30V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)\ max}$	I_D T_A = +25°C
-30V	50mΩ @ V_{GS} = -10V	-3.7A
	60mΩ @ V_{GS} = -4.5V	-3.3A
	85mΩ @ V_{GS} = -2.5V	-2.7A

Features

- Low Input Capacitance
- Low On-Resistance
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMG3401LSNQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

This new-generation small-signal enhancement-mode MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- Motor control
- Backlighting
- DC-DC converters
- Power management functions

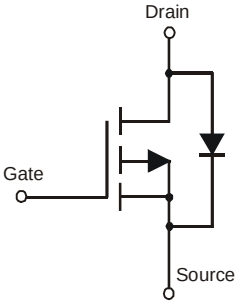
Mechanical Data

- Package: SC59
- Package Material - Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.014 grams (Approximate)

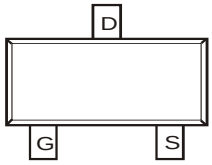
SC59



Top View



Equivalent Circuit



Top View

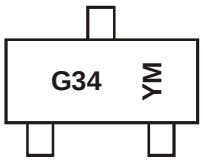
Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Quantity	Carrier
DMG3401LSNQ-7	SC59	3,000	Tape & Reel
DMG3401LSNQ-13	SC59	10,000	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

SC59



G34 = Product Type Marking Code
YM or $\overline{Y}$M= Date Code Marking
Y or $\overline{Y}$= Year (ex: Y = 2011)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	……	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	Y	……	L	M	N	P	R	S	T	U	V	W

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

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 5) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.0 -2.3	A
Continuous Drain Current (Note 6) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.7 -2.9	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	-30	A
Maximum Body Diode Continuous Current (Note 6)			I_S	-1.5	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	P_D	0.8	W
	(Note 6)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	159	°C/W
	(Note 6)		105	
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	36	
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}	-30	-	-	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	-	-	-1.0	µA	V_{DS} = -30V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-1.0	-1.3	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	41	50	mΩ	V_{GS} = -10V, I_D = -4A
		-	47	60		V_{GS} = -4.5V, I_D = -3.5A
		-	60	85		V_{GS} = -2.5V, I_D = -2.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	12	-	S	V_{DS} = -5V, I_D = -4A
Diode Forward Voltage	V_{SD}	-	-0.8	-1.0	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	1,326	-	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	103	-		
Reverse Transfer Capacitance	C_{rss}	-	71	-		
Gate Resistance	R_g	-	7.3	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	-	11.6	-	nC	V_{DD} = -15V, I_D = -4A
Total Gate Charge (V_{GS} = -10V)	Q_g	-	25.1	-		
Gate-Source Charge	Q_{gs}	-	2	-		
Gate-Drain Charge	Q_{gd}	-	1.7	-		
Turn-On Delay Time	$t_{D(on)}$	-	8	-	nS	V_{DS} = -15V, V_{GS} = -10V, R_{GEN} = 6Ω, R_L = 3.75Ω
Turn-On Rise Time	t_r	-	13	-		
Turn-Off Delay Time	$t_{D(off)}$	-	71	-		
Turn-Off Fall Time	t_f	-	38	-		

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

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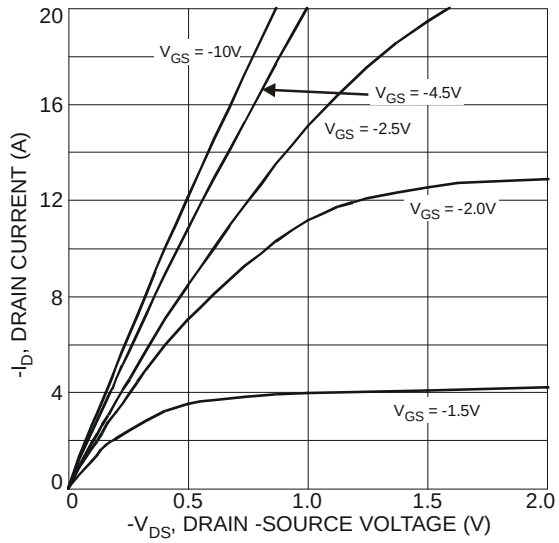


