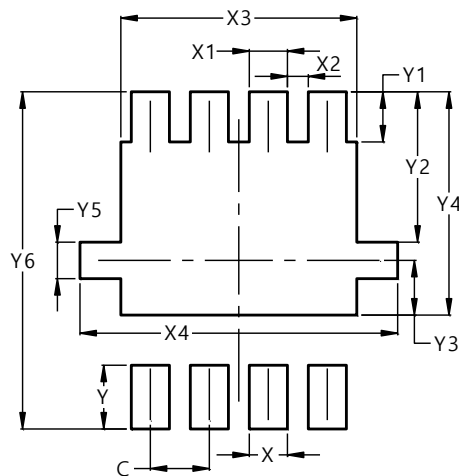


PowerDI3333-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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