

Product Summary

BV _{DSS}	BV _{DSS} @T _{Jmax}	R _{DS(ON)} Max	I _D Max T _A = +25°C
115V	120V	90mΩ @ V _{GS} = 10V	3.4A
		100mΩ @ V _{GS} = 4.5V	2.3A

Description

This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, which makes it ideal for high-efficiency power management applications.

Applications

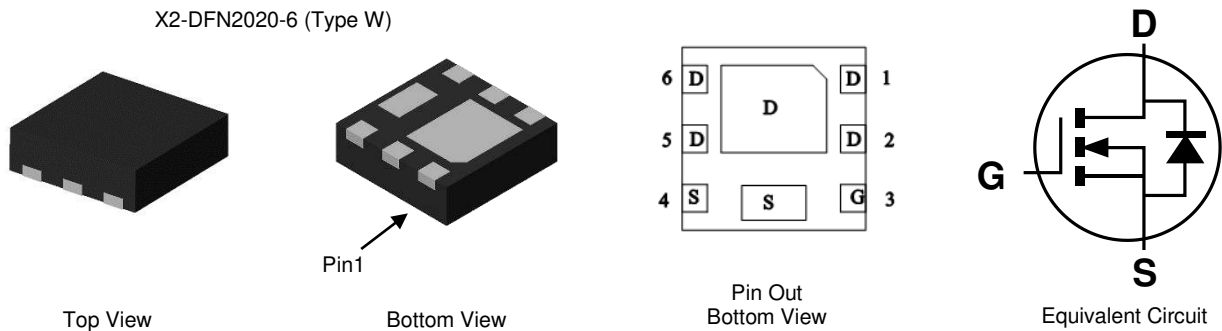
- DC-DC Primary Switch
- Load Switch

Features and Benefits

- 0.4mm Profile—Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- 100% Unclamped Inductive Switching (UIS) Test in Production—Ensures More Reliable and Robust End Application
- 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-DFN2020-6
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.006 grams (Approximate)



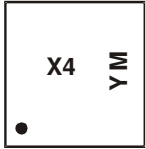
Ordering Information (Note 4)

Part Number	Case	Quantity Per Reel
DMT12H090LFDF4-7	X2-DFN2020-6 (Type W)	3,000
DMT12H090LFDF4-13	X2-DFN2020-6 (Type W)	10,000

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

Site 1:

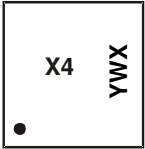


X4 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: 1 = 2021)
 M = Month (ex: 9 = September)

Date Code Key

Year	2018	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	F	...	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

Site 2:



X4 = Product Type Marking Code
 YWX = Date Code Marking
 Y = Year (ex: 1 = 2021)
 W = Week (ex: a = Week 27; z Represents Week 52 and 53)
 X = Internal Code (ex: U = Monday)

Date Code Key

Year	2018	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	8	...	1	2	3	4	5	6	7	8	9	0
Week	1-26			27-52				53				
Code	A-Z			a-z				z				
Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat					
Code	T	U	V	W	X	Y	Z					

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	115	V
Gate-Source Voltage	V _{GSS}	±12	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	T _A = +25°C	3.4
		T _A = +70°C	2.7
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	15	A
Maximum Body Diode Continuous Current (Note 6)	I _S	3.4	A
Pulsed Body Diode Continuous Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	15	A
Avalanche Current, L = 0.3mH	I _{AS}	2.3	A
Avalanche Energy, L = 0.3mH	E _{AS}	0.79	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	T _A = +25°C	0.9
		T _A = +70°C	0.6
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	141	°C/W
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	1.6
		T _A = +70°C	1.0
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	78	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	15	
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}	115	—	—	V	V _{GS} = 0V, I _D = 10mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 92V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±9.6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.6	—	2.2	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	90	mΩ	V _{GS} = 10V, I _D = 3.5A
		—	—	100		V _{GS} = 4.5V, I _D = 3.0A
		—	—	300		V _{GS} = 3.8V, I _D = 1.0A
		—	—	350		V _{GS} = 3V, I _D = 0.5A
		—	—	—		—
Diode Forward Voltage	V _{SD}	—	—	1.3	V	V _{GS} = 0V, I _S = 2.4A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	251	—	pF	V _{DS} = 50V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	80	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	3	—	pF	
Gate Resistance	R _g	—	7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	6	—	nC	V _{DS} = 50V, I _D = 4.5A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	0.3	—	nC	
Gate-Drain Charge	Q _{gd}	—	2	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	2.2	—	ns	V _{DS} = 50V, R _L = 11Ω V _{GS} = 10V, R _{GEN} = 3Ω
Turn-On Rise Time	t _r	—	2.6	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	9.3	—	ns	
Turn-Off Fall Time	t _f	—	3.9	—	ns	
Reverse Recovery Time	t _{RR}	—	83	—	ns	I _F = 4.5A, di/dt = 300A/µs
Reverse Recovery Charge	Q _{RR}	—	189	—	nC	

