

Product Summary

BV _{DSS}	R _{Ds(ON)} Max	I _D Max T _A = +25°C
-20V	54mΩ @ V _{GS} = -4.5V	-4.7A
	69mΩ @ V _{GS} = -2.5V	-4.2A
	90mΩ @ V _{GS} = -1.8V	-3.7A

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

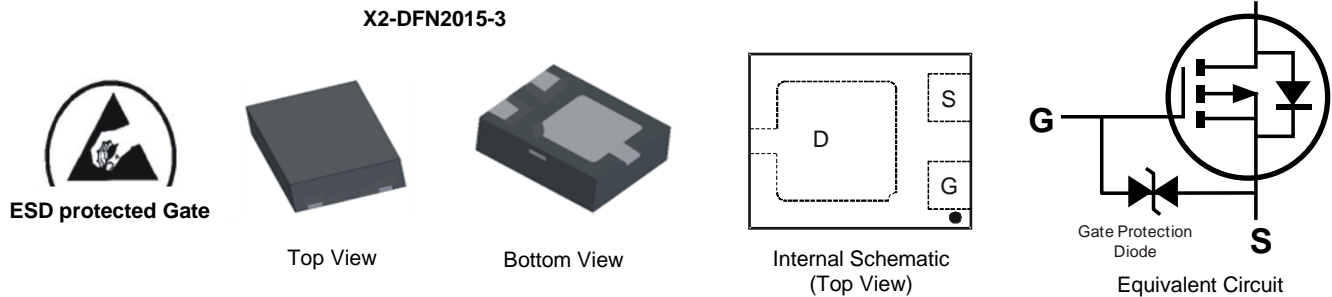
Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP2070UFY4Q 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: X2-DFN2015-3
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^(e4)
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

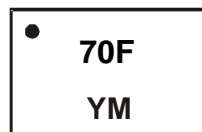


Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2070UFY4Q-7	X2-DFN2015-3	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



70F = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: L = 2024)
 M = Month (ex: 9 = September)

Date Code Key

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	K	L	M	N	P	R	S	T	U	V	W	X

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	-20	V
Gate-Source Voltage	V _{GSS}	±8	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	I _D	Steady State T _A = +25°C	-4.7
		T _A = +70°C	-3.8
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	-2.5	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	-26	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	160	°C/W
Total Power Dissipation (Note 6)	P _D	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	68	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	8.6	
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}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	T _J = +25°C V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±8.0V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.3	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	32	54	mΩ	V _{GS} = -4.5V, I _D = -4.0A
		—	45	69		V _{GS} = -2.5V, I _D = -3.5A
		—	58	90		V _{GS} = -1.8V, I _D = -1.0A
Diode Forward Voltage	V _{SD}	—	-0.6	-1	V	V _{GS} = 0V, I _S = -1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	915	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	90	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	65	—	pF	
Gate Resistance	R _g	—	424	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	10.2	—	nC	V _{GS} = -4.5V, V _{DS} = -10V I _D = -4A
Gate-Source Charge	Q _{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.3	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	113	—	ns	V _{DS} = -10V, V _{GS} = -4.5V, R _D = 2.5Ω, R _G = 3.0Ω, I _D = -1A
Turn-On Rise Time	t _r	—	188	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	996	—	ns	
Turn-Off Fall Time	t _f	—	516	—	ns	
Reverse Recovery Time	t _{RR}	—	294	—	ns	I _F = -1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	364	—	nC	I _F = -1.0A, di/dt = 100A/μs

- 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 product testing.

