

Product Summary

BV _{DSS}	R _{DS(ON)} MAX	I _D MAX T _A = +25°C
-20V	45mΩ @ V _{GS} = -4.5V	-4.2A
	62mΩ @ V _{GS} = -2.5V	-3.4A

Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) making it ideal for high efficiency power management applications.

- Battery Management
- Load Switch
- Battery Protection

Features and Benefits

- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.35mm Height
- ESD Protected
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

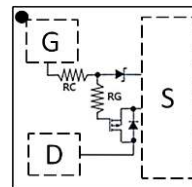
Mechanical Data

- Case: X2-DSN1010-3
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208



ESD PROTECTED

X2-DSN1010-3



Top View
Equivalent Circuit

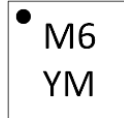
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2043UCA3-7	X2-DSN1010-3	5000/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 (Note 5)

Marking 1



M6 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: 1 = 2021)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2017	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	E	...	I	J	K	L	M	N	O	P	R	S

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

Marking 2



M6 = Product Type Marking Code
 YW = Date Code Marking
 Y or \bar{Y} = Year (ex: 1 = 2021)
 W or \bar{W} = Week (ex: a = Week 27; z Represents Week 52 and 53)

Date Code Key

Year	2017	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	7	...	1	2	3	4	5	6	7	8	9	0

Week	1-26	27-52	53
Code	A-Z	a-z	z

Note: 5. The marking code changed to Marking 2 from week 6, 2021.

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	-20	V
Gate-Source Voltage	V _{GSS}	-20	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	I _D	T _A = +25°C	-4.2
		T _A = +70°C	-3.4
Continuous Drain Current (Note 6) V _{GS} = -2.5V	I _D	T _A = +25°C	-3.4
		T _A = +70°C	-2.7
Pulsed Drain Current (Note 7)	I _{DM}	-25	A
Continuous Gate Clamp Current	I _G	-5	mA

