


ZXMN15A27K
150V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = 25^\circ C$
150V	650mΩ @ $V_{GS} = 10V$	2.6A

Description and Applications

This MOSFET features low on-state resistance, fast switching and high avalanche withstand capability, making it ideal for high efficiency power management applications.

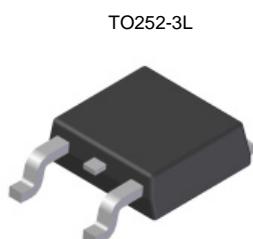
- SLIC line drivers for VoIP applications
- Transformer Driving Switch
- Power management functions
- Motor control
- Uninterrupted power supply

Features and Benefits

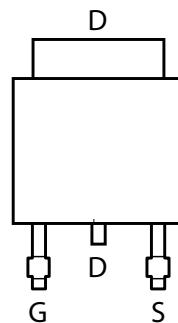
- 100% Unclamped Inductive Switch (UIS) test in production
- High avalanche energy pulse withstand capability
- Low input capacitance
- Low on-resistance
- Fast switching speed
- "Green" component and RoHS Compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

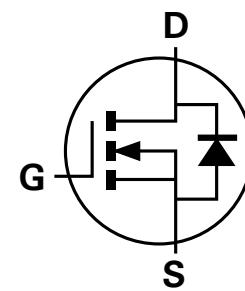
- Case: TO252-3L
- Case Material: Molded Plastic "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)



Top View



Pin Out – Top View



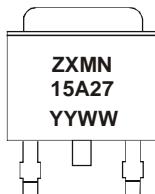
Equivalent Circuit

Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN15A27KTC	See Below	13	16	2,500

Notes: 1. Diodes, Inc. defines "Green" products as those which are Eu RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.'s "Green" Policy can be found on our website. For packaging details, go to our website.

Marking Information



ZXMN = Product Type Marking Code, Line 1
15A27 = Product Type Marking Code, Line 2
YYWW = Date Code Marking
YY = Last two digits of year (ex: 09 = 2009)
WW = Week (01-52)

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic		Symbol	Value	Unit
Drain-Source voltage		V_{DSS}	150	V
Gate-Source voltage		V_{GS}	± 25	V
Single Pulsed Avalanche Energy	(Note 7)	E_{AS}	55	mJ
Single Pulsed Avalanche Energy	(Note 7)	I_{AS}	4.3	A
Repetitive Avalanche Energy	(Note 4)	E_{AR}	3.0	mJ
Repetitive Avalanche Current	(Note 4)	I_{AR}	4.3	A
Continuous Drain current	$V_{GS} = 10\text{V}$	I_D	2.55	
			2.0	
			1.7	
Pulsed Drain current	$V_{GS} = 10\text{V}$	I_{DM}	17.2	A
Continuous Source current (Body diode)	(Note 2)	I_S	5.2	A
Pulsed Source current (Body diode)	(Note 4)	I_{SM}	17.2	A