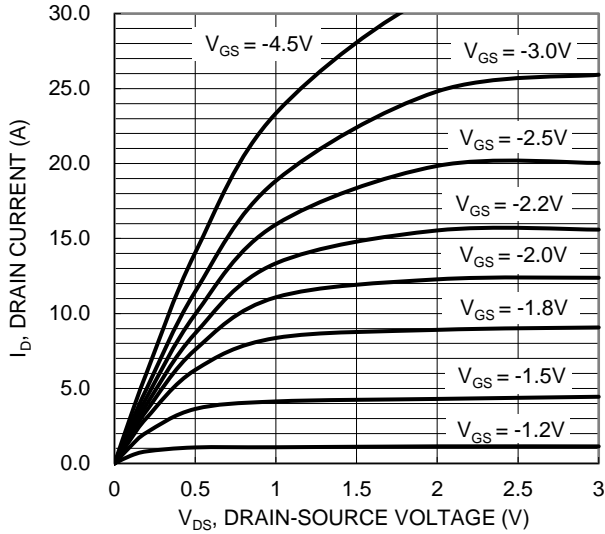


Figure 1. Typical Output Characteristic

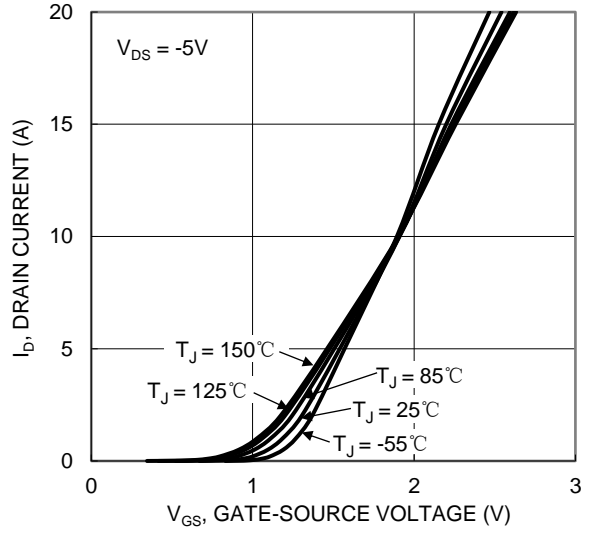


Figure 2. Typical Transfer Characteristic

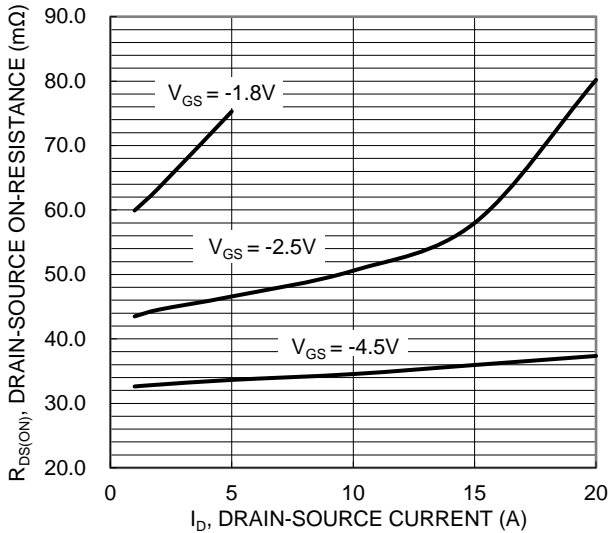


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

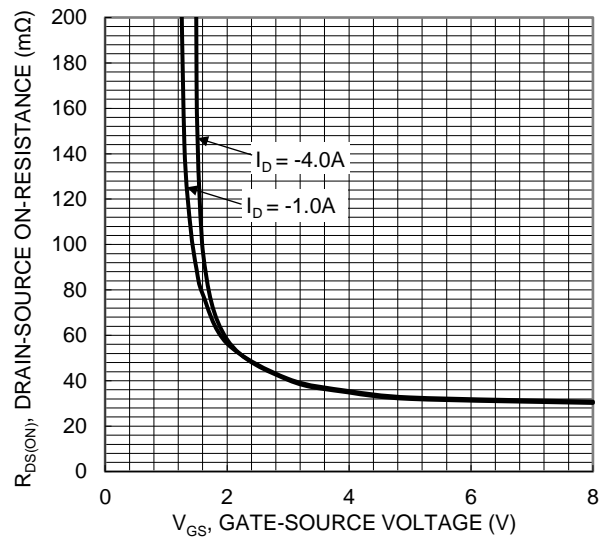


