

Product Summary (Typ. @ $V_{GS} = 4.5V$, $T_A = +25^{\circ}C$)

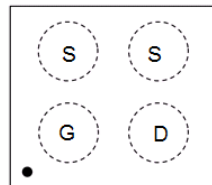
BV_{DSS}	$R_{DS(ON)}$	I_D
12V	38m Ω	4.0A

Description

This new generation MOSFET is engineered to minimize on-state losses and switch ultra-fast, making it ideal for high-efficiency power transfer. It uses Chip-Scale Package (CSP) to increase power density by combining low thermal impedance with minimal $R_{DS(ON)}$ per footprint area.

Applications

- DC-DC Converters
- Battery Management
- Load Switch

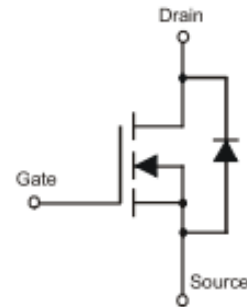

 Top-View
Pin Configuration

Features

- TR-MOS Technology with the Lowest $R_{DS(ON)}$
- CSP with Footprint 0.81mm x 0.81mm (Typ.)
- Height = 0.29mm for Low Profile
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: X3-DSN0808-4
- Terminal Connections: See Diagram Below
- Terminal Finish: Matte Tin Annealed Over Copper Pillar[Ⓔ]
- UBM: 203 μ m

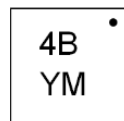


Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1053UCP4-7	X3-DSN0808-4	3,000/Tape & Reel

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


4B = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: E = 2017)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2016	2017	2018	2019	2020	2021	2022
Code	D	E	F	G	H	I	J

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	12	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Source Current @ $V_{GS} = 4.5V$ (Note 5)	I_D	$T_A = +25^\circ C$ 2.7	A
		$T_A = +70^\circ C$ 2.2	
Continuous Source Current @ $V_{GS} = 4.5V$ (Note 6)	I_D	$T_A = +25^\circ C$ 4.0	A
		$T_A = +70^\circ C$ 3.2	
Pulsed Drain Current (Pulse Duration 10 μs , Duty Cycle $\leq 1\%$)	I_{DM}	8	A
Continuous Source-Drain Diode Current	I_S	0.74	A
Pulse Diode Forward Current	I_{SM}	15	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.74	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	167	$^\circ C/W$
Total Power Dissipation (Note 6)	P_D	1.34	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	93	$^\circ C/W$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	12	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1.0	μA	$V_{DS} = 9.6V, V_{GS} = 0V$
Gate-Body Leakage	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 8V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.35	0.5	0.7	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	38	42	m Ω	$V_{GS} = 4.5V, I_D = 1.0A$
			42	50		$V_{GS} = 2.5V, I_D = 1.0A$
			45	53		$V_{GS} = 2.1V, I_D = 1.0A$
			49	65		$V_{GS} = 1.8V, I_D = 0.5A$
			57	80		$V_{GS} = 1.5V, I_D = 0.2A$
			82	110		$V_{GS} = 1.2V, I_D = 0.1A$
Forward Transfer Admittance	$ Y_{fs} $	-	6.0	-	S	$V_{DS} = 6V, I_S = 1.0A$
Body Diode Forward Voltage	V_{SD}	-	0.7	1	V	$V_{GS} = 0V, I_S = 1.0A$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	612	908	pF	$V_{DS} = 6V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	C_{oss}	-	91	127	pF	
Reverse Transfer Capacitance	C_{rss}	-	84	126	pF	
Gate Resistance	R_g	-	1.3	2.6	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	Q_g	-	7.2	15	nC	$V_{GS} = 4.5V, V_{DS} = 6V, I_D = 1.0A$
Gate-Source Charge	Q_{gs}	-	0.6	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.3	-	nC	
Turn-On Delay Time	$t_{D(ON)}$	-	3.6	10	ns	$V_{DD} = 6V, I_D = 1.0A, V_{GEN} = 4.5V, R_G = 1\Omega, R_L = 6\Omega$
Turn-On Rise Time	t_R	-	6.0	14	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	13.5	32	ns	
Turn-Off Fall Time	t_F	-	2	4	ns	
Reverse Recovery Charge	Q_{RR}	-	0.7	1.5	nC	$I_F = 1A, di/dt = 100A/\mu s$
Body Diode Reverse Recovery Time	t_{RR}	-	6.4	14	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