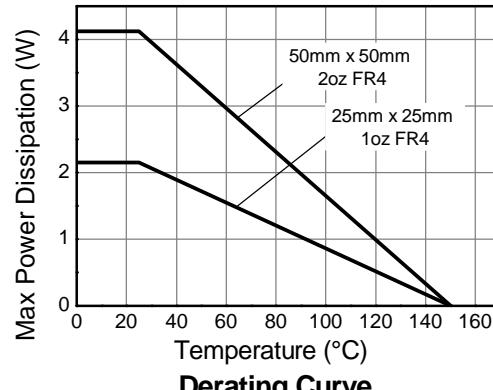
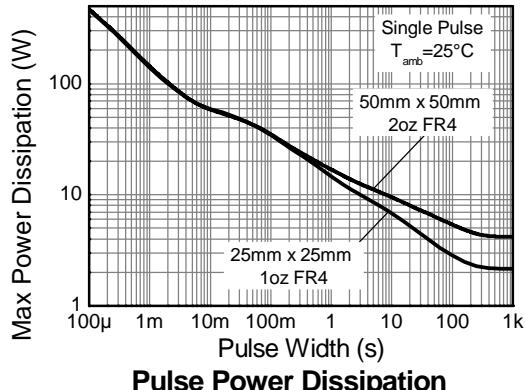
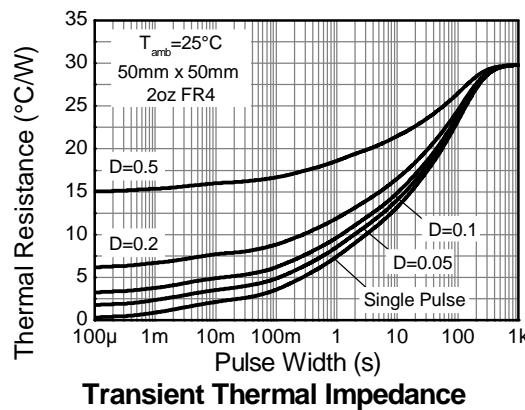
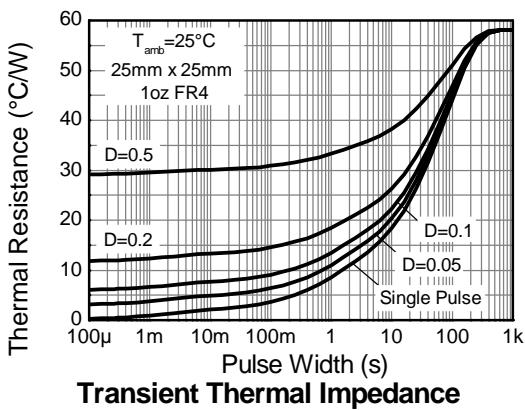
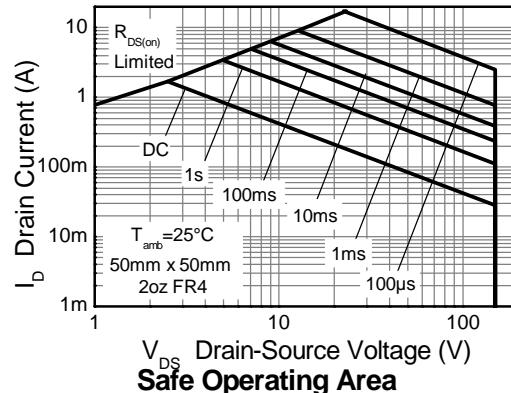
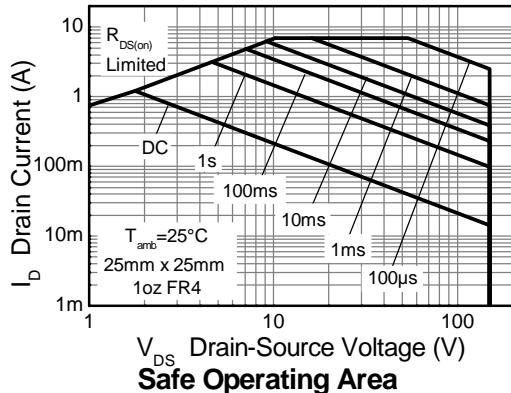
Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 2)	P_D	4.2	W mW/°C
			33.6	
	(Note 3)		9.5	
			76.0	
Thermal Resistance, Junction to Ambient	(Note 6)		2.2	°C/W
			17.2	
	(Note 2)	$R_{\theta JA}$	30.2	
	(Note 3)		13.1	
Thermal Resistance, Junction to Lead	(Note 6)		58.1	
	(Note 5)	$R_{\theta JL}$	2.06	°C/W
		T_J, T_{STG}	-55 to 150	°C

Notes:

- For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions. The device is measured when operating in a steady-state condition.
- Same as note 2, except the device is measured at $t \leq 10$ sec.
- Same as note 2, except the device is operating in a repetitive state with pulse width and duty cycle limited by maximum junction temperature.
- Thermal resistance from junction to solder-point at the end of the drain lead.
- For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition..
- UIS in production with $L = 5.95\text{mH}$, $I_{AS} = 4.3\text{A}$, $R_G = 25\Omega$, $V_{DD} = 100\text{V}$, starting $T_J = 25^\circ\text{C}$.