Figure 4. Typical Transfer Characteristic

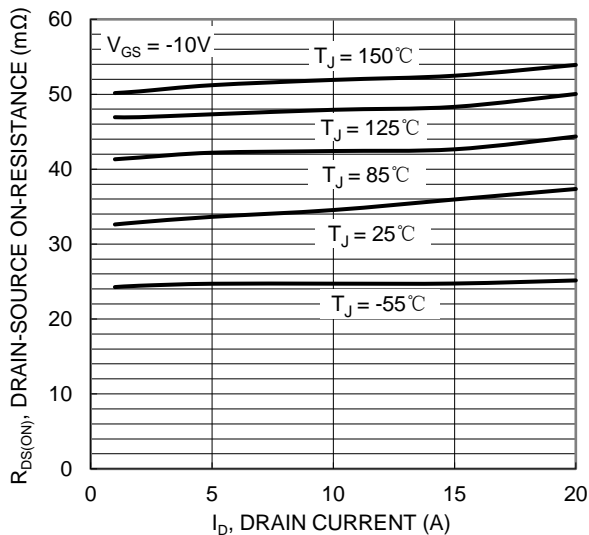


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

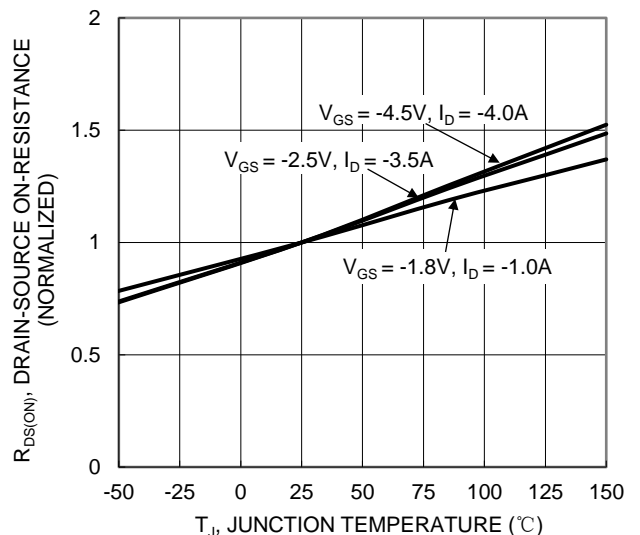


Figure 6. On-Resistance Variation with Junction Temperature

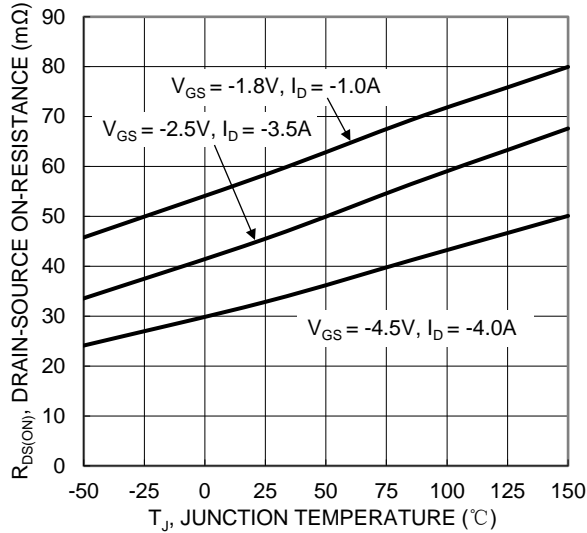