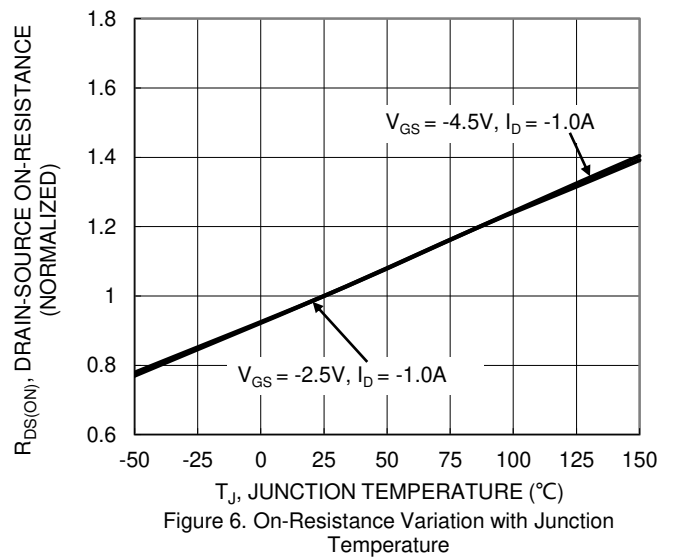
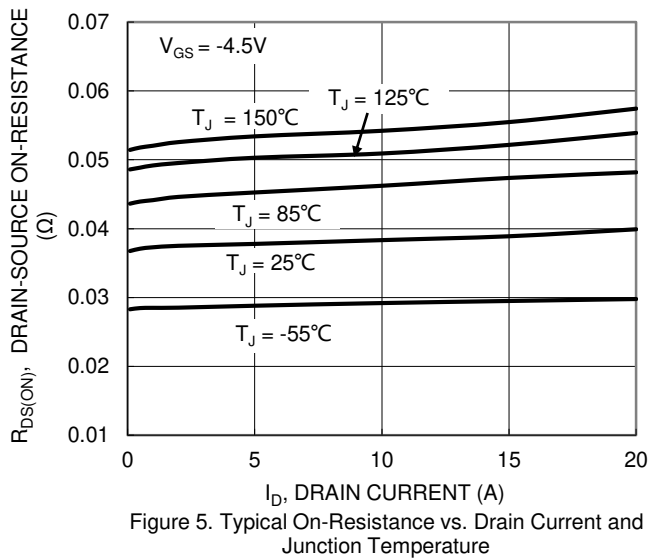
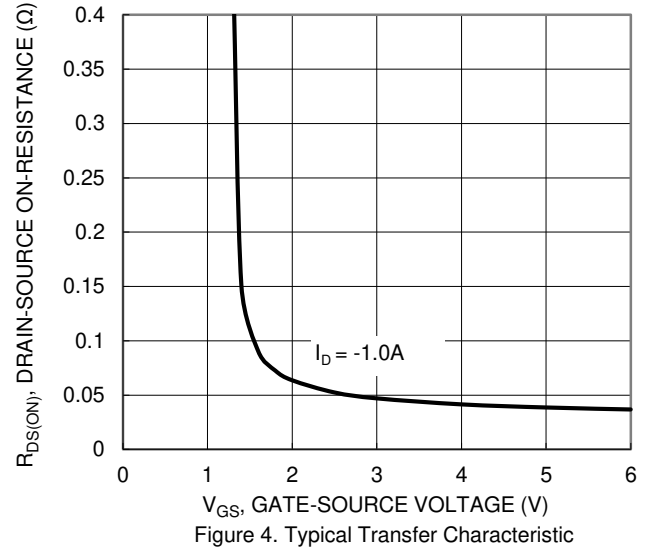
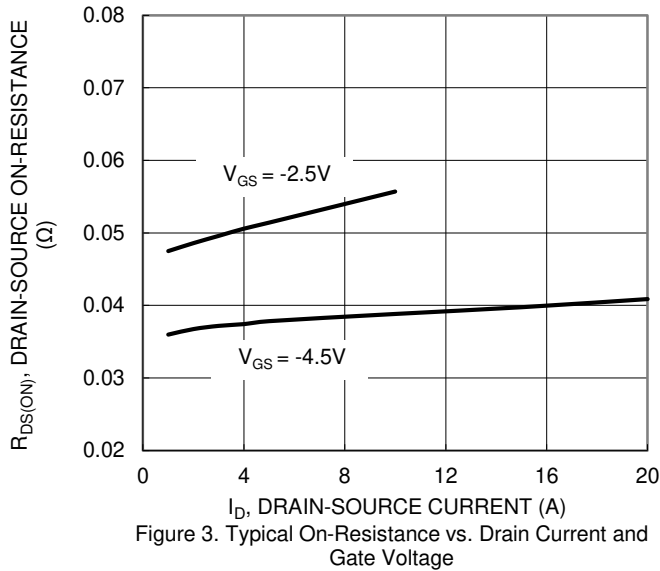
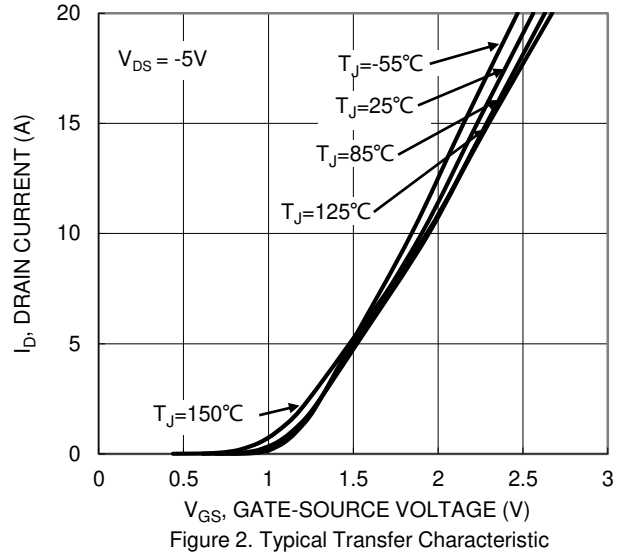
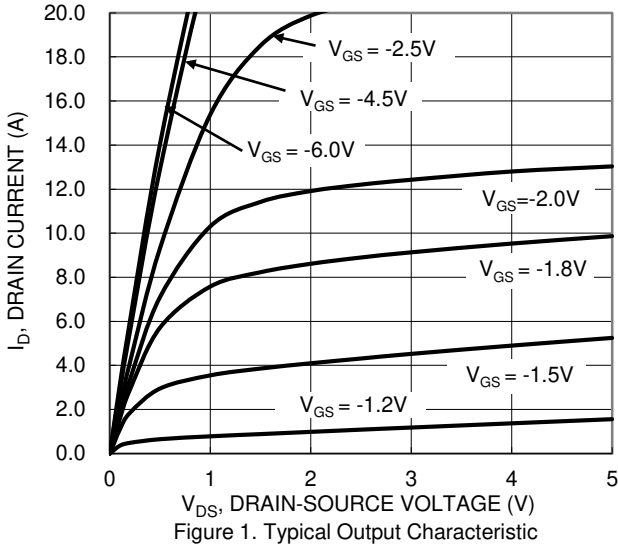
Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 8)	P _D	0.65	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 8)	R _{θJA}	193.5	°C/W
Power Dissipation (Note 6)	P _D	1.3	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	98.5	°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}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -10V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	-100	nA	V _{GS} = -6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-0.4	-0.8	-1.2	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	36	45	mΩ	V _{GS} = -4.5V, I _D = -1A
		—	47	62		V _{GS} = -2.5V, I _D = -1A