Thermal Characteristics



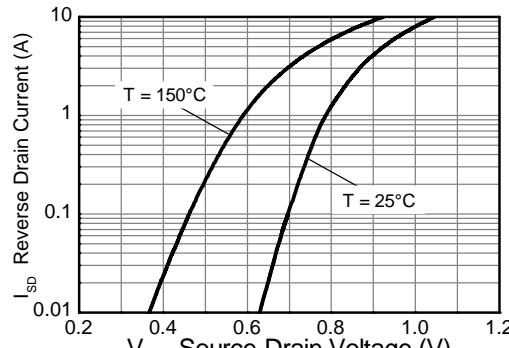
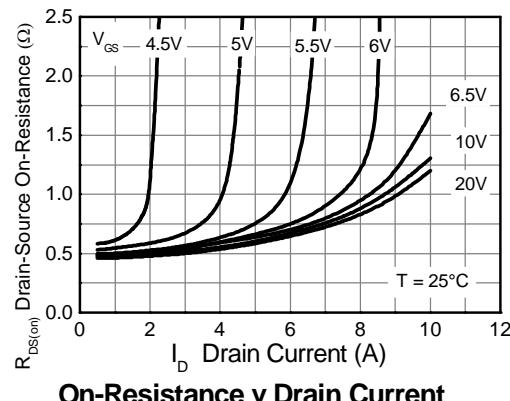
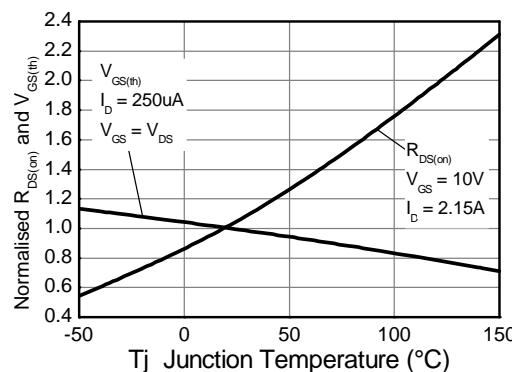
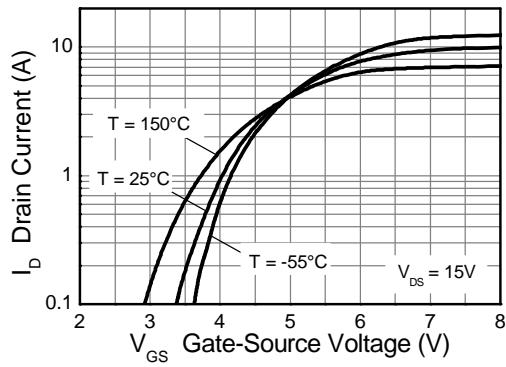
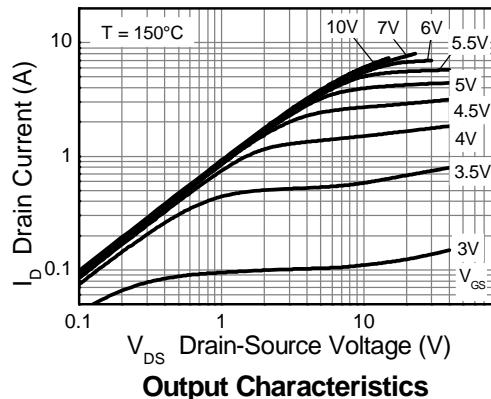
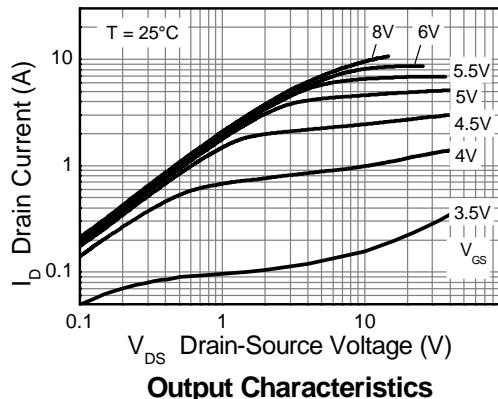
ZXMN15A27K
Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	150	—	—	V	$I_D = 250\mu\text{A}$, $V_{\text{GS}} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	500	nA	$V_{\text{DS}} = 150\text{V}$, $V_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{\text{GS}} = \pm 25\text{V}$, $V_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	2	2.7	4	V	$I_D = 250\mu\text{A}$, $V_{\text{DS}} = V_{\text{GS}}$
Static Drain-Source On-Resistance (Note 8)	$R_{\text{DS}(\text{ON})}$	—	0.500	0.650	Ω	$V_{\text{GS}} = 10\text{V}$, $I_D = 2.15\text{A}$
Forward Transconductance (Notes 8 & 9)	g_{fs}	—	2.8	—	S	$V_{\text{DS}} = 40\text{V}$, $I_D = 2.15\text{A}$
Diode Forward Voltage (Note 8)	V_{SD}	—	0.880	0.950	V	$I_S = 4.3\text{A}$, $V_{\text{GS}} = 0\text{V}$
Reverse recovery time (Note 9)	t_{rr}	—	153	—	ns	$I_S = 5.4\text{A}$, $V_{\text{GS}} = 0\text{V}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (Note 9)	Q_{rr}	—	1.1	—	μC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	169	—	pF	$V_{\text{DS}} = 25\text{V}$, $V_{\text{GS}} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	64.5	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	23.3	—	pF	
Total Gate Charge	Q_g	—	6.6	—	nC	$V_{\text{DS}} = 120\text{V}$, $V_{\text{GS}} = 10\text{V}$ $I_D = 5.4\text{A}$
Gate-Source Charge	Q_{gs}	—	1.0	—	nC	
Gate-Drain Charge	Q_{gd}	—	3.4	—	nC	
Turn-On Delay Time (Note 10)	$t_{\text{D}(\text{on})}$	—	3.3	—	ns	$V_{\text{DD}} = 75\text{V}$, $V_{\text{GS}} = 10\text{V}$ $I_D = 5.4\text{A}$, $R_G \geq 25\Omega$
Turn-On Rise Time (Note 10)	t_r	—	12.7	—	ns	
Turn-Off Delay Time (Note 10)	$t_{\text{D}(\text{off})}$	—	17.1	—	ns	
Turn-Off Fall Time (Note 10)	t_f	—	13.3	—	ns	

