

Product Summary

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

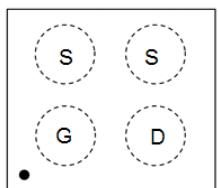
BV_{DSS}	$R_{DS(ON)}$	I_D
12V	38m Ω	4.0A

Description

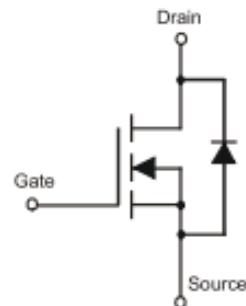
This new generation MOSFET is engineered to minimize on-state losses and switch ultra-fast, making it ideal for high-efficiency power transfer. It uses Chip-Scale Package (CSP) to increase power density by combining low thermal impedance with minimal $R_{DS(ON)}$ per footprint area.

Applications

- DC-DC Converters
- Battery Management
- Load Switch



Top-View
Pin Configuration



Equivalent Circuit

Ordering Information

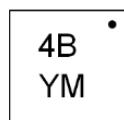
(Note 4)

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

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 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 _{DSS}	12	V	
Gate-Source Voltage	V _{GSS}	±8	V	
Continuous Source Current @ V _{GS} = 4.5V (Note 5)	T _A = +25°C T _A = +70°C	I _D	2.7 2.2	A
Continuous Source Current @ V _{GS} = 4.5V (Note 6)	T _A = +25°C T _A = +70°C	I _D	4.0 3.2	A
Pulsed Drain Current (Pulse Duration 10μs, Duty Cycle ≤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 _{θJA}	167	°C/W
Total Power Dissipation (Note 6)	P _D	1.34	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	93	°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}	12	-	-	V	V _{GS} = 0V, I _D = 250μA
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} = ±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 = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	-	38 42 45 49 57 82	42 50 53 65 80 110	mΩ	V _{GS} = 4.5V, I _D = 1.0A V _{GS} = 2.5V, I _D = 1.0A V _{GS} = 2.1V, I _D = 1.0A V _{GS} = 1.8V, I _D = 0.5A V _{GS} = 1.5V, I _D = 0.2A 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 _{trs}	-	84	126	pF	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Gate Resistance	R _g	-	1.3	2.6	Ω	
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	V _{DD} = 6V, I _D = 1.0A V _{GEN} = 4.5V, R _G = 1Ω, R _L = 6Ω
Turn-On Delay Time	t _{D(ON)}	-	3.6	10	ns	
Turn-On Rise Time	t _R	-	6.0	14	ns	V _{DD} = 6V, I _D = 1.0A V _{GEN} = 4.5V, R _G = 1Ω, R _L = 6Ω
Turn-Off Delay Time	t _{D(OFF)}	-	13.5	32	ns	
Turn-Off Fall Time	t _F	-	2	4	ns	I _F = 1A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	-	0.7	1.5	nC	
Body Diode Reverse Recovery Time	t _{RR}	-	6.4	14	ns	I _F = 1A, di/dt = 100A/μs

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

7. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to production testing.

