



## Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching

## Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

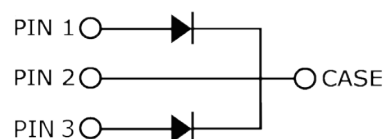
## Applications

- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters



TO247-3L

## Package



Part Number	Package	Qty(PCS)
HWNSC401200CWQ	TO247-3L	30

## Maximum Ratings (T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	1200	V		
V <sub>RSM</sub>	Surge Peak Reverse Voltage	1300	V		
V <sub>R</sub>	DC Peak Reverse Voltage	1200	V		
I <sub>F</sub>	Continuous Forward Current (Per Leg/Device)	56.5/113 27/54 20/40	A	T <sub>C</sub> =25°C T <sub>C</sub> =135°C T <sub>C</sub> =150°C	Fig. 3
I <sub>FRM</sub>	Repetitive Peak Forward Surge Current	91* 61*	A	T <sub>C</sub> =25°C, t <sub>p</sub> =10 ms, Half Sine Pulse T <sub>C</sub> =110°C, t <sub>p</sub> =10 ms, Half Sine Pulse	
I <sub>FSM</sub>	Non-Repetitive Forward Surge Current	130* 110*	A	T <sub>C</sub> =25°C, t <sub>p</sub> =10 ms, Half Sine Pulse T <sub>C</sub> =110°C, t <sub>p</sub> =10 ms, Half Sine Pulse	Fig. 8
I <sub>F,Max</sub>	Non-Repetitive Peak Forward Current	1150* 950*	A	T <sub>C</sub> =25°C, t <sub>p</sub> =10 ms, Pulse T <sub>C</sub> =110°C, t <sub>p</sub> =10 ms, Pulse	Fig. 8
P <sub>tot</sub>	Power Dissipation (Per Leg/Device)	266/532 114/228	W	T <sub>C</sub> =25°C T <sub>C</sub> =110°C	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	V <sub>R</sub> =0-960V	
∫i²dt	i²t value	84.5* 60.5*	A²s	T <sub>C</sub> =25°C, t <sub>p</sub> =10 ms T <sub>C</sub> =110°C, t <sub>p</sub> =10 ms	
T <sub>J</sub>	Operating Junction Range	-55 to +175	°C		
T <sub>stg</sub>	Storage Temperature Range	-55 to +135	°C		
	TO-247 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

\* Per Leg, \*\* Per Device



## Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$V_F$	Forward Voltage	1.5 2.2	1.8 3	V	$I_F = 20\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 20\text{ A}$ $T_J = 175^\circ\text{C}$	Fig. 1
$I_R$	Reverse Current	35 65	200 400	$\mu\text{A}$	$V_R = 1200\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V}$ $T_J = 175^\circ\text{C}$	Fig. 2
$Q_C$	Total Capacitive Charge	99		nC	$V_R = 800\text{ V}$ , $I_F = 20\text{ A}$ $di/dt = 200\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance	1500 93 67		pF	$V_R = 0\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ $V_R = 400\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$ $V_R = 800\text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{ MHz}$	Fig. 6
$E_C$	Capacitance Stored Energy	28		$\mu\text{J}$	$V_R = 800\text{ V}$	Fig. 7

Note: This is a majority carrier diode, so there is no reverse recovery charge.

## Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.29** 0.57*	$^\circ\text{C}/\text{W}$	Fig. 9