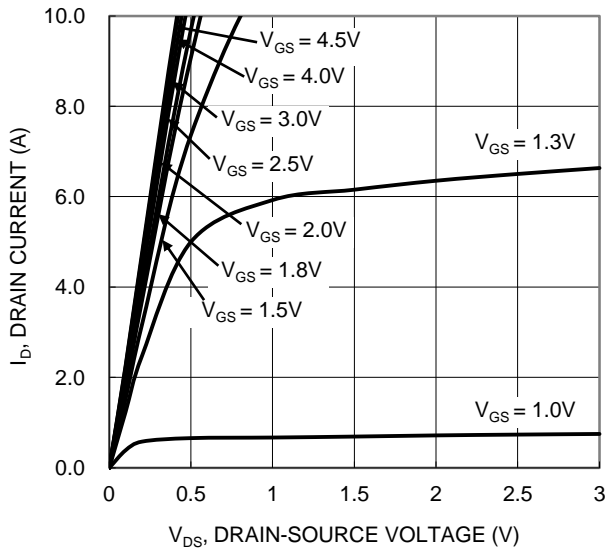


Figure 1. Typical Output Characteristic

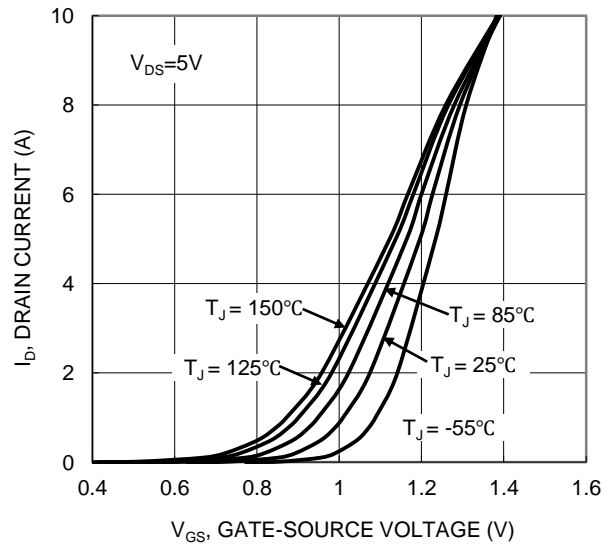


Figure 2. Typical Transfer Characteristic