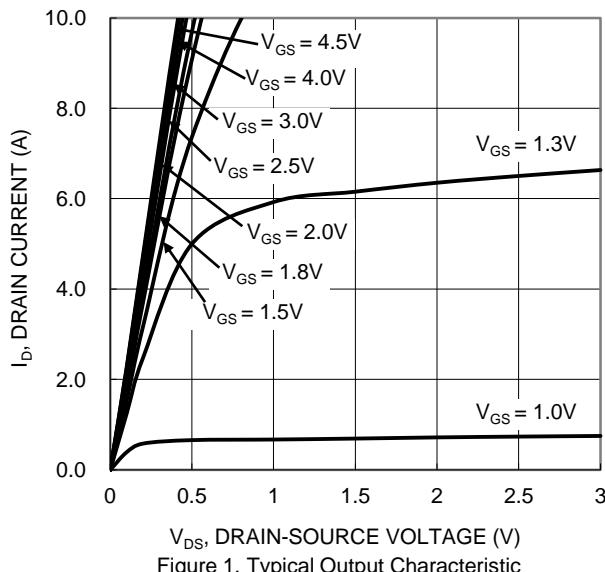


Figure 1. Typical Output Characteristic

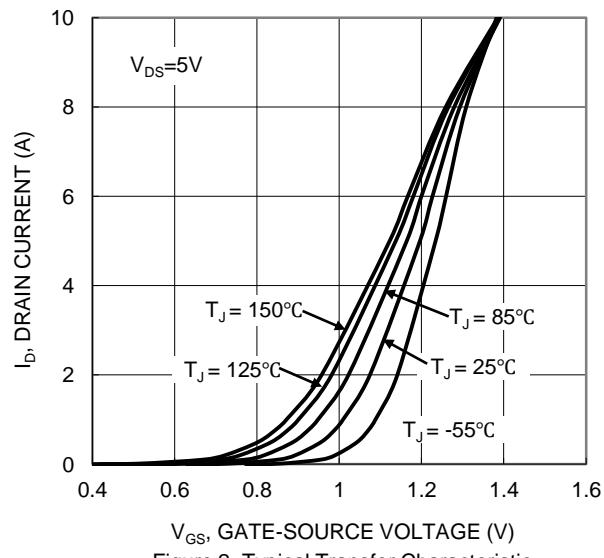


Figure 2. Typical Transfer Characteristic

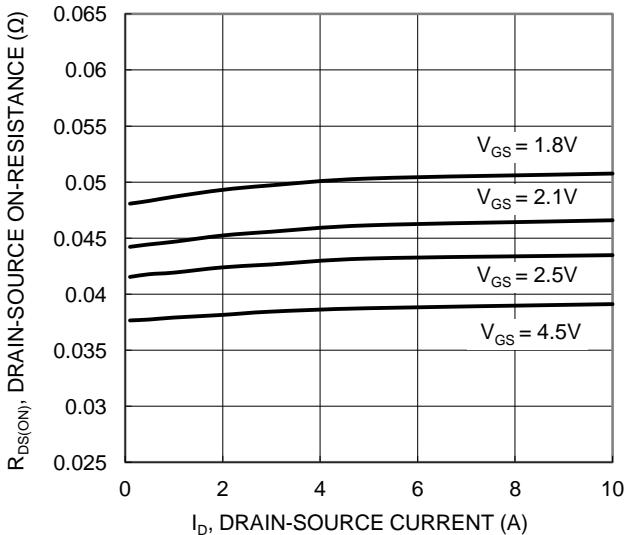


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

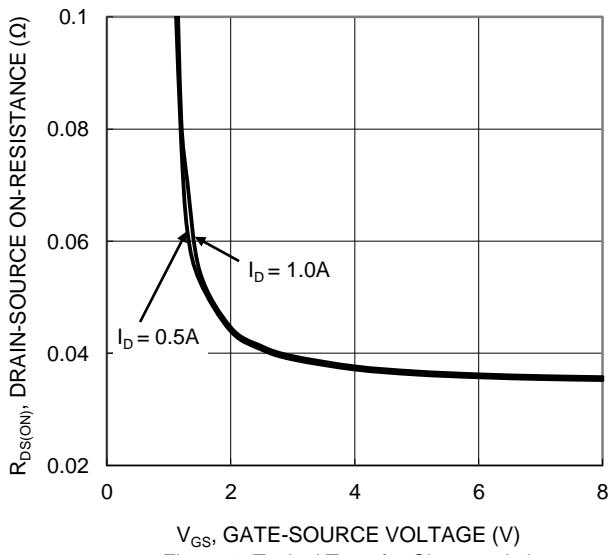


Figure 4. Typical Transfer Characteristic

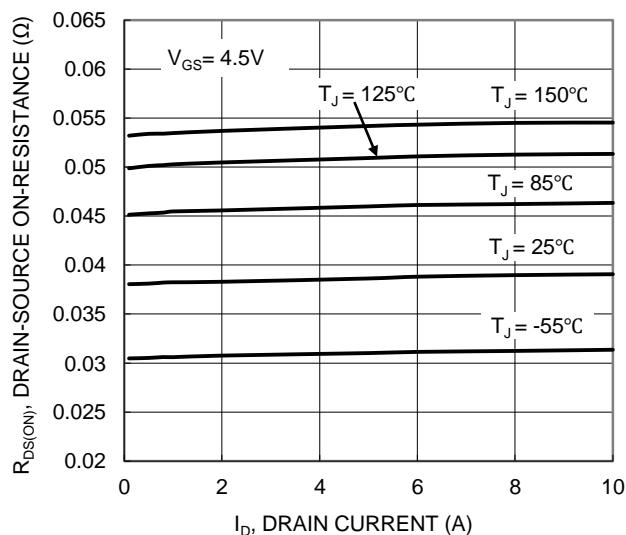