Figure 1 Typical Output Characteristics

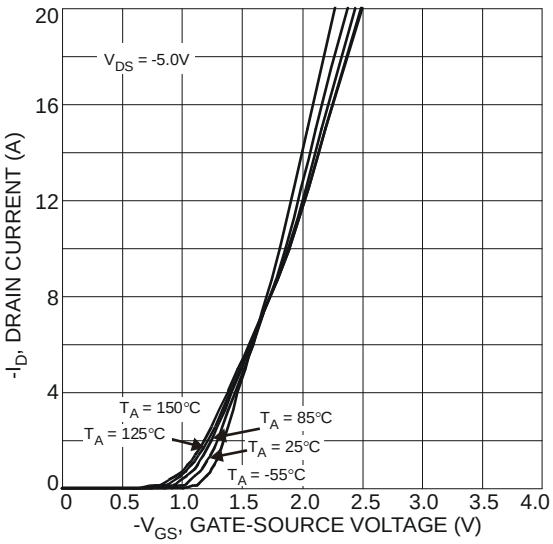


Figure 2 Typical Transfer Characteristics

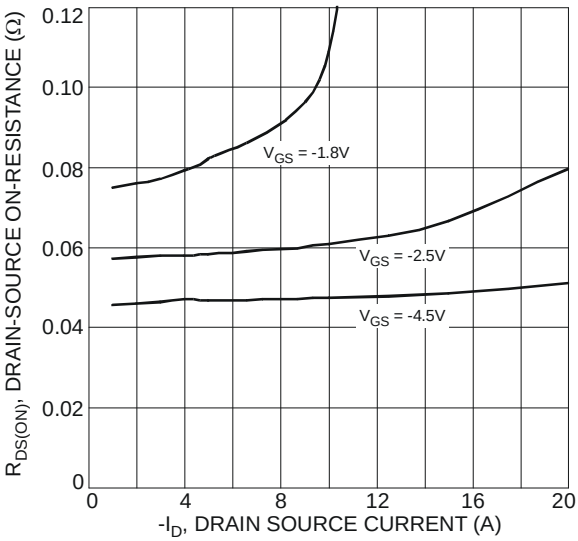


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

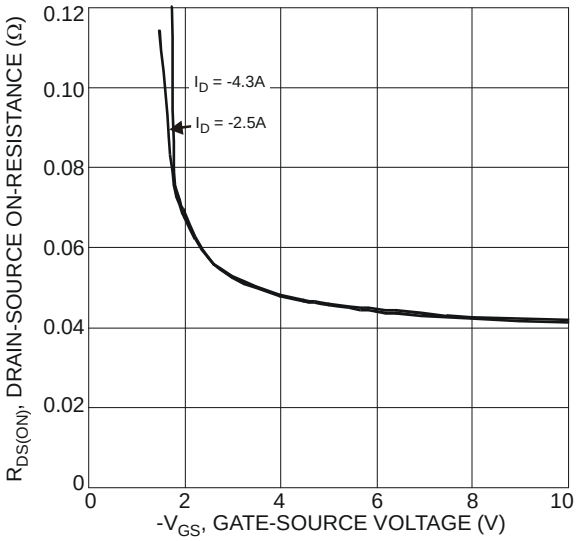


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

