

## Product Summary

<b>BV<sub>DSS</sub></b>	<b>R<sub>DSON</sub> Max</b>	<b>I<sub>D</sub> Max T<sub>C</sub> = +25°C</b>
60V	16mΩ @ V <sub>GS</sub> = 10V	41A
	27mΩ @ V <sub>GS</sub> = 4.5V	31.6A

## 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

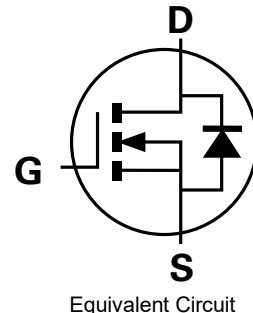
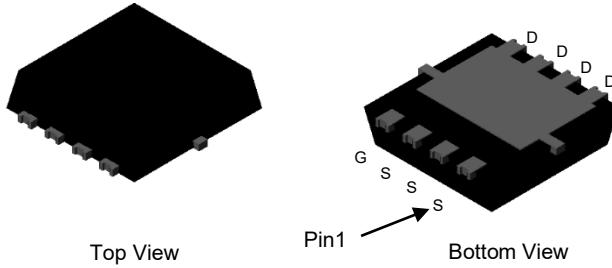
- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Small form factor thermally efficient package enables higher density end products
- Wettable Flank for Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- The DMTH6016LFVWQ 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: 0.03 grams (Approximate)

PowerDI3333-8/SWP (Type UX)



Equivalent Circuit

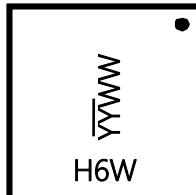
## Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMTH6016LFVWQ-7	PowerDI3333-8/SWP (Type UX)	2,000	Tape & Reel
DMTH6016LFVWQ-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



H6W = Product Type Marking Code

YYWW = Date Code Marking

YY = Last Two Digits of Year (ex: 25 = 2025)

WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated in the United States and other countries.

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 7) $V_{GS} = 10\text{V}$	$I_D$	41 29	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	160	A
Maximum Continuous Body Diode Forward Current (Note 7)	$I_S$	33	A
Pulsed Body Diode Forward Current (Note 7)	$I_{SM}$	160	A
Avalanche Current, $L = 0.1\text{mH}$ (Note 8)	$I_{AS}$	16	A
Avalanche Energy, $L = 0.1\text{mH}$ (Note 8)	$E_{AS}$	12.8	mJ

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	1.17	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	128	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$P_D$	2.38	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	63	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	3.7	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$V_{GS} = 0, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 48\text{V}, V_{GS} = 0$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	12.3	16	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	20.3	27		$V_{GS} = 4.5\text{V}, I_D = 18\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.2	V	$V_{GS} = 0, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$C_{iss}$	—	939	—	$\text{pF}$	$V_{DS} = 30\text{V}, V_{GS} = 0, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	270	—		
Reverse Transfer Capacitance	$C_{rss}$	—	23.4	—		
Gate Resistance	$R_G$	—	1.4	—		
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	7.3	—	$\text{nC}$	$V_{DS} = 30\text{V}, I_D = 10\text{A}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	15.1	—		
Gate-Source Charge	$Q_{gs}$	—	2.5	—		
Gate-Drain Charge	$Q_{gd}$	—	3.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.9	—	$\text{ns}$	$V_{GS} = 10\text{V}, V_{DS} = 30\text{V}, R_G = 6\Omega, I_D = 10\text{A}$
Turn-On Rise Time	$t_R$	—	6.3	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	14.3	—		
Turn-Off Fall Time	$t_F$	—	5.9	—		
Reverse-Recovery Time	$t_{RR}$	—	22	—	$\text{ns}$	$I_F = 10\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse-Recovery Charge	$Q_{RR}$	—	12	—		

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  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