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

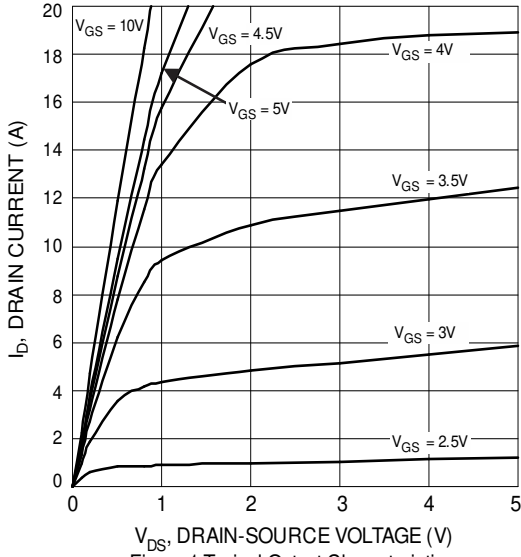


Figure 1 Typical Output Characteristic

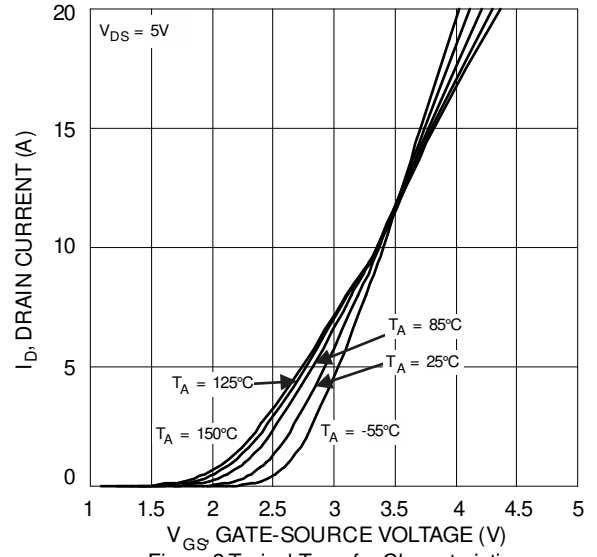


Figure 2 Typical Transfer Characteristics

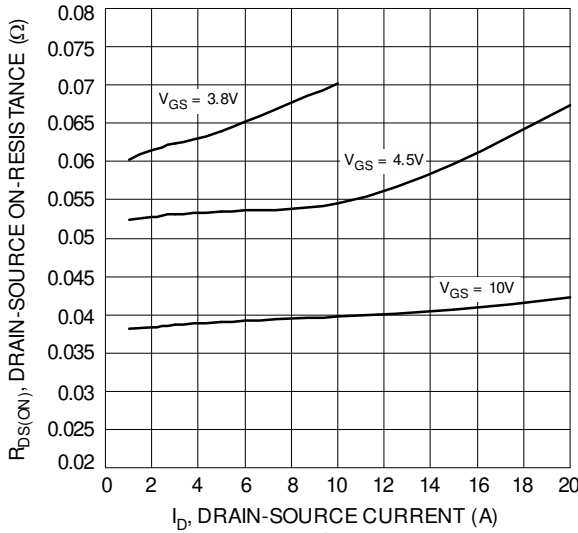


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