\* Per Leg, \*\* Per Device

## Typical Performance (Per Leg)

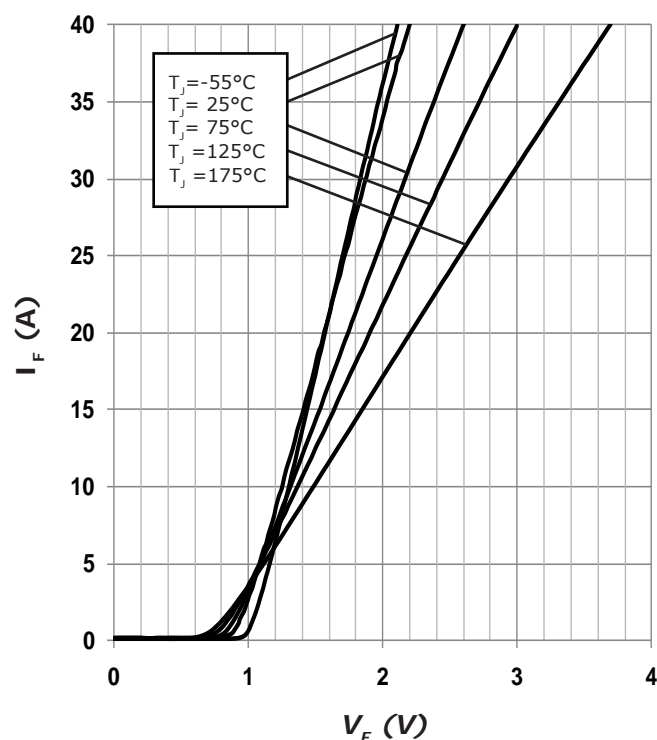


Figure 1. Forward Characteristics

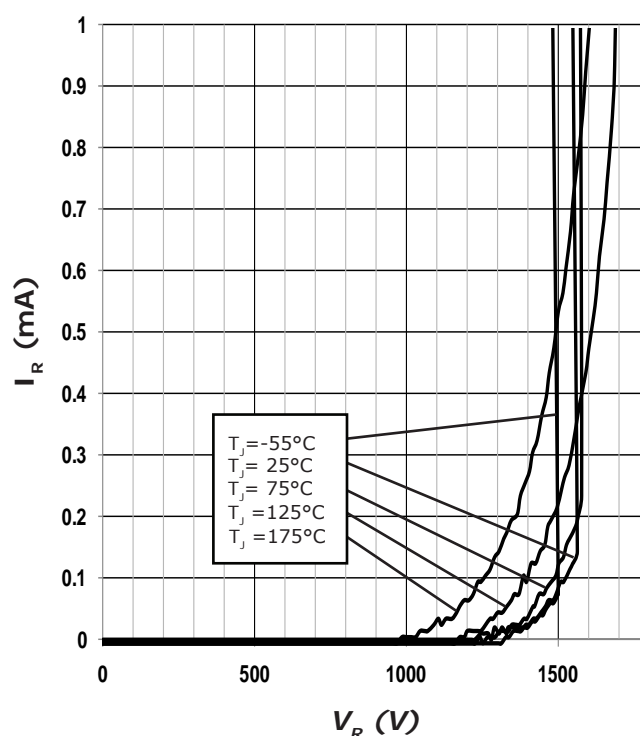


Figure 2. Reverse Characteristics



### Typical Performance (Per Leg)

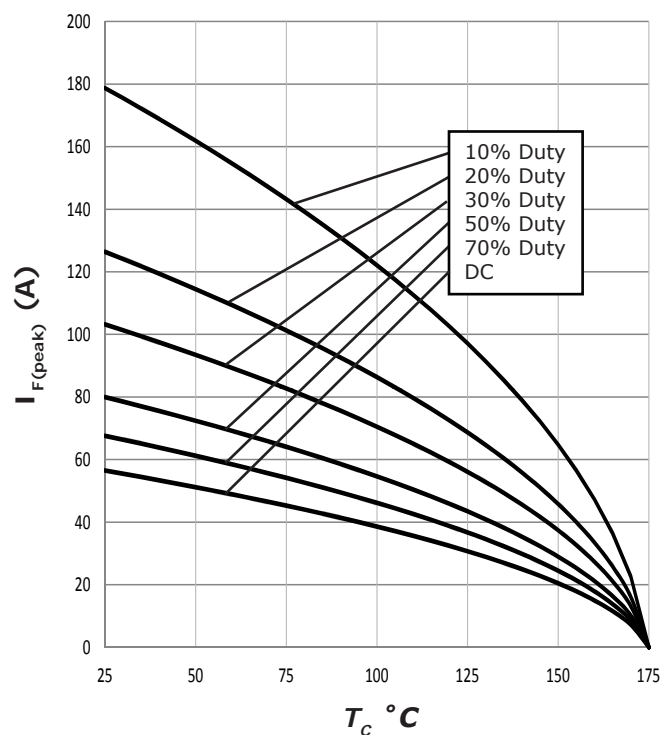


Figure 3. Current Derating

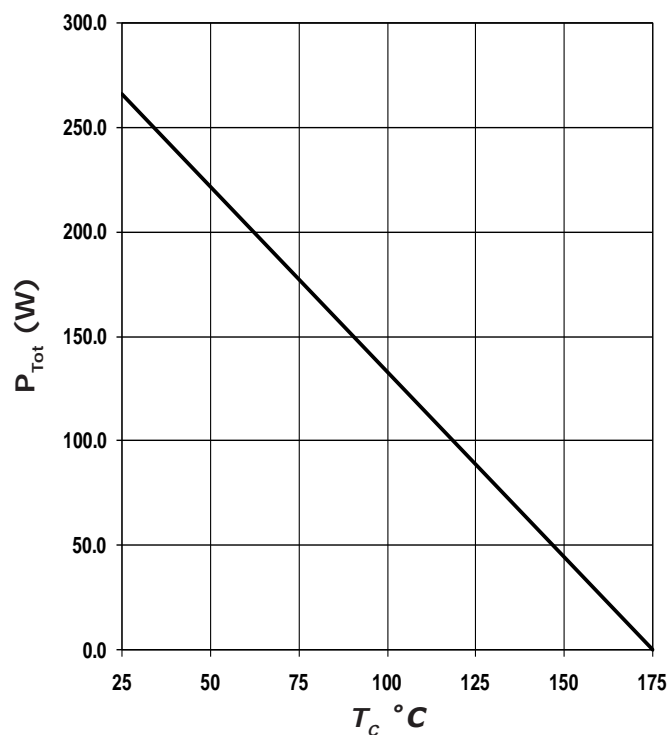


Figure 4. Power Derating