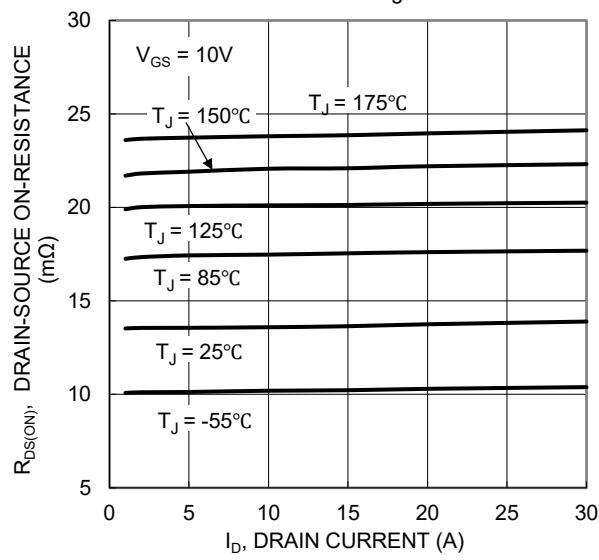
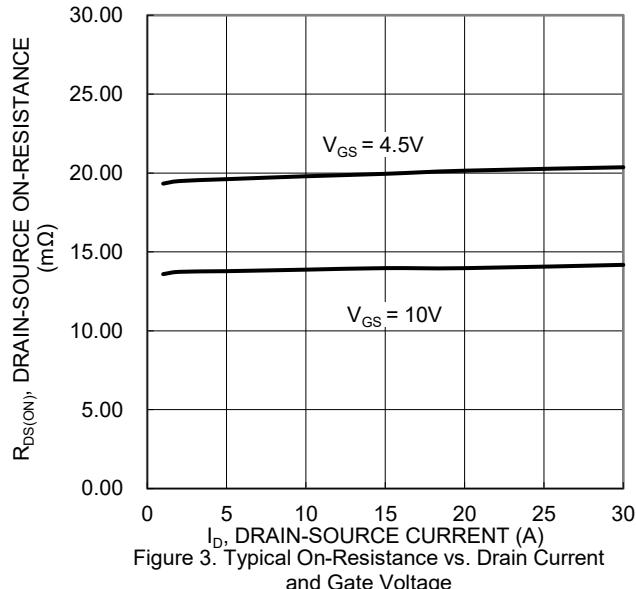
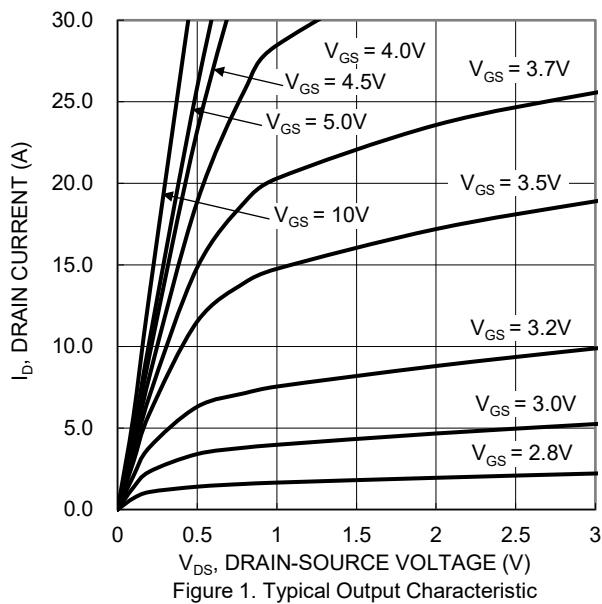
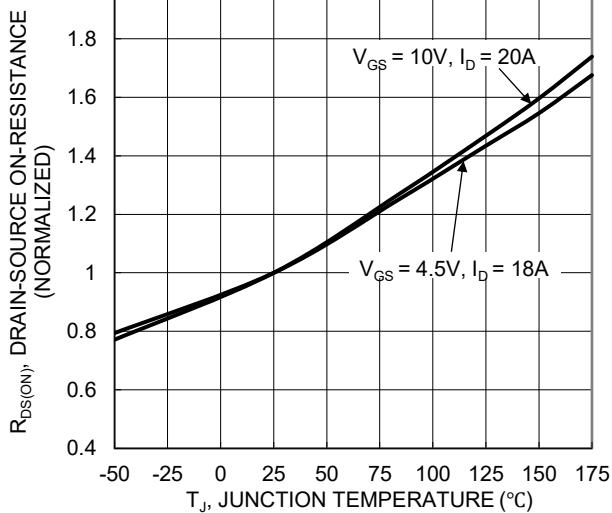
