

# GSM1012

## 20V N-Channel Enhancement Mode MOSFET

### Product Description

GSM1012, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, such as smart phone and notebook computer, and low in-line power loss are needed in commercial industrial surface mount applications.

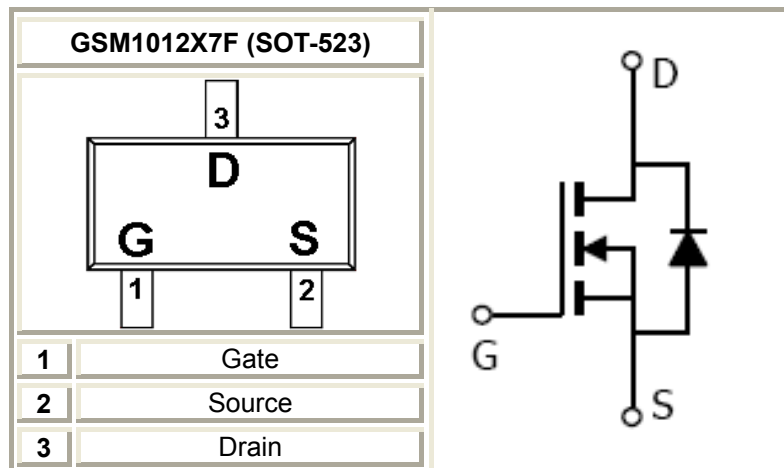
### Features

- 20V/0.6A,  $R_{DS(ON)}=360m@V_{GS}=4.5V$
- 20V/0.5A,  $R_{DS(ON)}=420m@V_{GS}=2.5V$
- 20V/0.4A,  $R_{DS(ON)}=560m@V_{GS}=1.8V$
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation
- SOT-523 package design

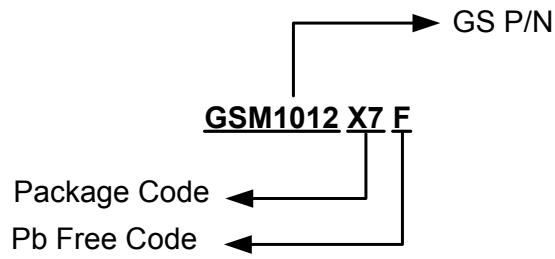
### Applications

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Smart Phones, Pagers

### Packages & Pin Assignments

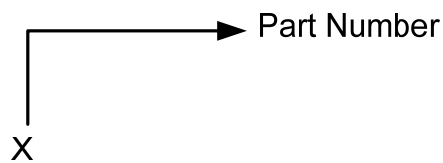


## Ordering Information



Part Number	Package	Quantity Reel
GSM1012X7F	SOT-523	3000 PCS

## Marking Information



## Absolute Maximum Ratings

(T<sub>A</sub>=25°C Unless otherwise noted)

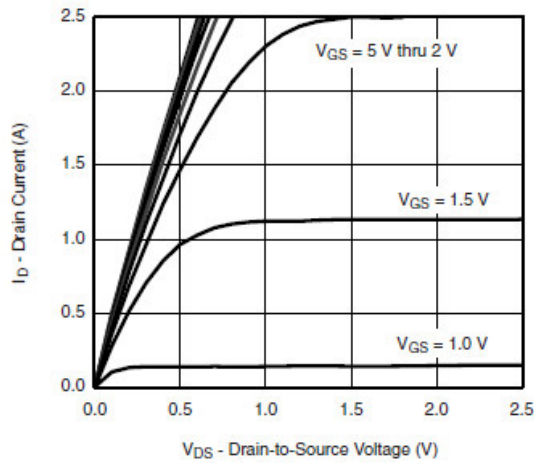
Symbol	Parameter	Typical	Unit	
V <sub>DSS</sub>	Drain-Source Voltage	20	V	
V <sub>GSS</sub>	Gate –Source Voltage	±12	V	
I <sub>D</sub>	Continuous Drain Current(T <sub>J</sub> =150°C)	T <sub>A</sub> =25°C	0.7	A
		T <sub>A</sub> =70°C	0.4	
I <sub>DM</sub>	Pulsed Drain Current	1.0	A	
I <sub>S</sub>	Continuous Source Current(Diode Conduction)	0.3	A	
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	0.27	W
		T <sub>A</sub> =70°C	0.16	
T <sub>J</sub>	Operating Junction Temperature	-55/150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55/150	°C	