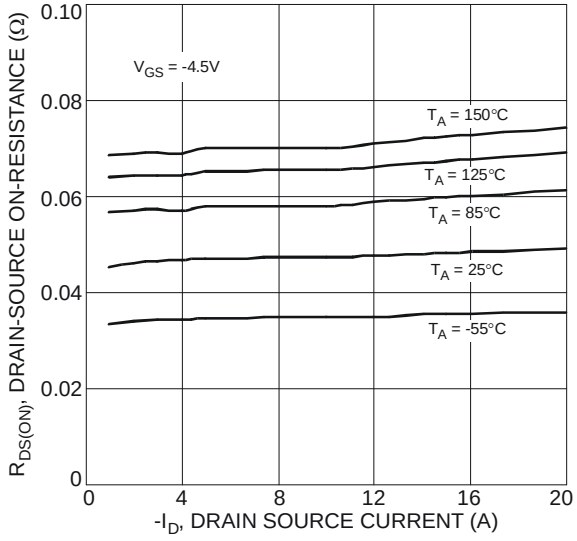


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

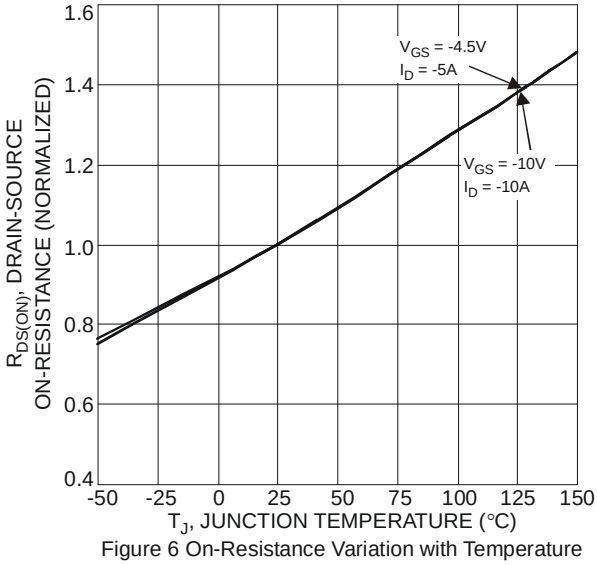


Figure 6 On-Resistance Variation with Temperature

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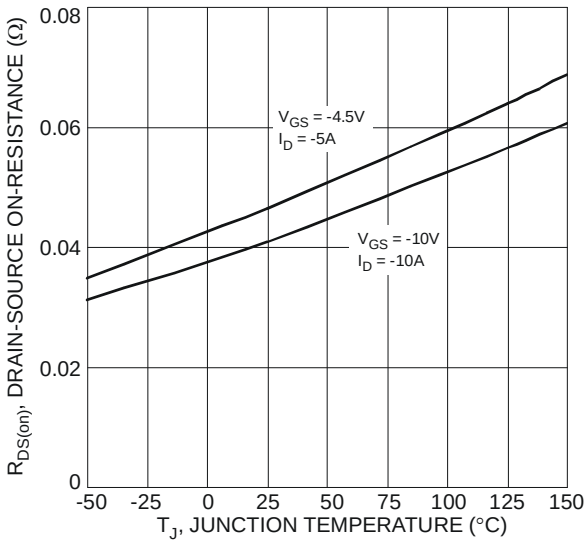