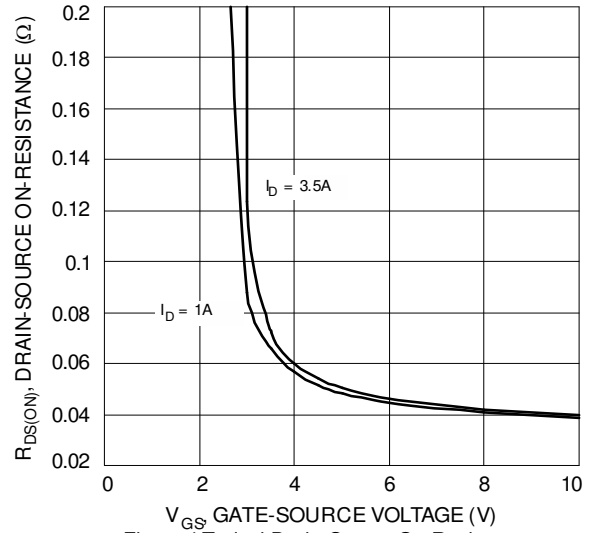


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

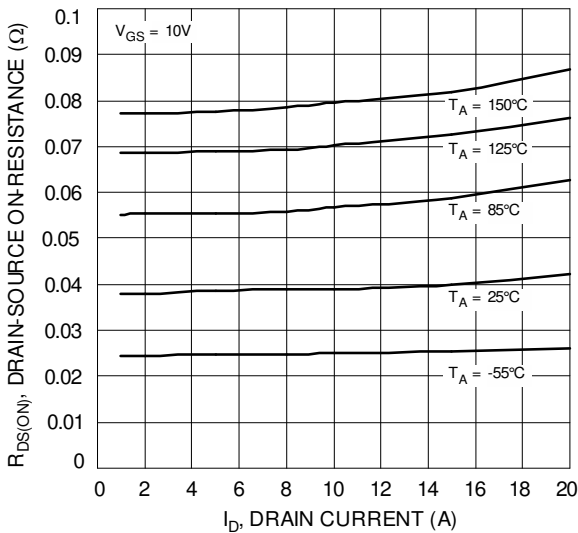


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

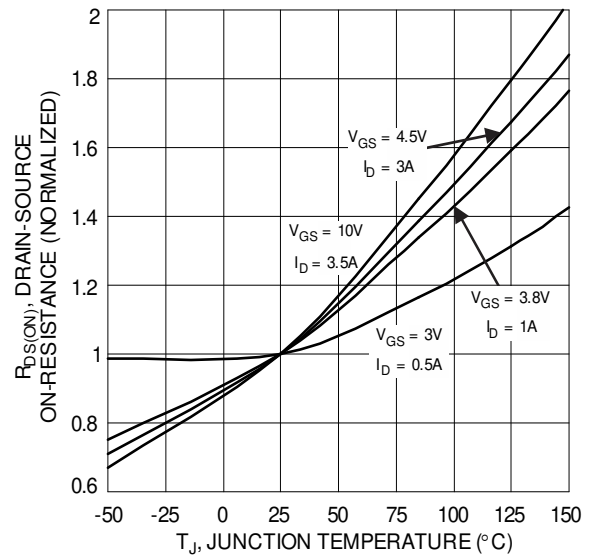


Figure 6 On-Resistance Variation with Temperature