## Electrical Characteristics

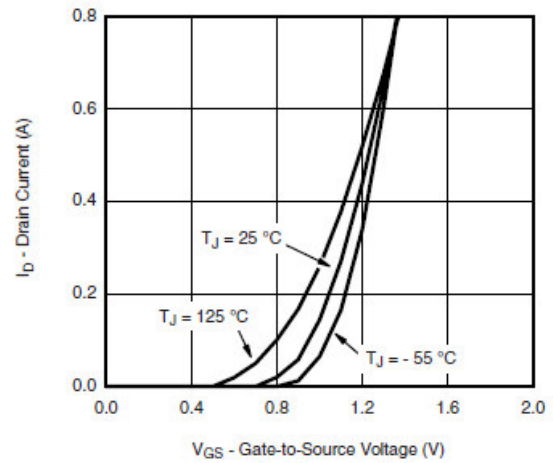
(T<sub>A</sub>=25°C Unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	0.4		1.0	
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V			1	uA
		V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C			5	
I <sub>D(on)</sub>	On-State Drain Current	V <sub>DS</sub> ≥5V, V <sub>GS</sub> =4.5V	0.7			A
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.6A		240	360	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.5A		300	420	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.4A		420	560	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =0.4A		1.0		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =0.15A, V <sub>GS</sub> =0V		0.65	1.2	V
<b>Dynamic</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		70		pF
C <sub>oss</sub>	Output Capacitance			20		
C <sub>rss</sub>	Reverse Transfer Capacitance			8		
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.6A		1.06	1.38	nC
Q <sub>gs</sub>	Gate-Source Charge			0.18		
Q <sub>gd</sub>	Gate-Drain Charge			0.32		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =10V, R <sub>L</sub> =20Ω, I <sub>D</sub> =0.5A, V <sub>GEN</sub> =4.5V, R <sub>G</sub> =1Ω		18	26	ns
t <sub>r</sub>				20	28	
t <sub>d(off)</sub>	Turn-Off Time			70	110	
t <sub>f</sub>				25	40	