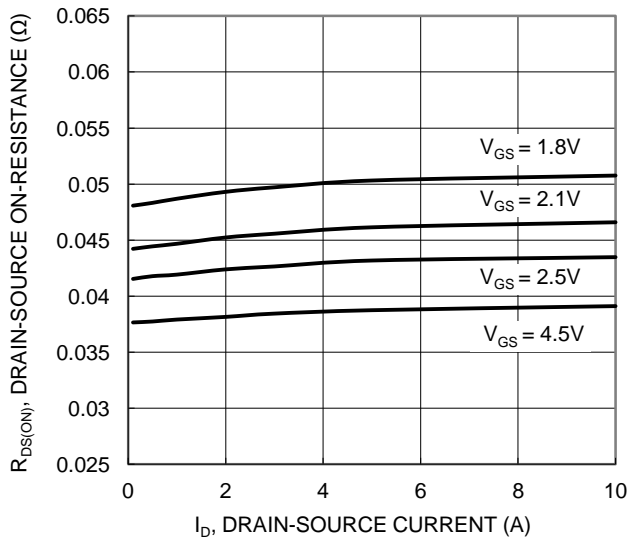


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

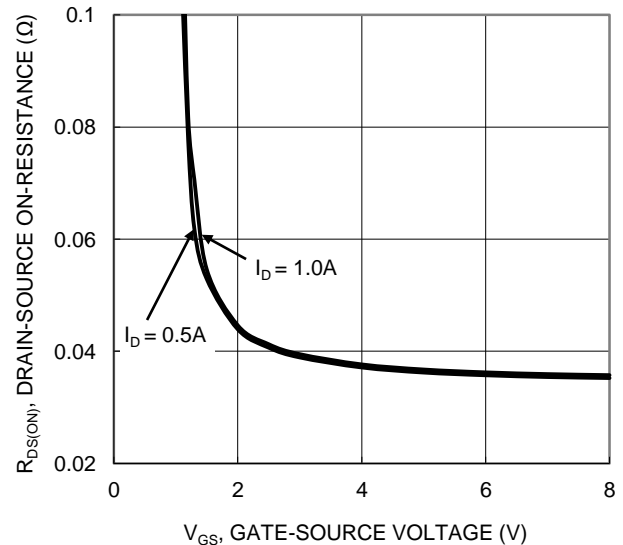


Figure 4. Typical Transfer Characteristic