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

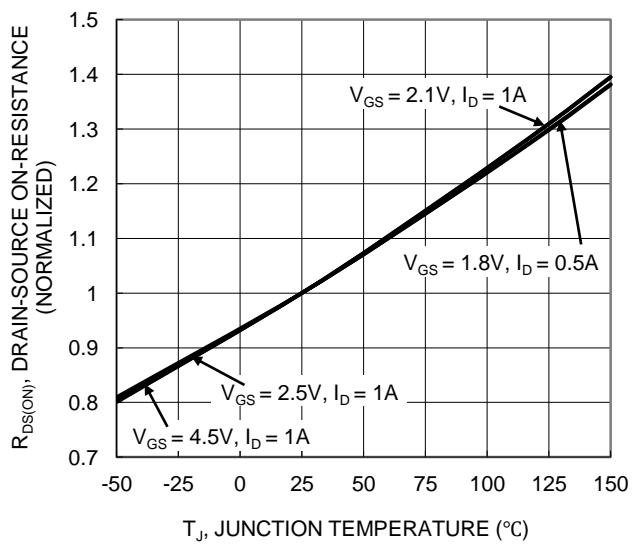


Figure 6. On-Resistance Variation with Junction Temperature

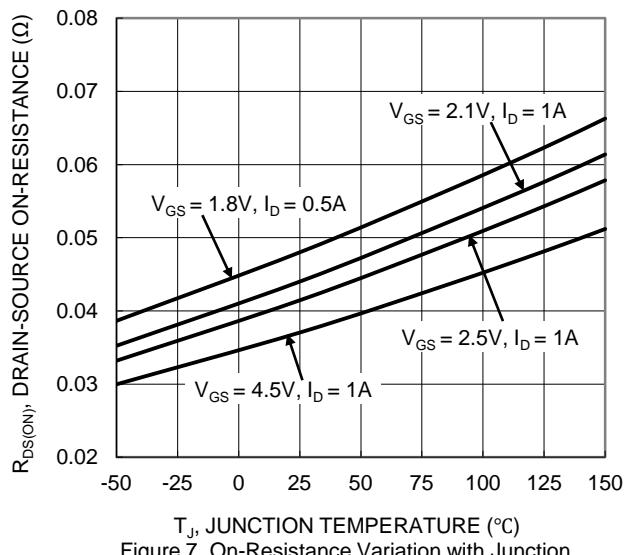


Figure 7. On-Resistance Variation with Junction Temperature

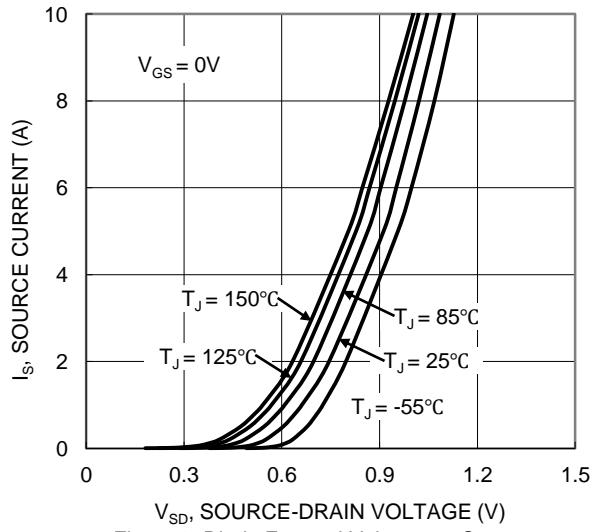


Figure 9. Diode Forward Voltage vs. Current

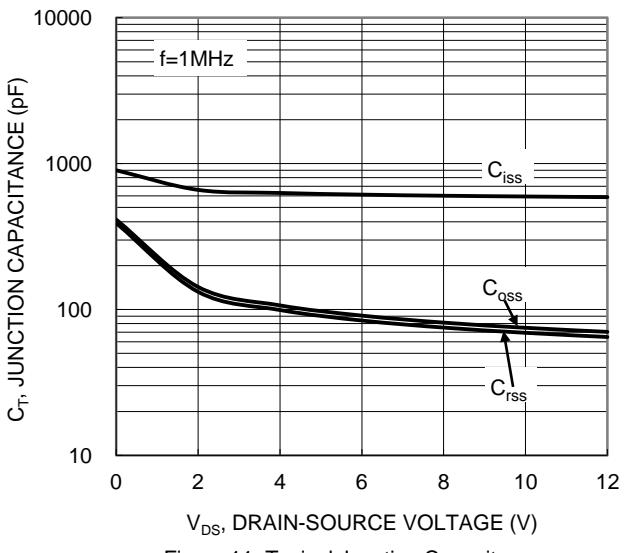


Figure 11. Typical Junction Capacitance