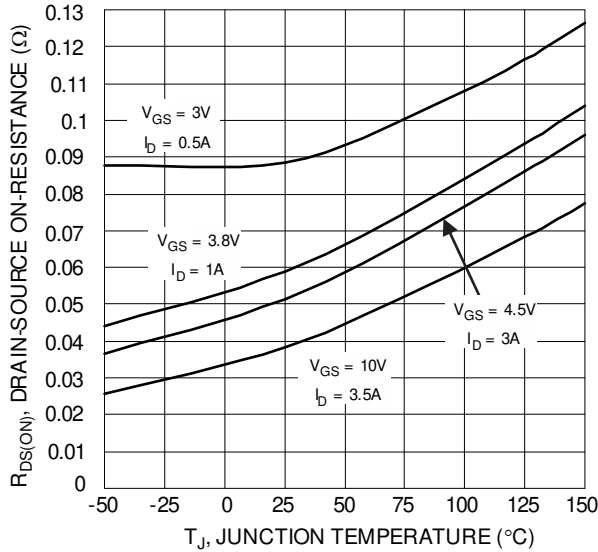


Figure 7 On-Resistance Variation with Temperature

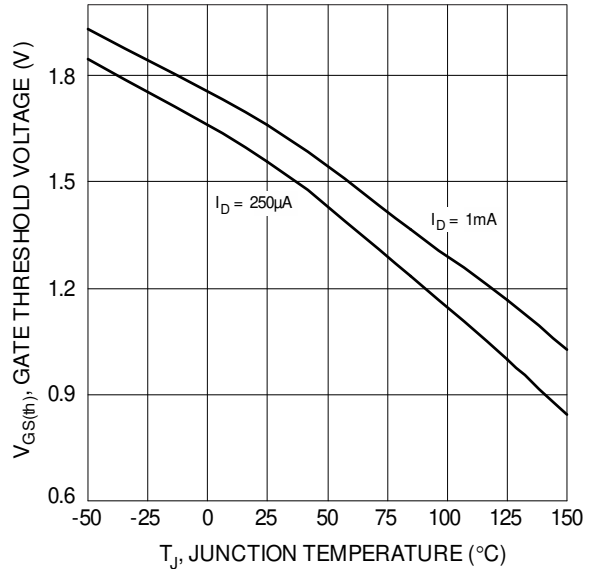


Figure 8 Gate Threshold Variation vs. Junction Temperature

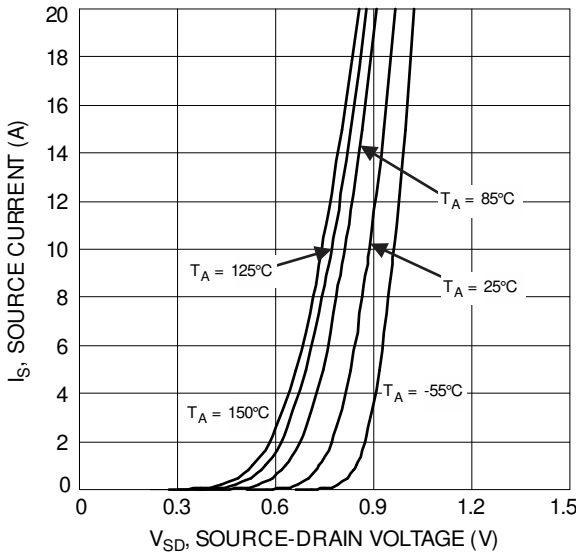


Figure 9 Diode Forward Voltage vs. Current