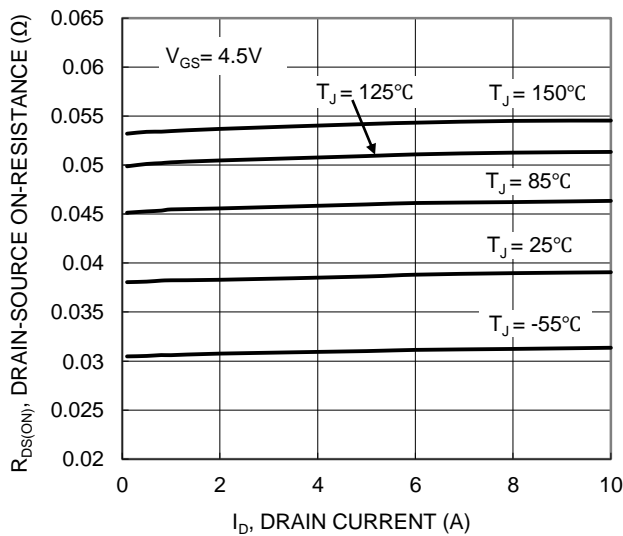


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

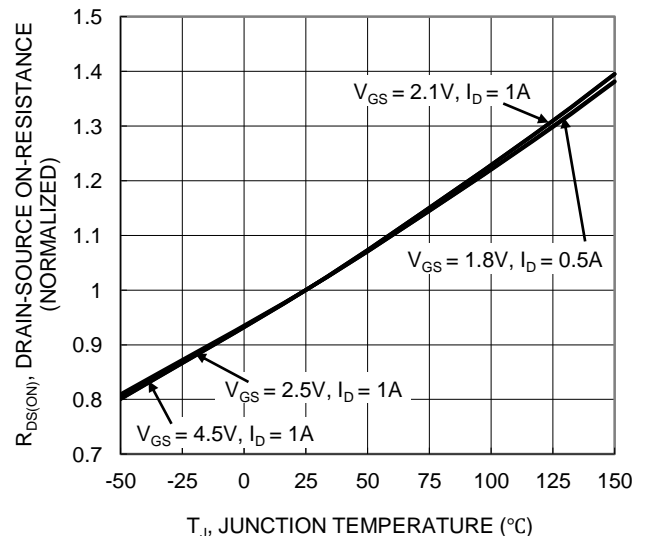
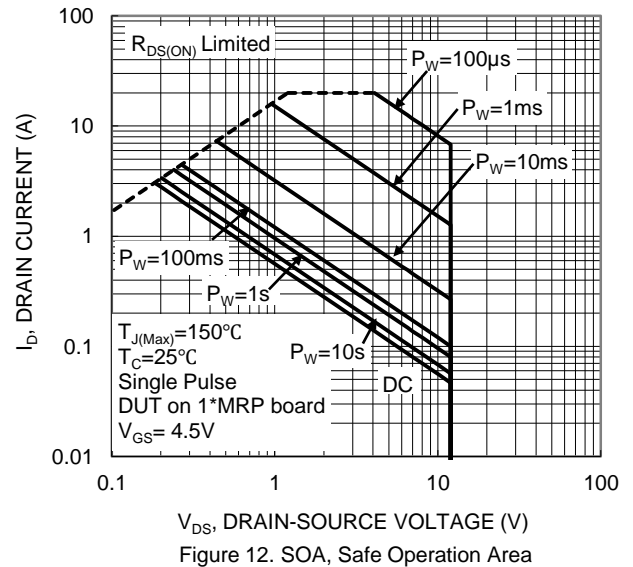
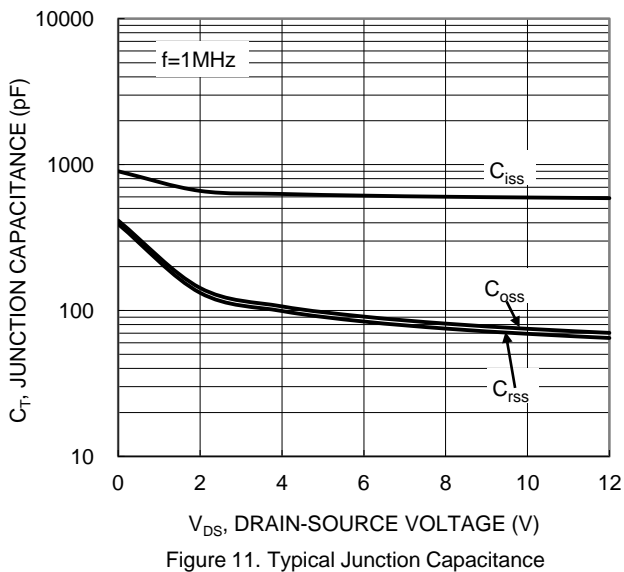