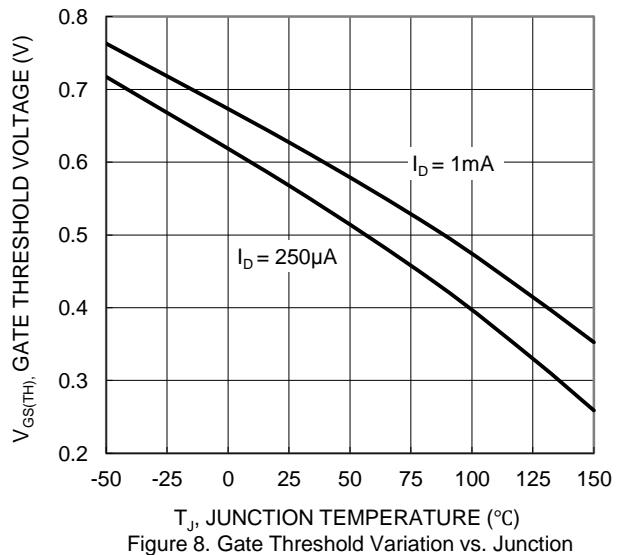


Figure 8. Gate Threshold Variation vs. Junction Temperature

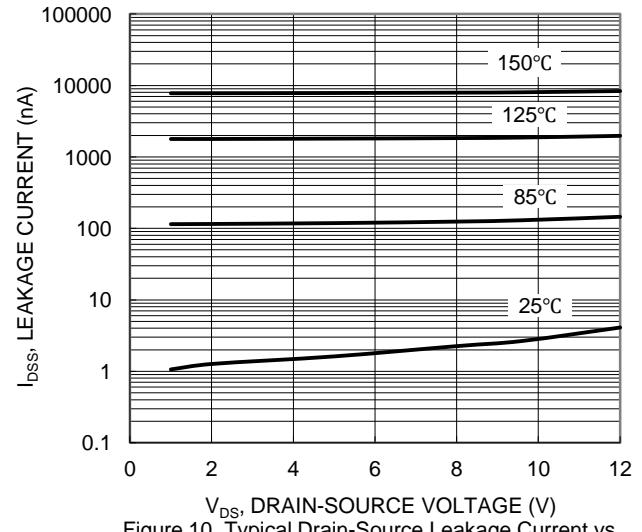


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

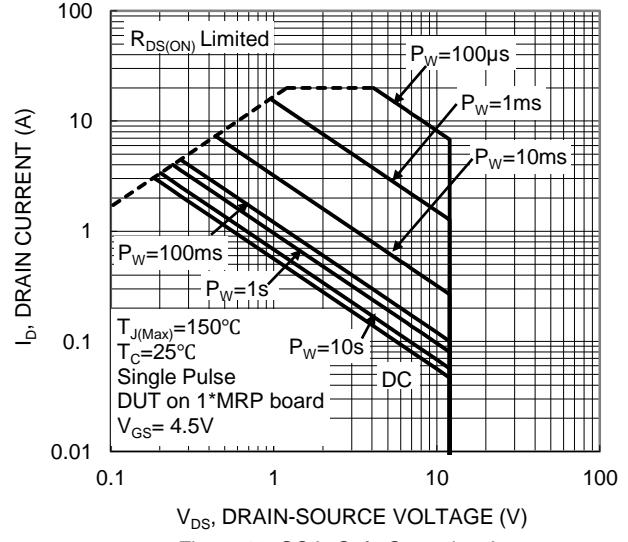


Figure 12. SOA, Safe Operation Area

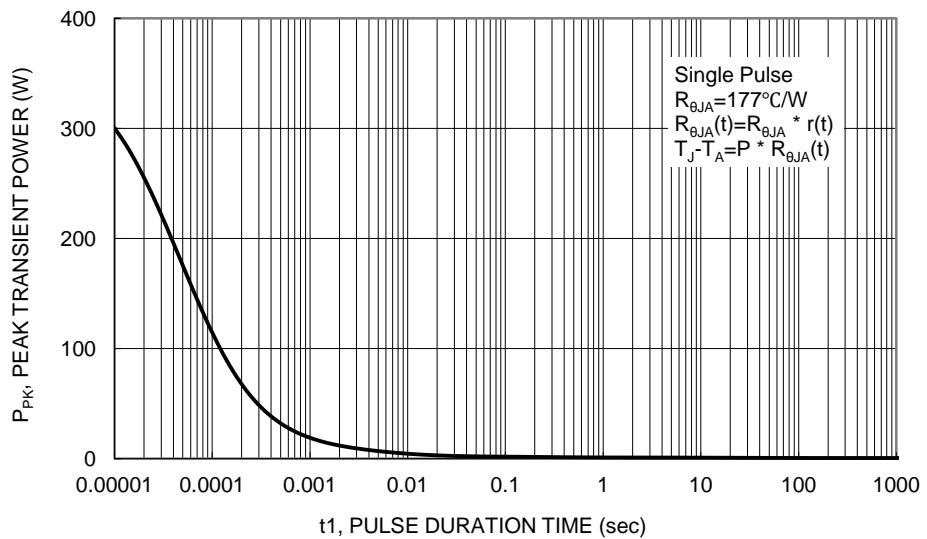


Figure 13. Single Pulse Maximum Power Dissipation

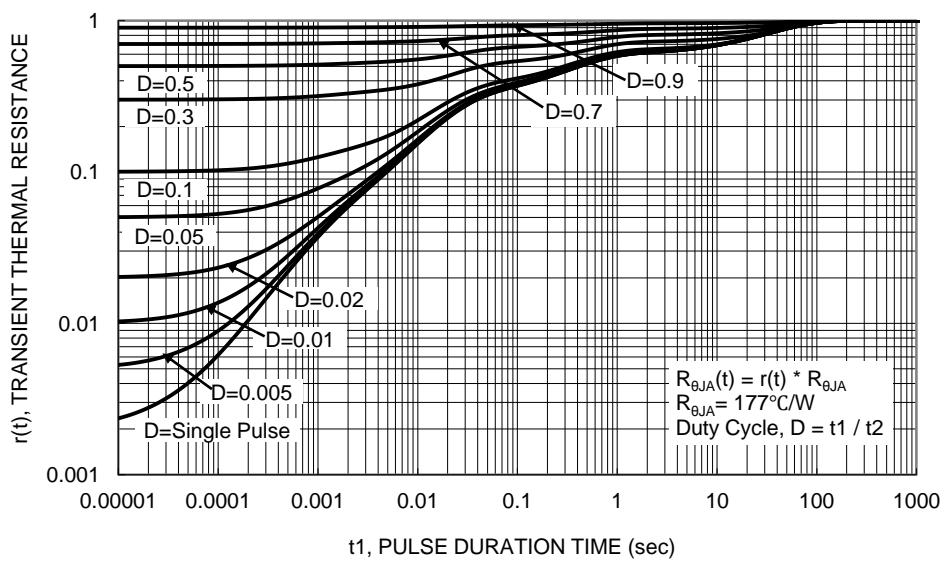