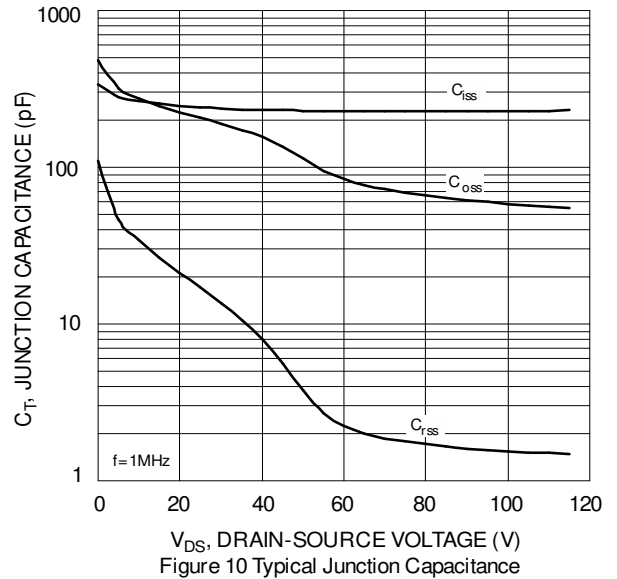


Figure 10 Typical Junction Capacitance

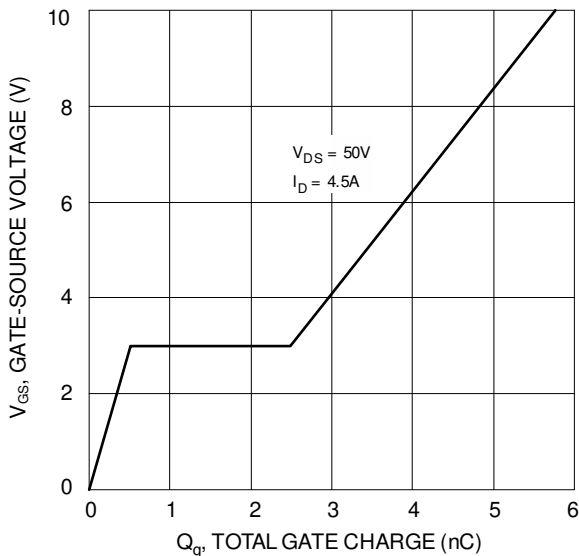


Figure 11 Gate Charge

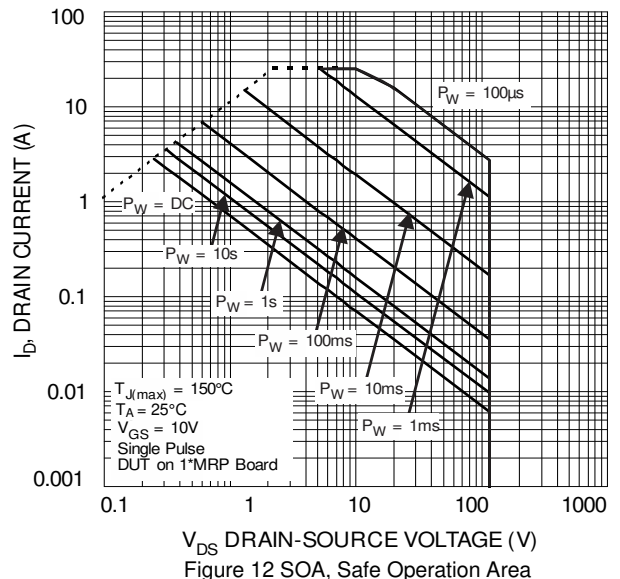
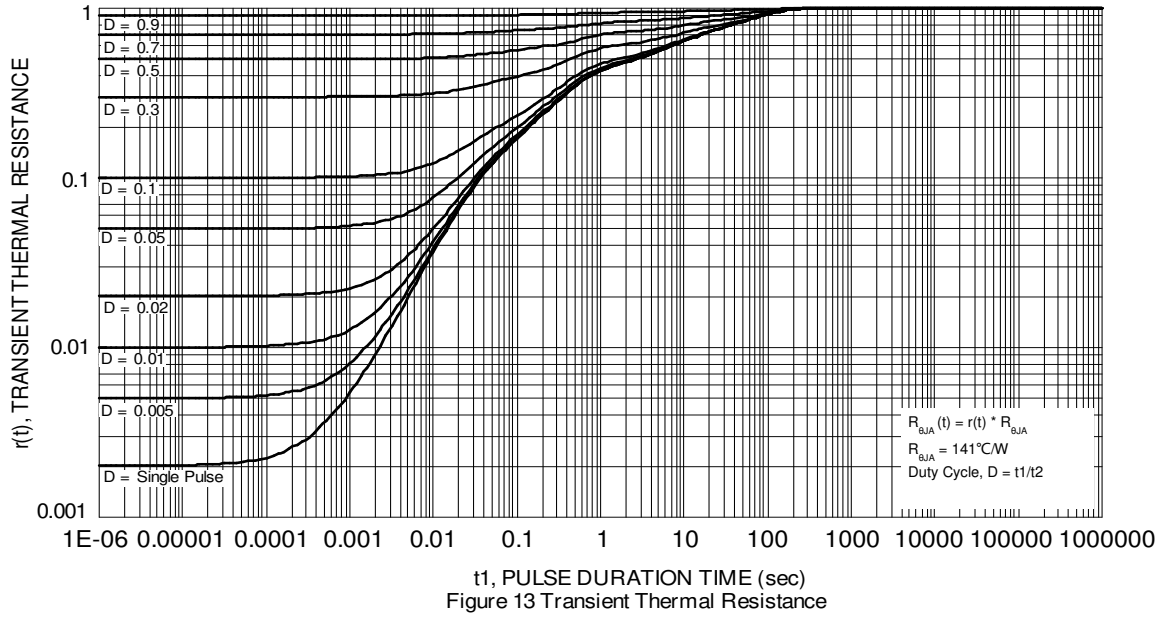


Figure 12 SOA, Safe Operation Area



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