Diode Forward Voltage	V _{SD}	—	-0.7	-1	V	V _{GS} = 0V, I _S = -1A
Reverse Recovery Charge	Q _R	—	3.3	—	nC	V _{DS} = -10V, I _F = -1A,
Reverse Recovery Time	t _{RR}	—	10.2	—	ns	di/dt = 200A/μs
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	327	425	pF	V _{DS} = -10V, V _{GS} = 0V, f = 10kHz
Output Capacitance	C _{oss}	—	174	226		
Reverse Transfer Capacitance	C _{rss}	—	13	17		
Series Gate Resistance	R _g	—	20	30	Ω	—
Series Clamp Resistance	R _C	—	14000	—		
Total Gate Charge	Q _g	—	1.46	1.90	nC	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -1A
Gate-Source Charge	Q _{gs}	—	0.35	—		
Gate-Drain Charge	Q _{gd}	—	0.37	—		
Gate Charge at V _{TH}	Q _{g(TH)}	—	0.20	—		
Turn-On Delay Time	t _{d(ON)}	—	986	1479	ns	V _{DS} = -10V, V _{GS} = -2.5V, R _g = 10Ω, I _D = -1A
Turn-On Rise Time	t _r	—	1877	—		
Turn-Off Delay Time	t _{d(OFF)}	—	2120	3180		
Turn-Off Fall Time	t _f	—	2230	—		