Notes:

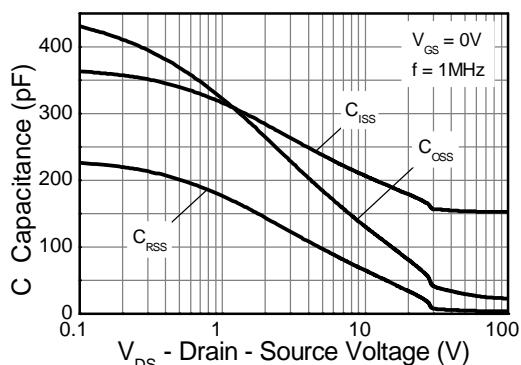
8. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$
9. For design aid only, not subject to production testing.
10. Switching characteristics are independent of operating junction temperatures.

Typical Characteristics

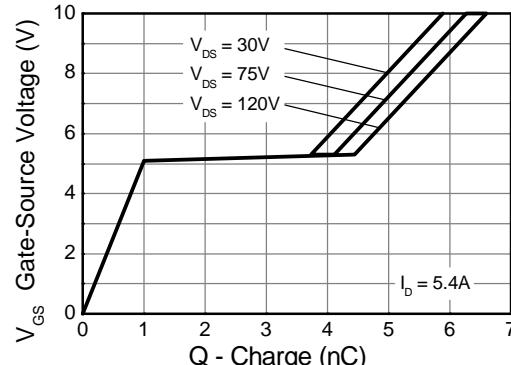


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Typical Characteristics - continued