Figure 7. On-Resistance Variation with Junction Temperature

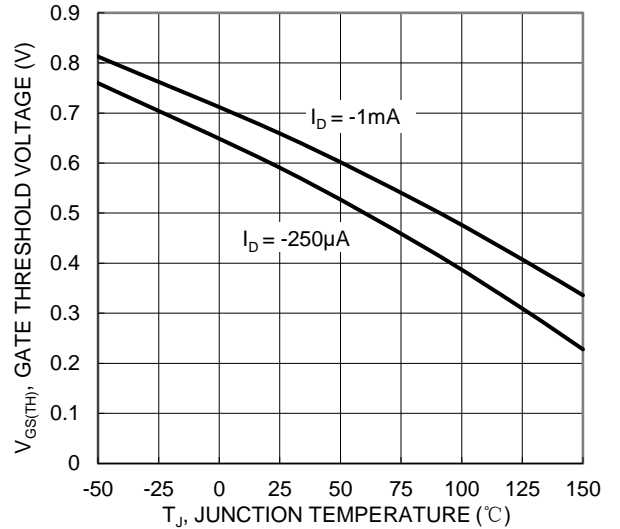


Figure 8. Gate Threshold Variation vs. Junction Temperature

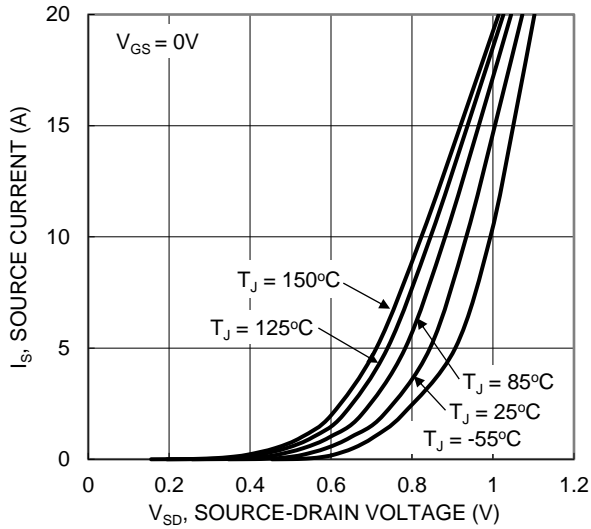


Figure 9. Diode Forward Voltage vs. Current

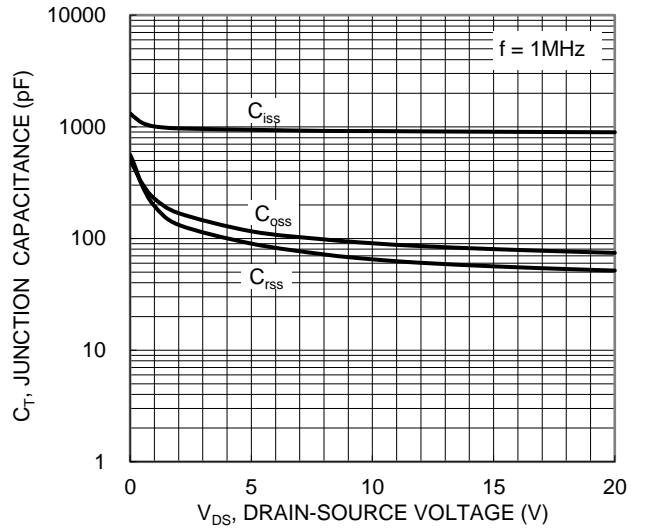