- Notes:
6. Device mounted on FR-4 material with 1inch² (6.45cm²), 2oz. (0.071mm thick) Cu.
 7. Repetitive rating, pulse width limited by junction temperature.
 8. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 9. Short duration pulse test used to minimize self-heating effect.
 10. Guaranteed by design. Not subject to production testing.



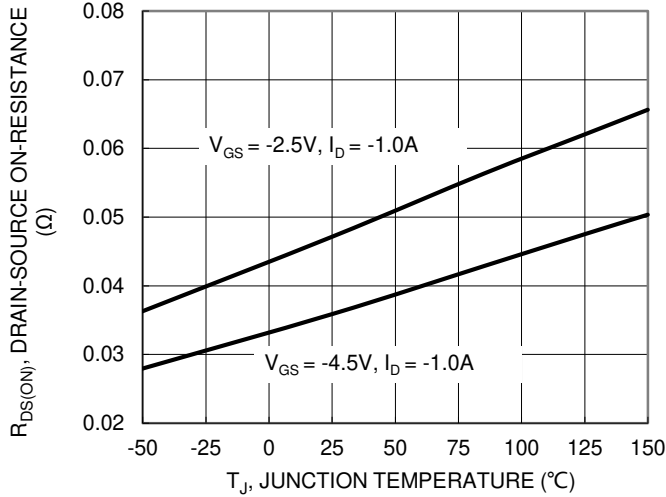


Figure 7. On-Resistance Variation with Junction Temperature

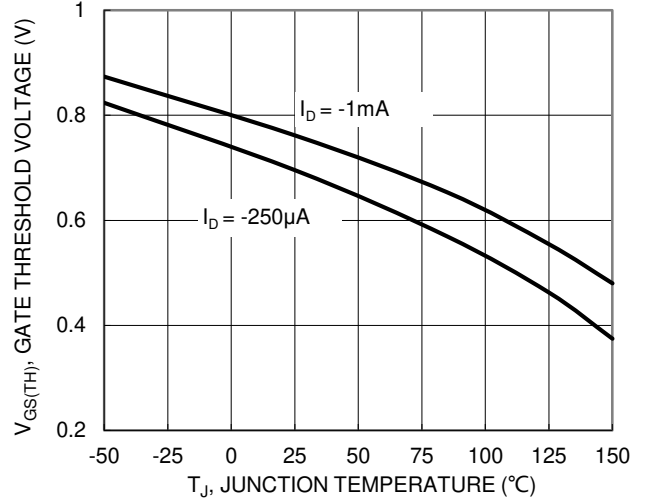