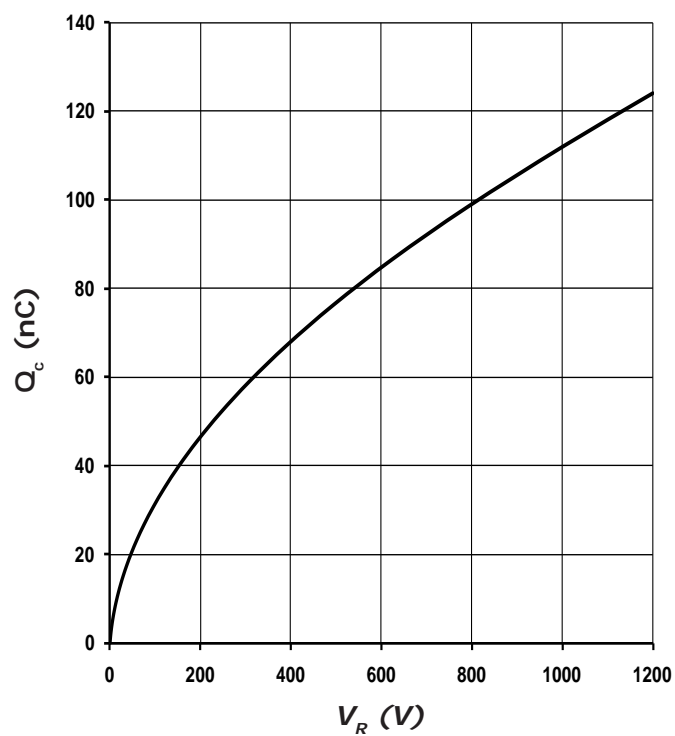


Figure 5. Recovery Charge vs. Reverse Voltage

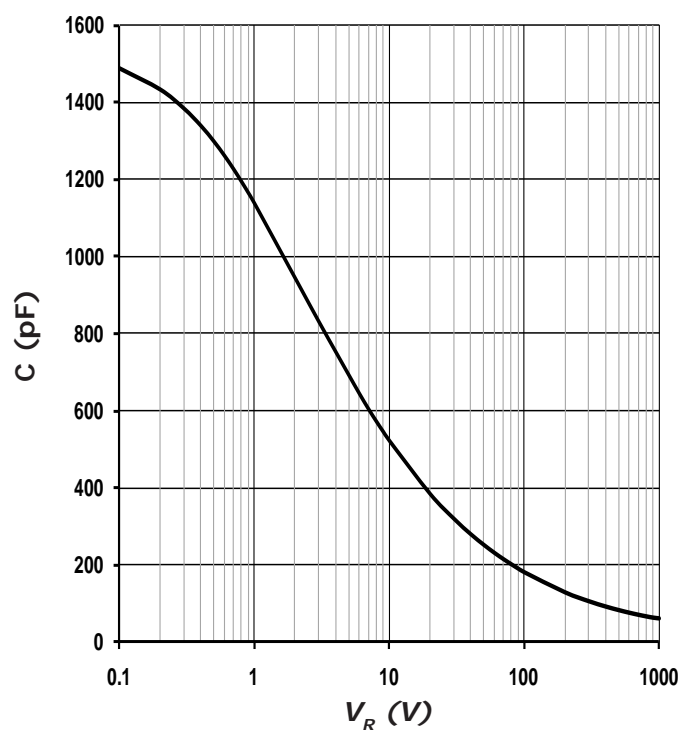


Figure 6. Capacitance vs. Reverse Voltage



## Typical Performance

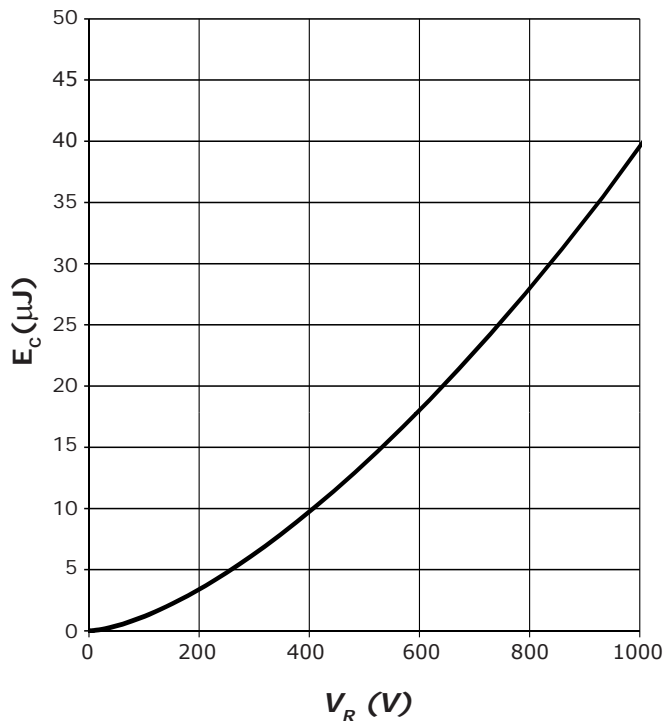


Figure 7. Typical Capacitance Stored Energy, per leg

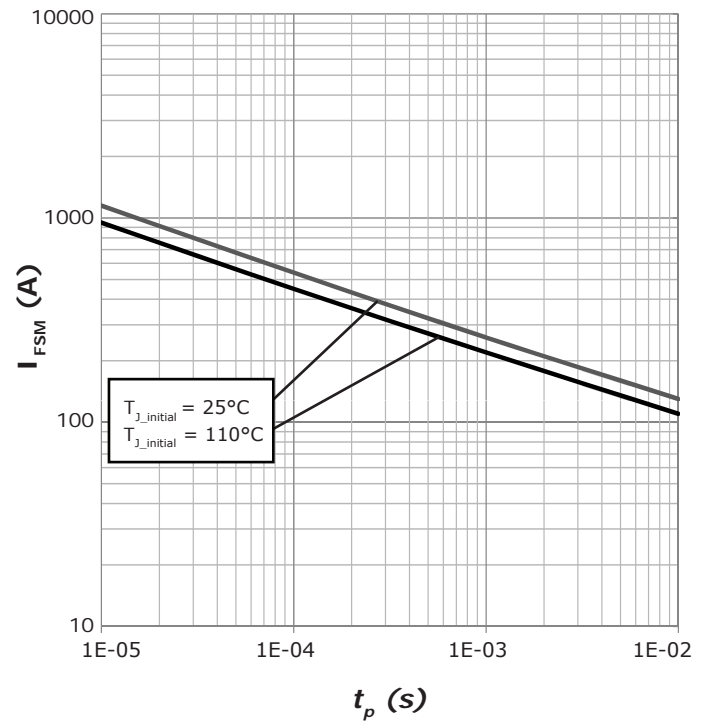


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform), per leg

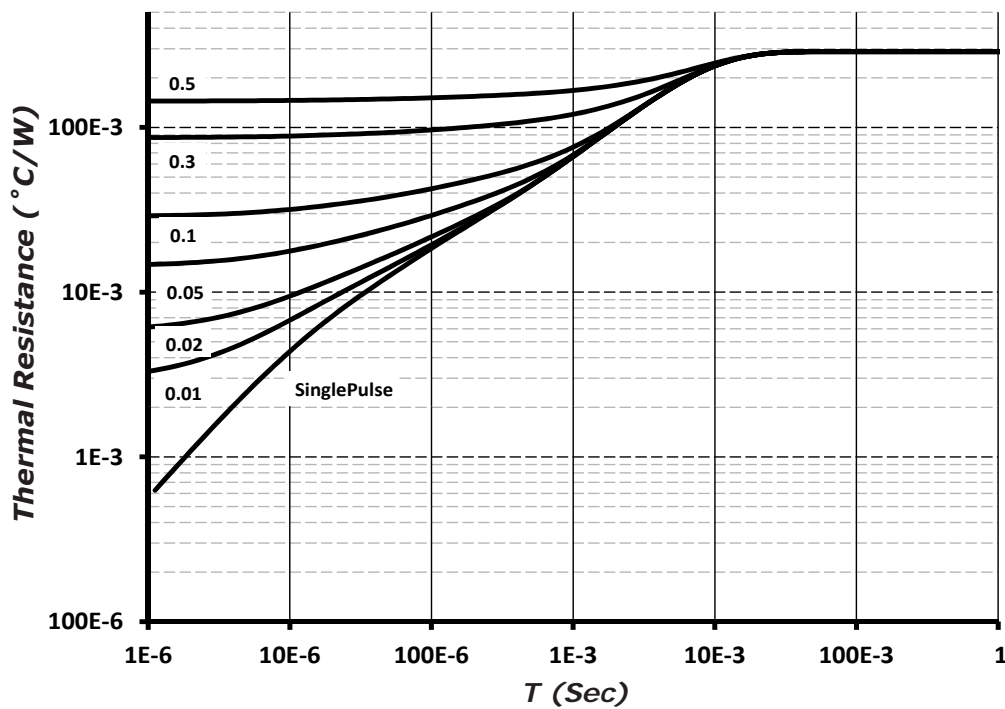