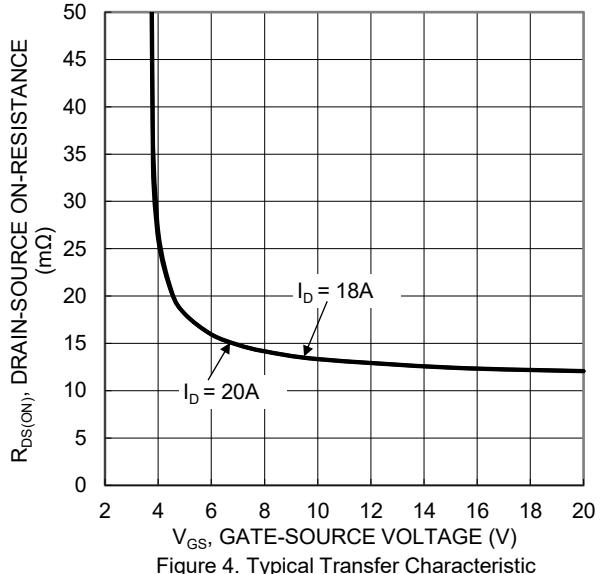
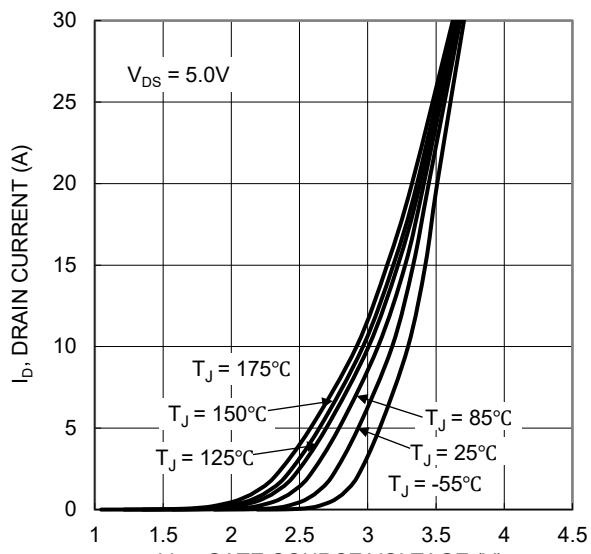
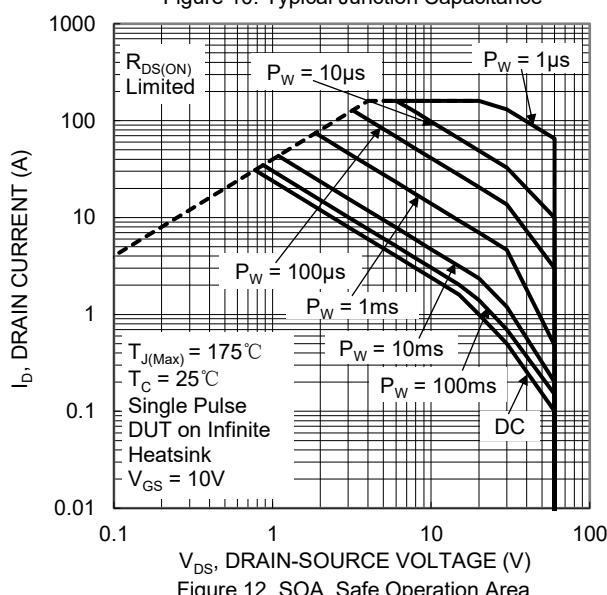
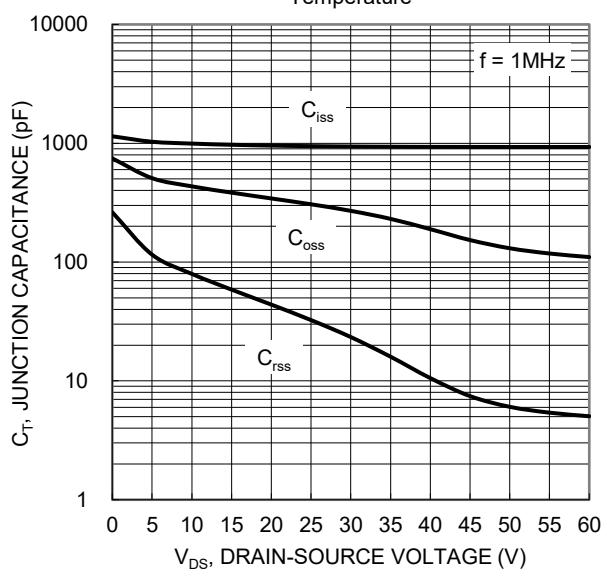