Figure 8. Gate Threshold Variation vs. Junction Temperature

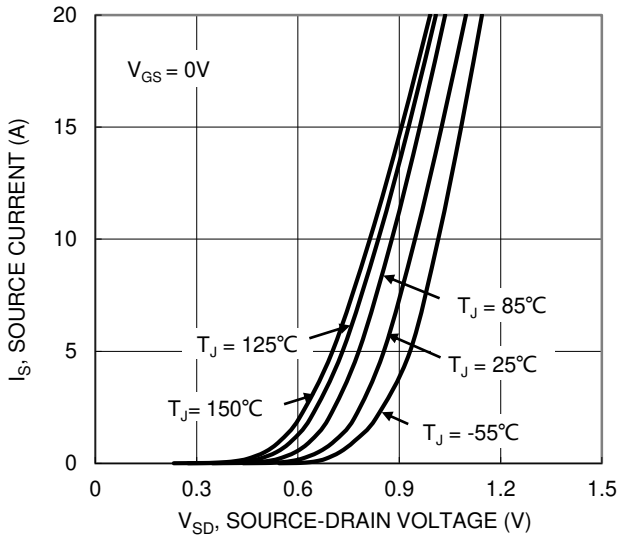


Figure 9. Diode Forward Voltage vs. Current

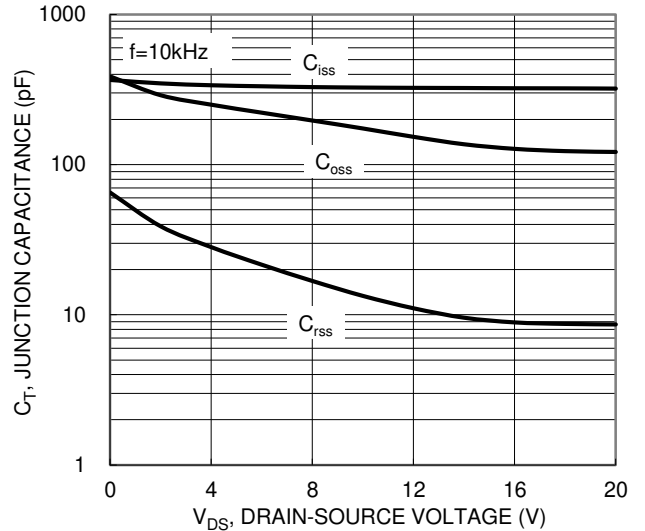


Figure 10. Typical Junction Capacitance

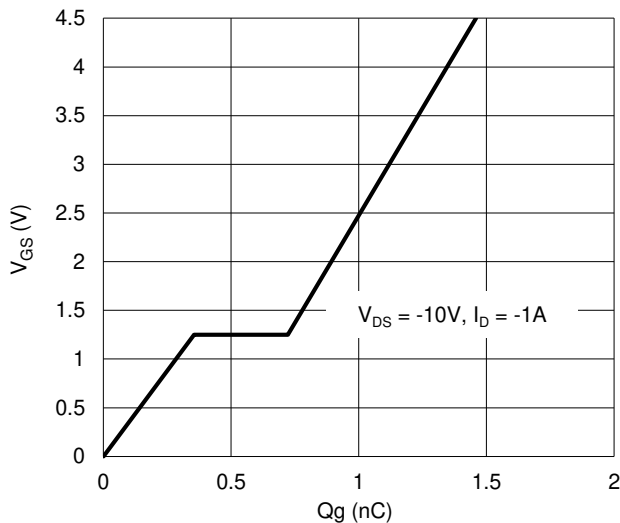


Figure 11. Gate Charge

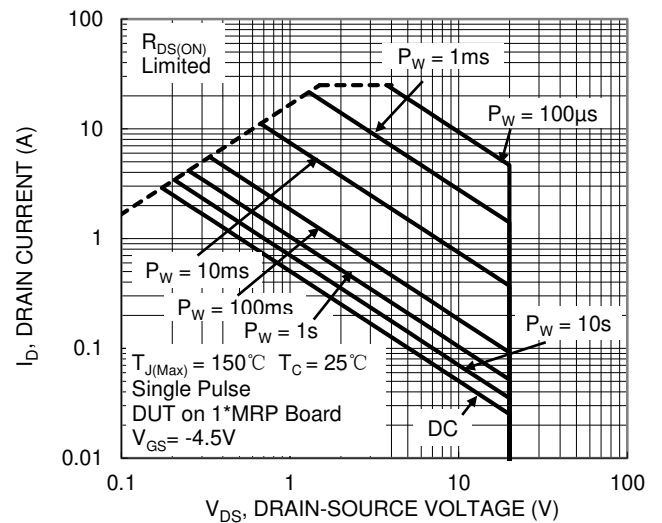


Figure 12. SOA, Safe Operation Area

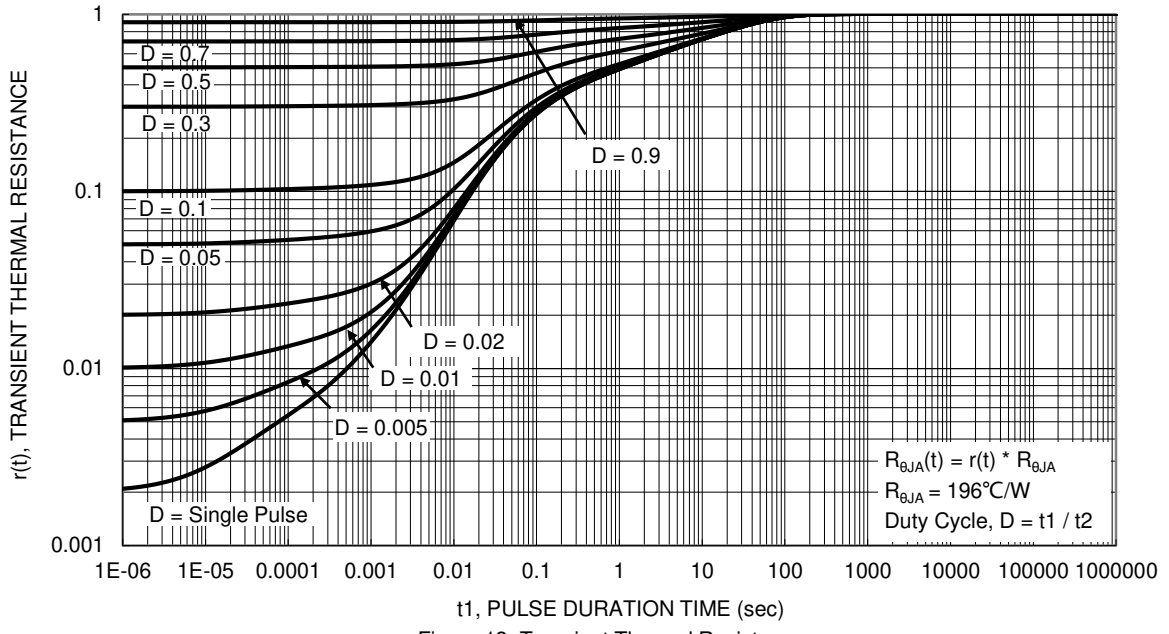
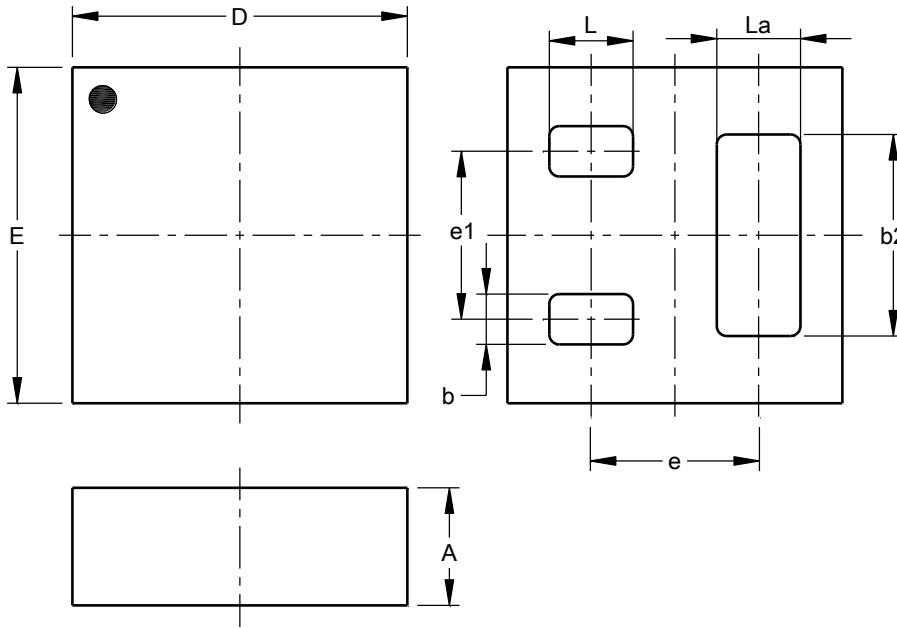


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-DSN1010-3

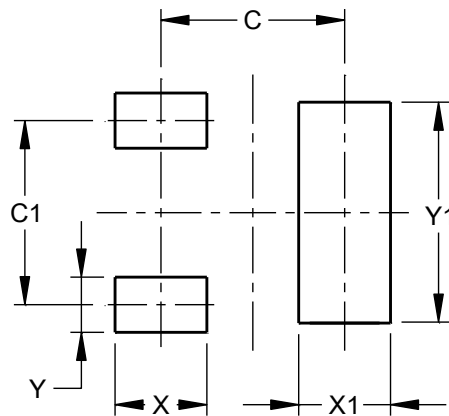


X2-DSN1010-3			
Dim	Min	Max	Typ
A	--	0.35	0.30
b	0.14	0.16	0.15
b2	0.64	0.66	0.65
D	0.92	1.00	0.96
E	0.92	1.00	0.96
e	-	-	0.50
e1	-	-	0.50
L	0.24	0.26	0.25
La	0.24	0.26	0.25
All Dimensions in mm			

Suggested Pad Layout

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

X2-DSN1010-3



Dimensions	Value (in mm)
C	0.50
C1	0.50
X	0.25
X1	0.25
Y	0.15
Y1	0.65

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