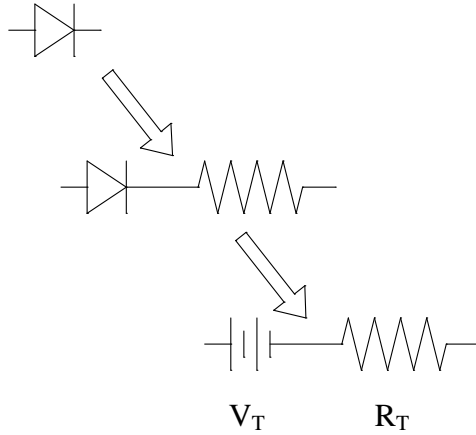


Figure 9. Device Transient Thermal Impedance



## Diode Model



$$V_{fT} = V_T + I_f R_T$$

$$V_T = 0.97 + (T_J - 1.40 \times 10^{-3})$$

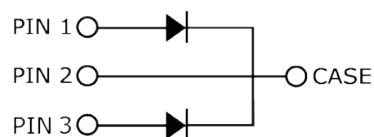
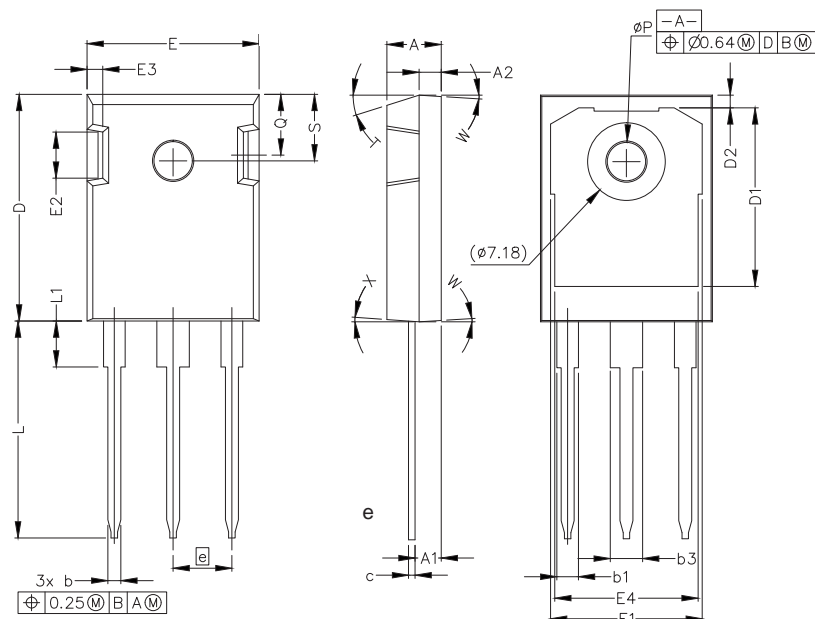
$$R_T = 0.023 + (T_J - 2.71 \times 10^{-4})$$

Note:  $T_J$  = Diode Junction Temperature In Degrees Celsius,  
valid from 25°C to 175°C



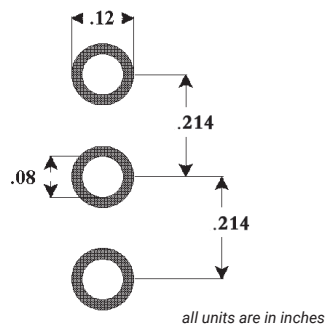
## Package Dimensions

Package TO247-3L



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b3	.113	.133	2.87	3.38
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
N	3			
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	17.5° REF			
W	3.5° REF			
X	4° REF			

## Recommended Solder Pad Layout





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