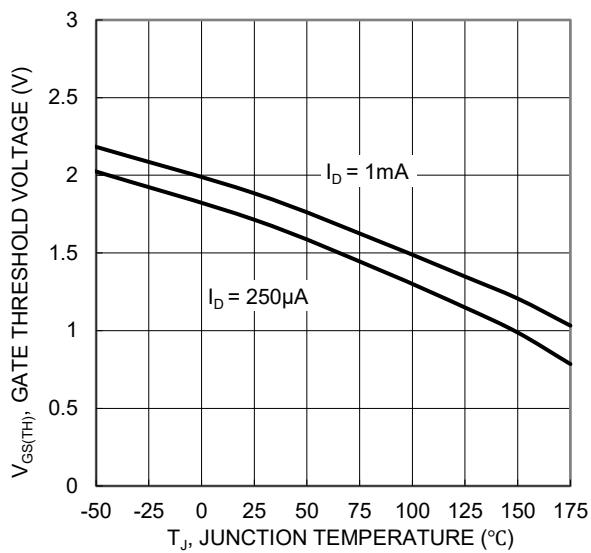
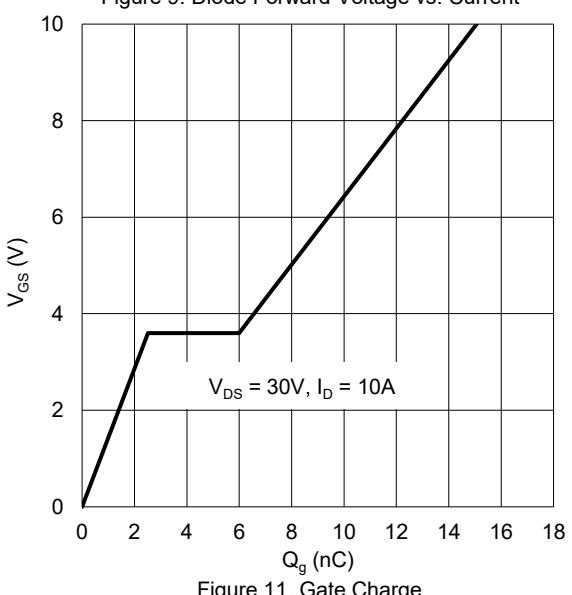
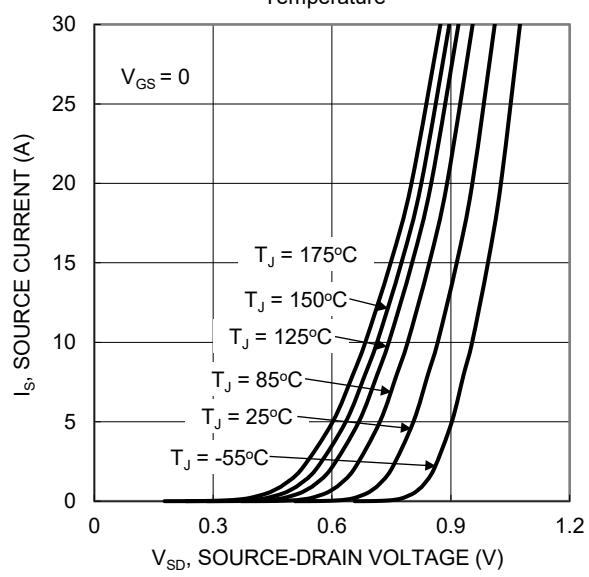
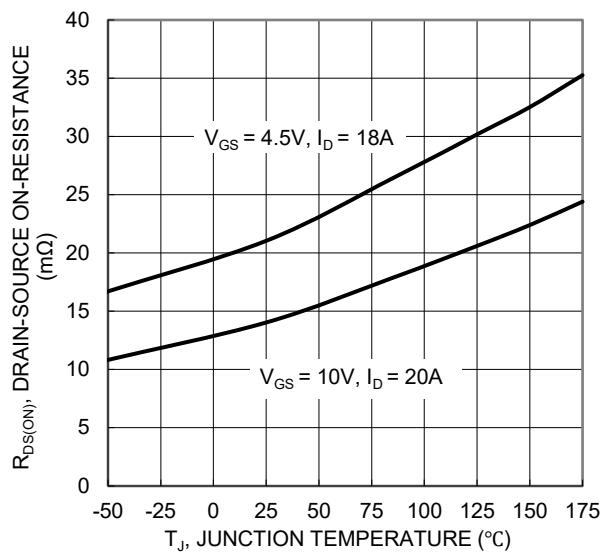