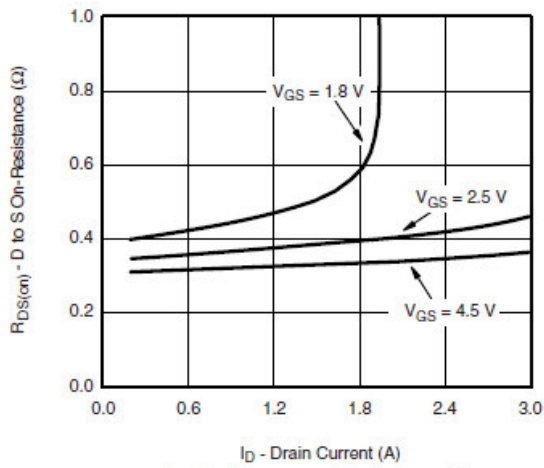
## Typical Performance Characteristics



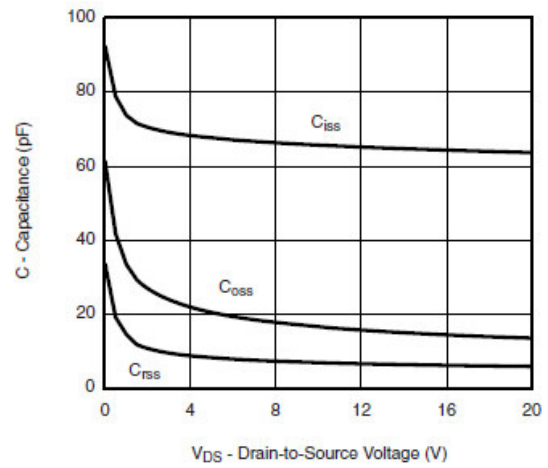
Output Characteristics



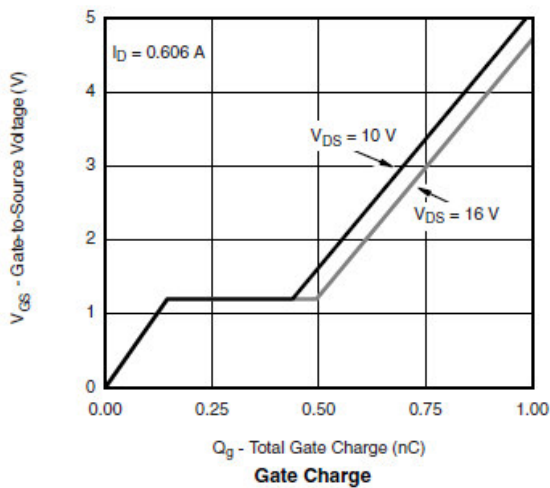
Transfer Characteristics



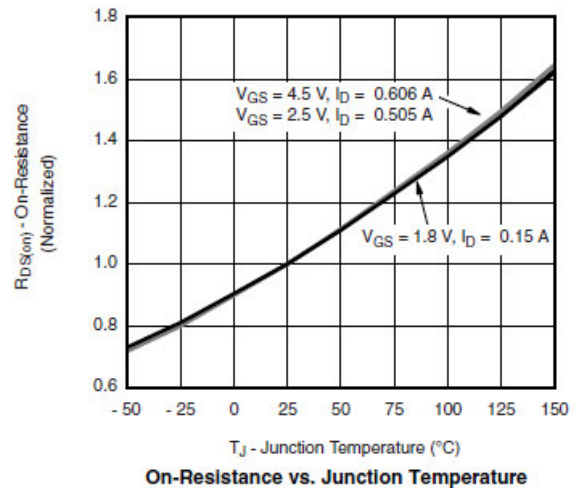