Figure 10. Typical Junction Capacitance

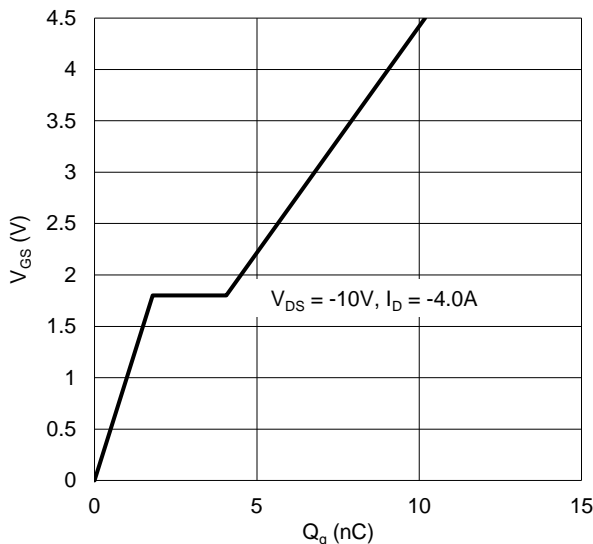


Figure 11. Gate Charge

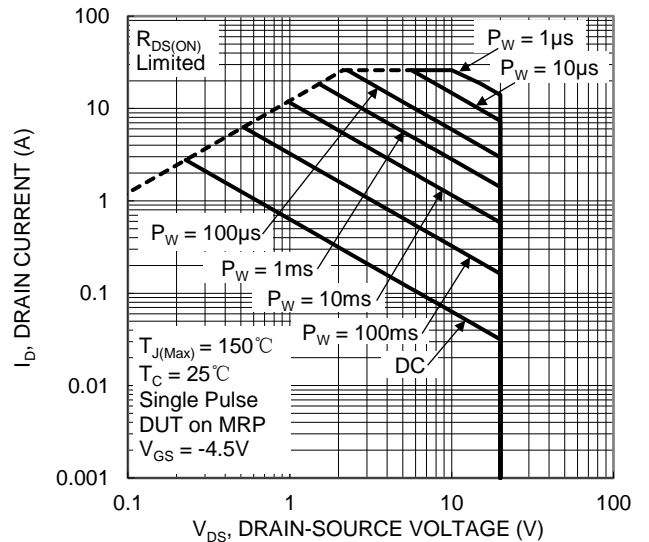


Figure 12. SOA, Safe Operation Area

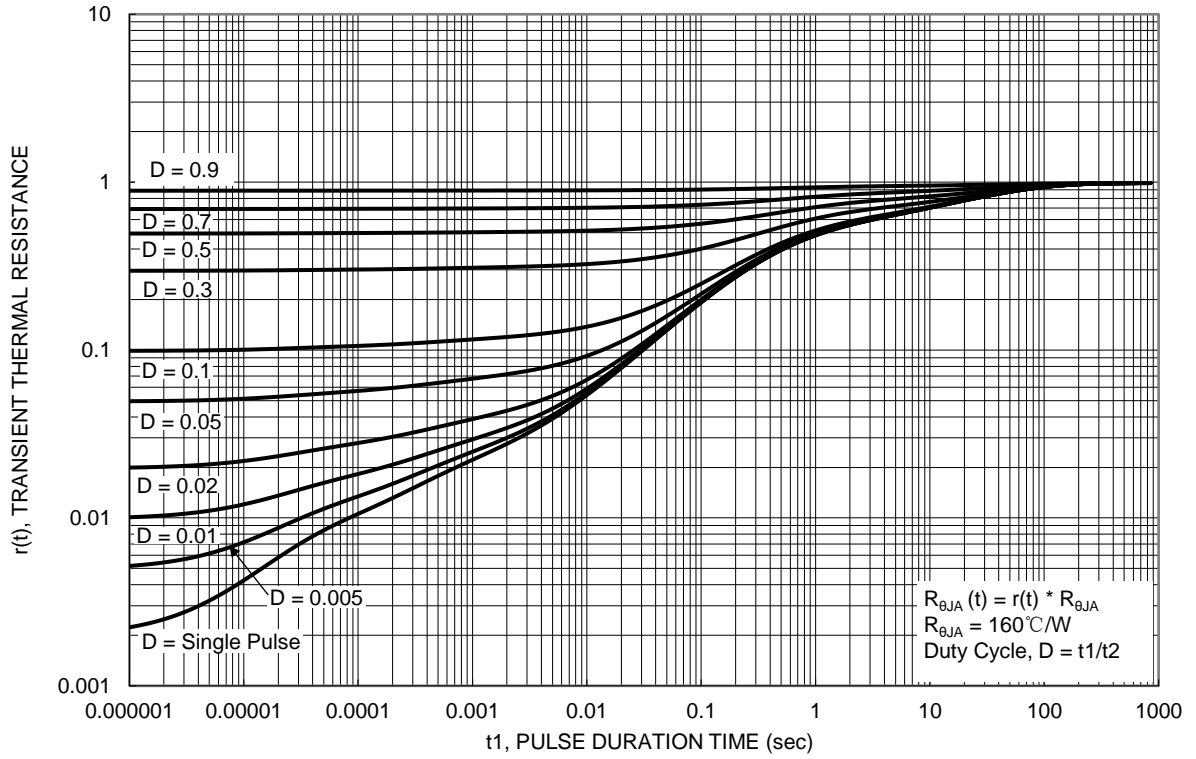


Figure 13. Transient Thermal Resistance

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