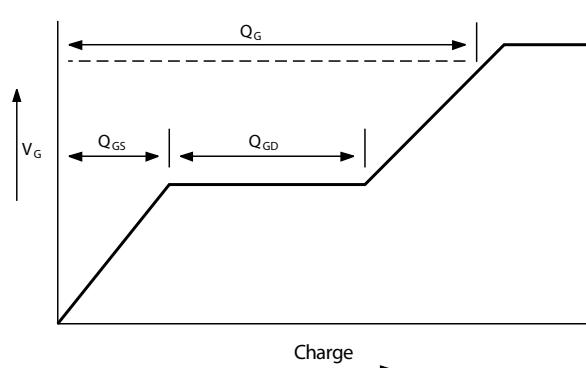


Capacitance v Drain-Source Voltage

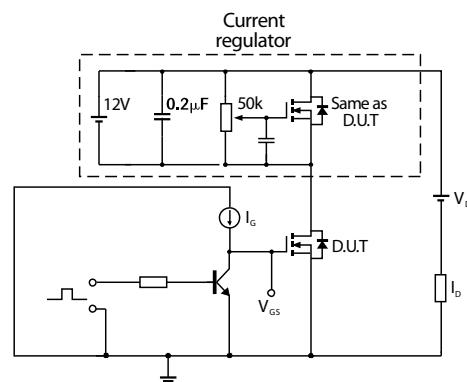


Gate-Source Voltage v Gate Charge

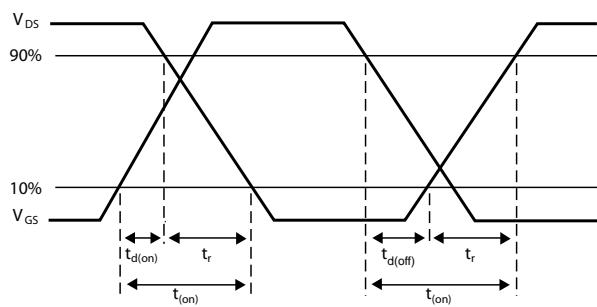
Test Circuits



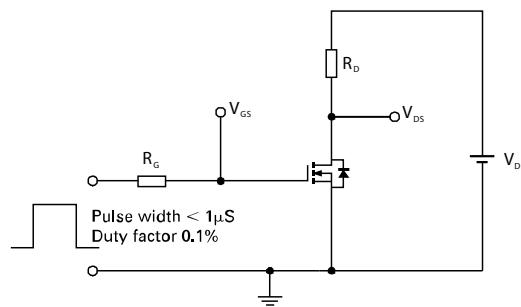
Basic gate charge waveform



Gate charge test circuit



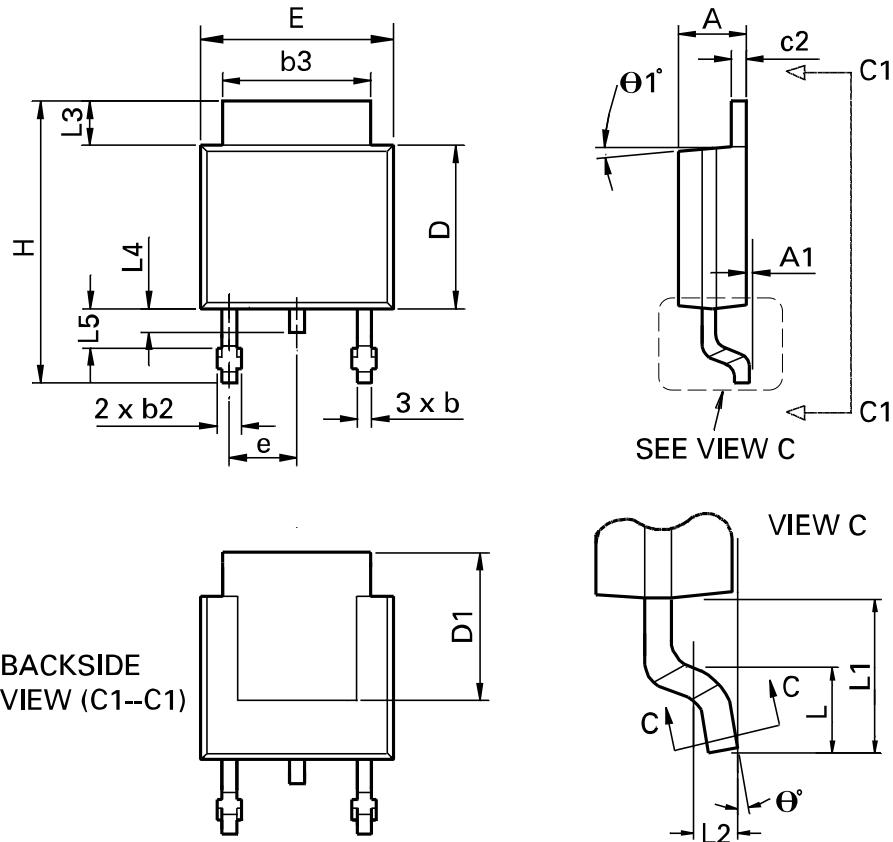
Switching time waveforms



Switching time test circuit

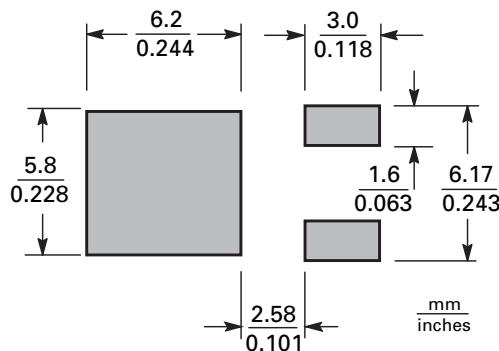
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Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.086	0.094	2.18	2.39	e	0.090 BSC		2.29 BSC	
A1	-	0.005	-	0.127	H	0.370	0.410	9.40	10.41
b	0.020	0.035	0.508	0.89	L	0.055	0.070	1.40	1.78
b2	0.030	0.045	0.762	1.14	L1	0.108 REF		2.74 REF	
b3	0.205	0.215	5.21	5.46	L2	0.020 BSC		0.508 BSC	
c	0.018	0.024	0.457	0.61	L3	0.035	0.065	0.89	1.65
c2	0.018	0.023	0.457	0.584	L4	0.025	0.040	0.635	1.016
D	0.213	0.245	5.41	6.22	L5	0.045	0.060	1.14	1.52
D1	0.205	-	5.21	-	Θ1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	Θ°	0°	15°	0°	15°
E1	0.170	-	4.32	-	-	-	-	-	-

Suggested Pad Layout



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