Figure 7 On-Resistance Variation with Temperature

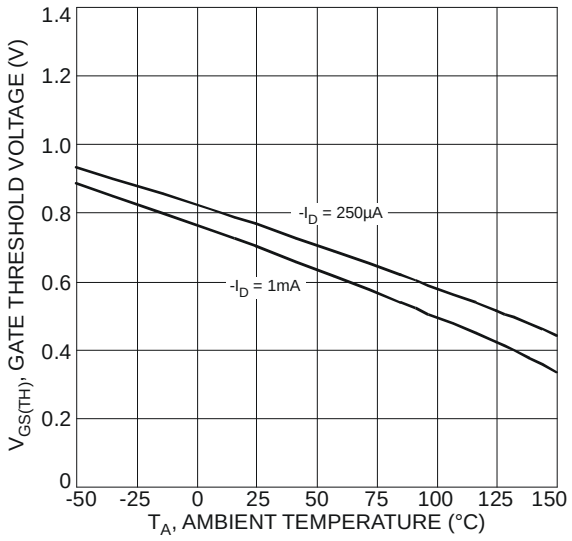


Figure 8 Gate Threshold Variation vs. Ambient Temperature

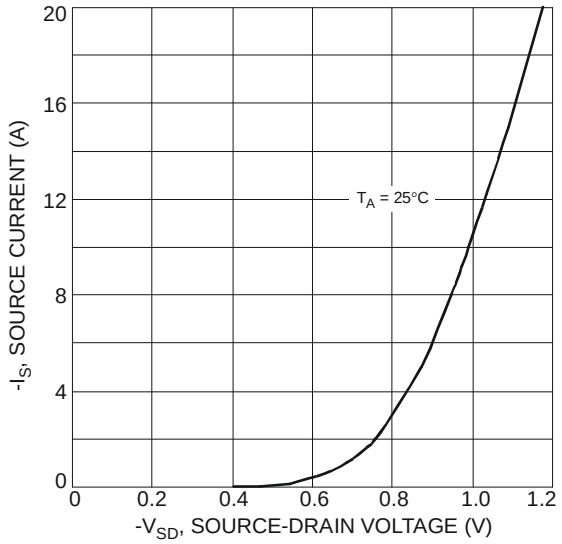


Figure 9 Diode Forward Voltage vs. Current

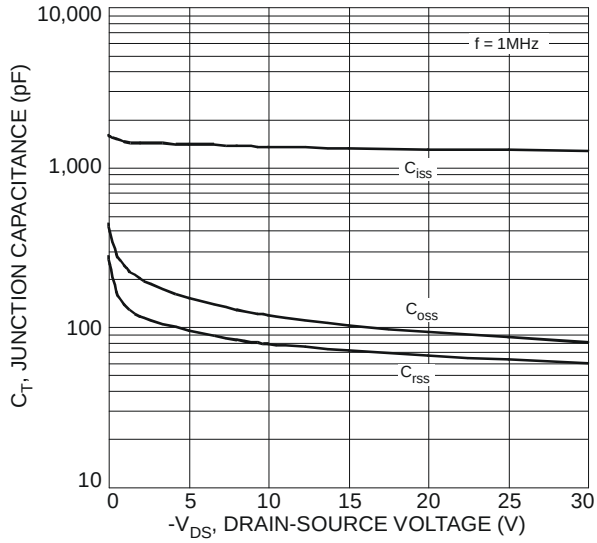


Figure 10 Typical Junction Capacitance

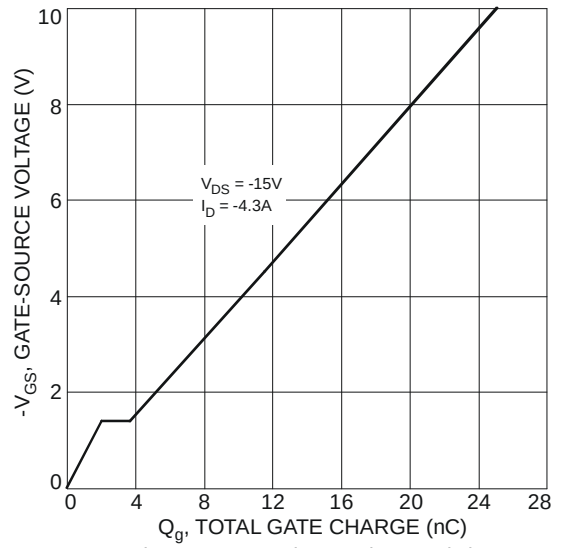


Figure 11 Gate-Charge Characteristics

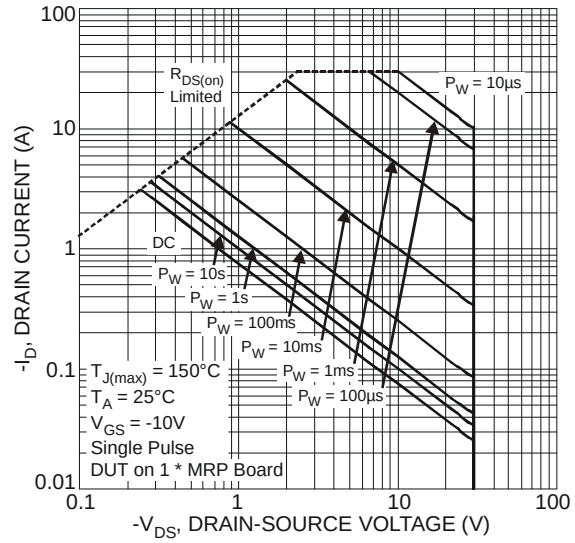


Figure 12 SOA, Safe Operation Area

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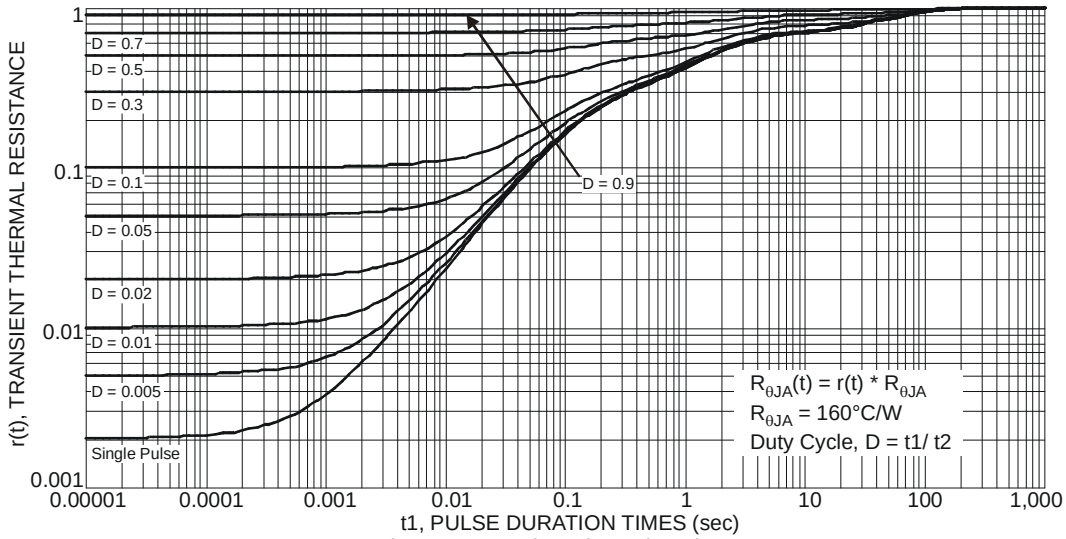