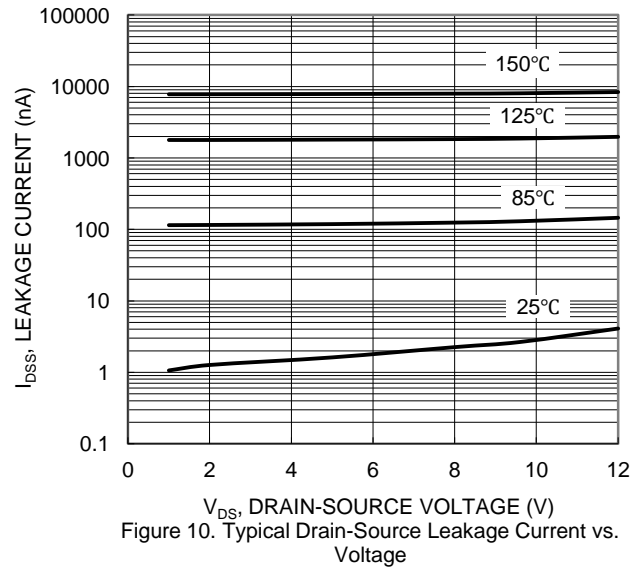
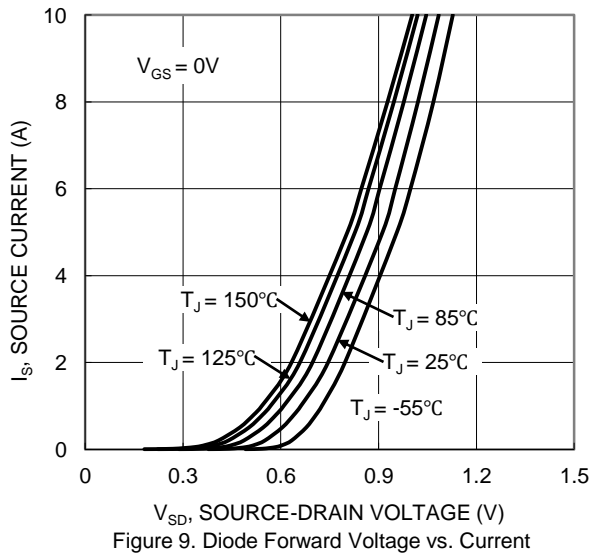
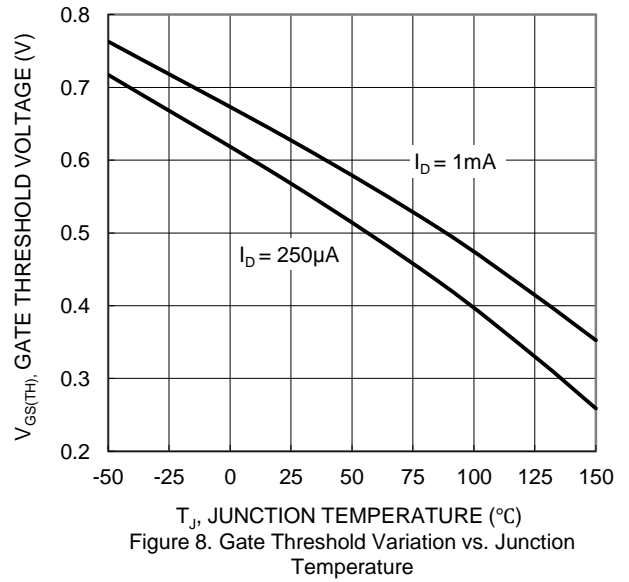
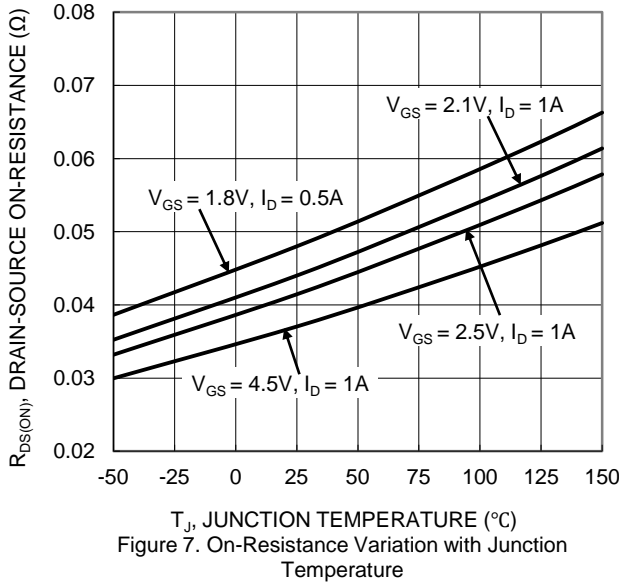