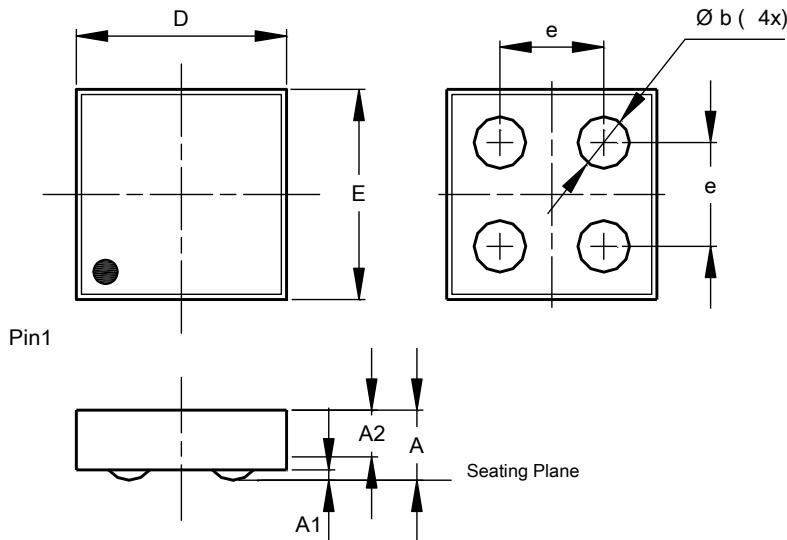


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

X3-DSN0808-4



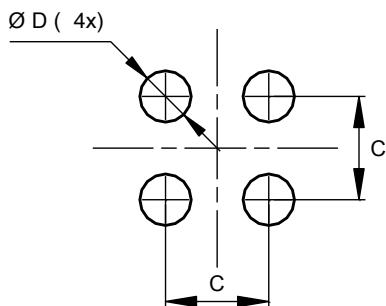
X3-DSN0808-4			
Dim	Min	Max	Typ
A	0.2510	0.2890	0.2700
A1	0.0360	0.0440	0.0400
A2	0.2150	0.2450	0.2300
b	0.1836	0.2244	0.2040
D	0.7900	0.8300	0.810
E	0.7900	0.8300	0.810
e	-	-	0.400

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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