Figure 5. Typical On-Resistance vs. Drain Current and Temperature





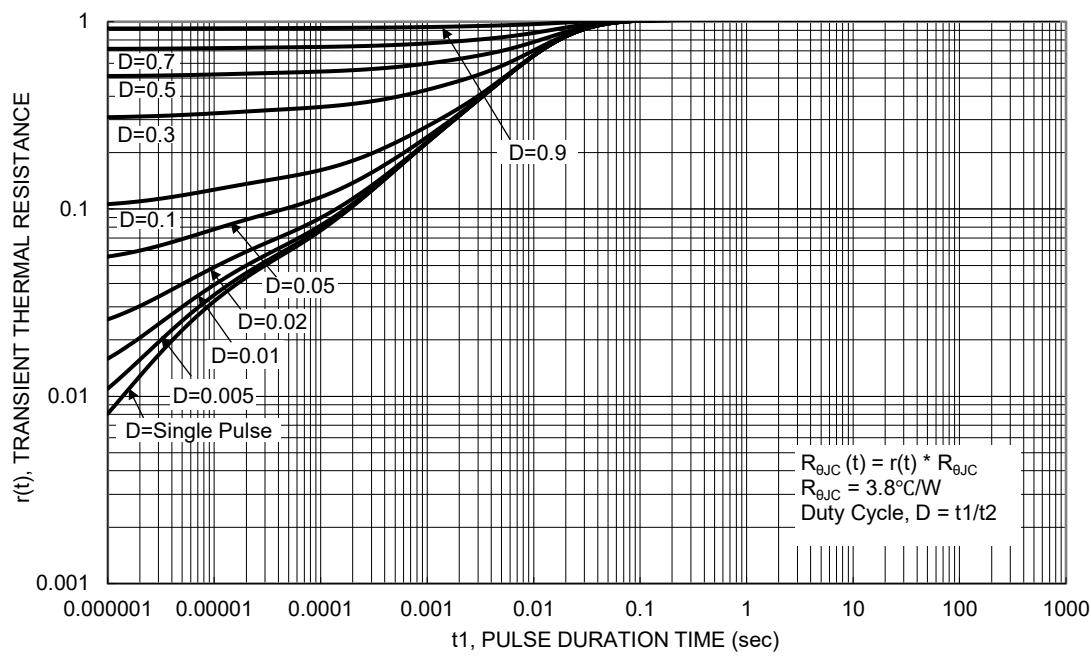
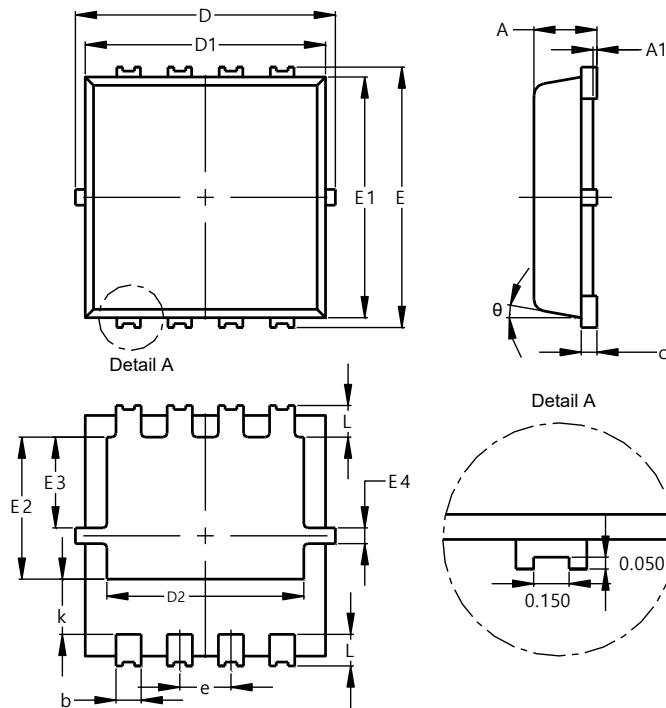


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)



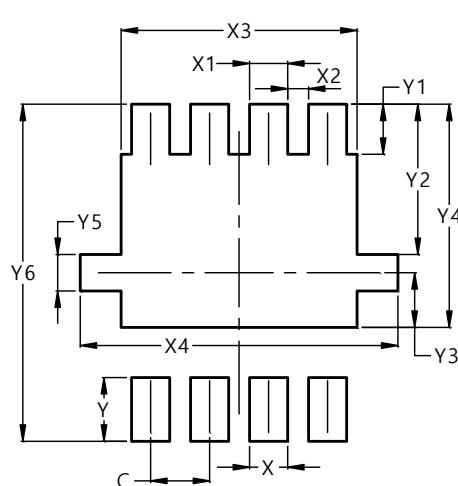
PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	—	—	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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