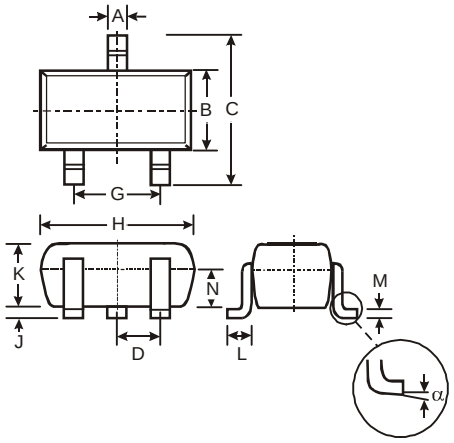
Figure 13 Transient Thermal Resistance

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Package Outline Dimensions

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

SC59

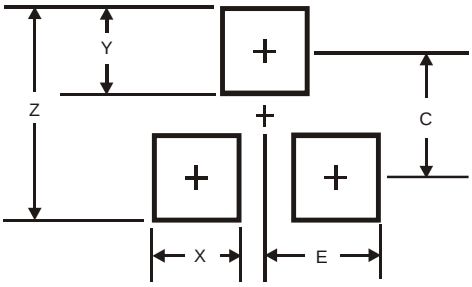


SC59			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

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

SC59



Dimensions	SC59
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

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