Figure 6. On-Resistance Variation with Junction Temperature



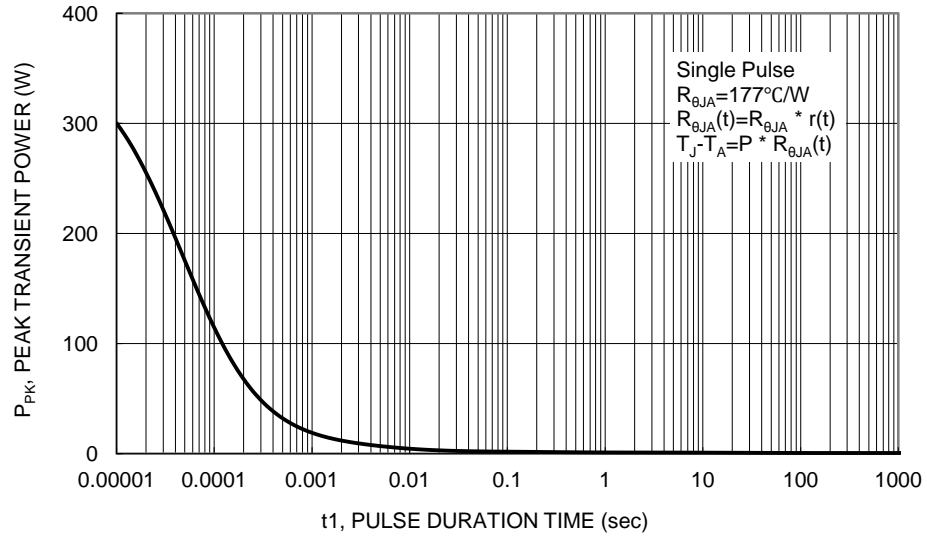


Figure 13. Single Pulse Maximum Power Dissipation

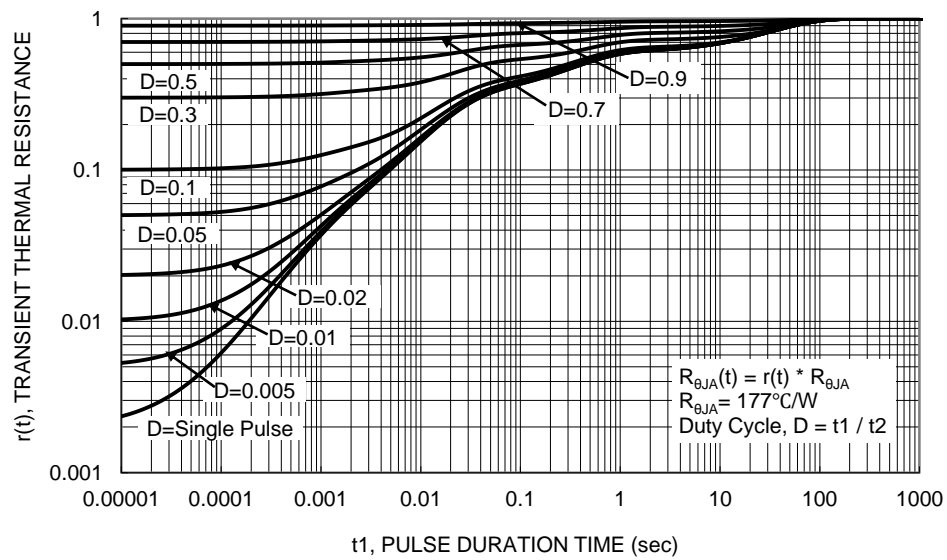
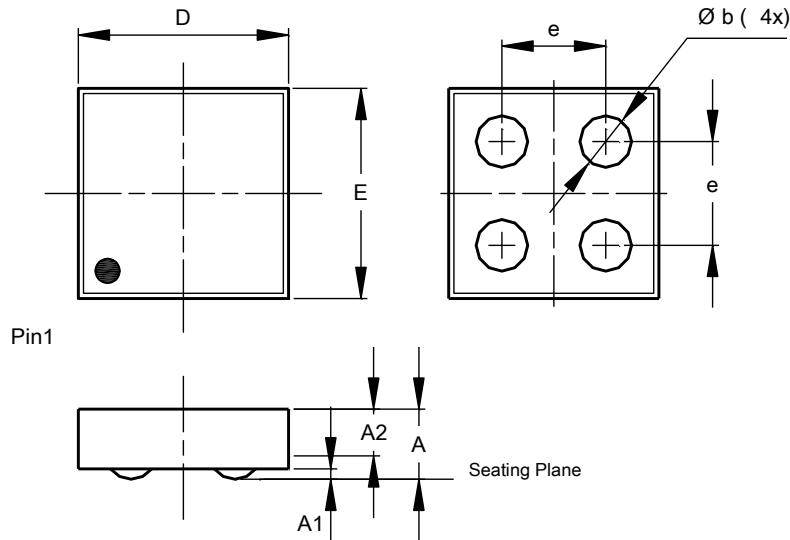


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

X3-DSN0808-4

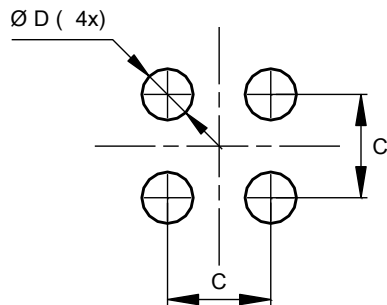


X3-DSN0808-4			
Dim	Min	Max	Typ
A	0.2510	0.2890	0.2700
A1	0.0360	0.0440	0.0400
A2	0.2150	0.2450	0.2300
b	0.1836	0.2244	0.2040
D	0.7900	0.8300	0.810
E	0.7900	0.8300	0.810
e	-	-	0.400
All Dimensions in mm			

Suggested Pad Layout

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

X3-DSN0808-4



Dimensions	Value (in mm)
C	0.400
D	0.2040

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