On-Resistance vs. Drain Current



Capacitance

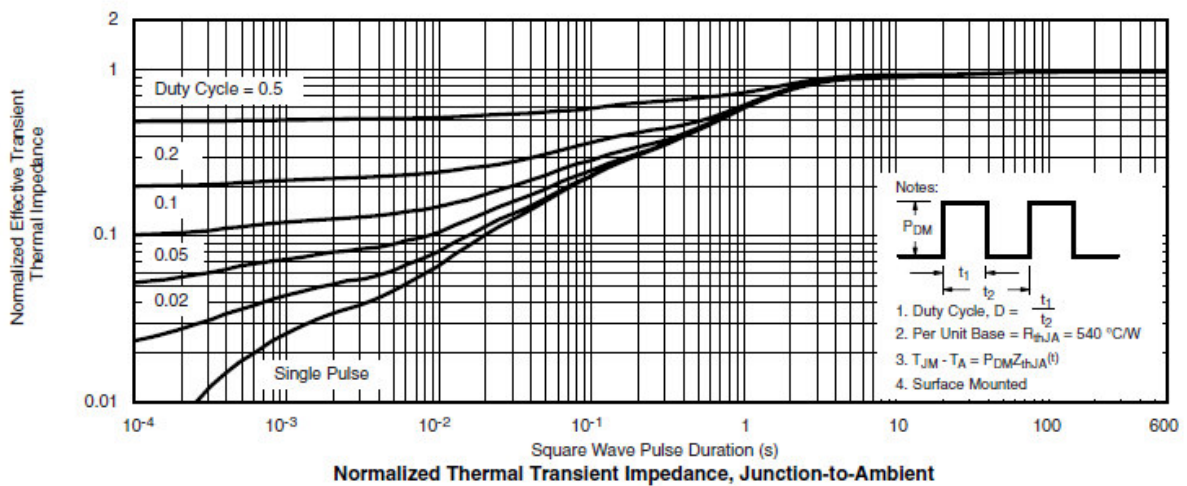
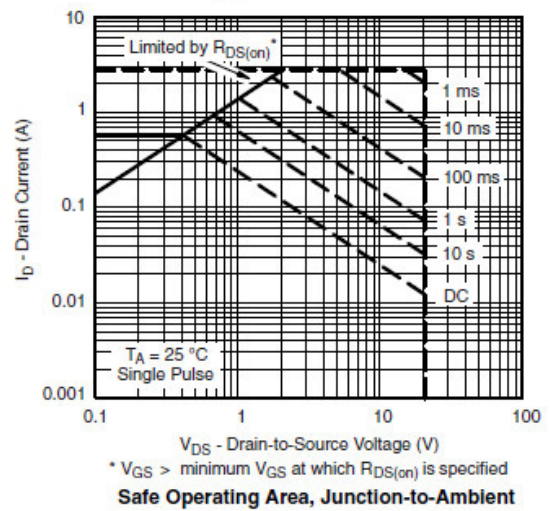
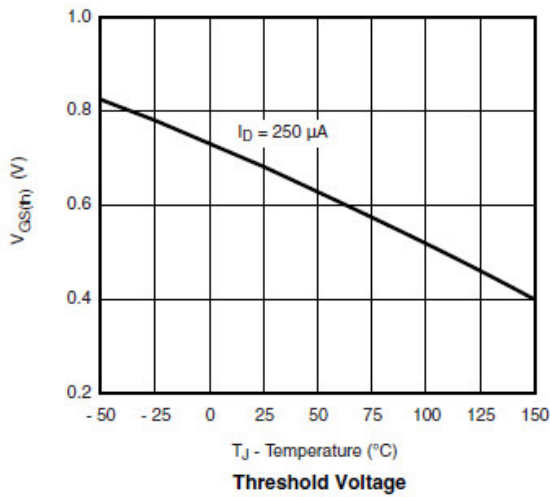
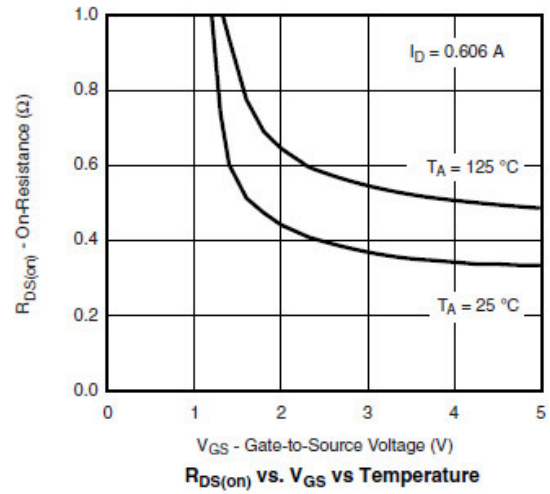
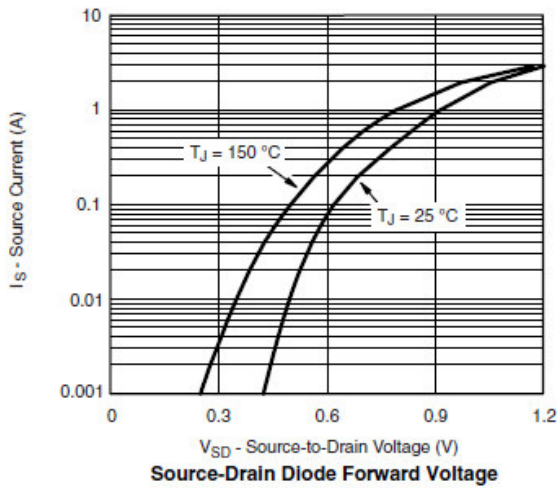


Gate Charge



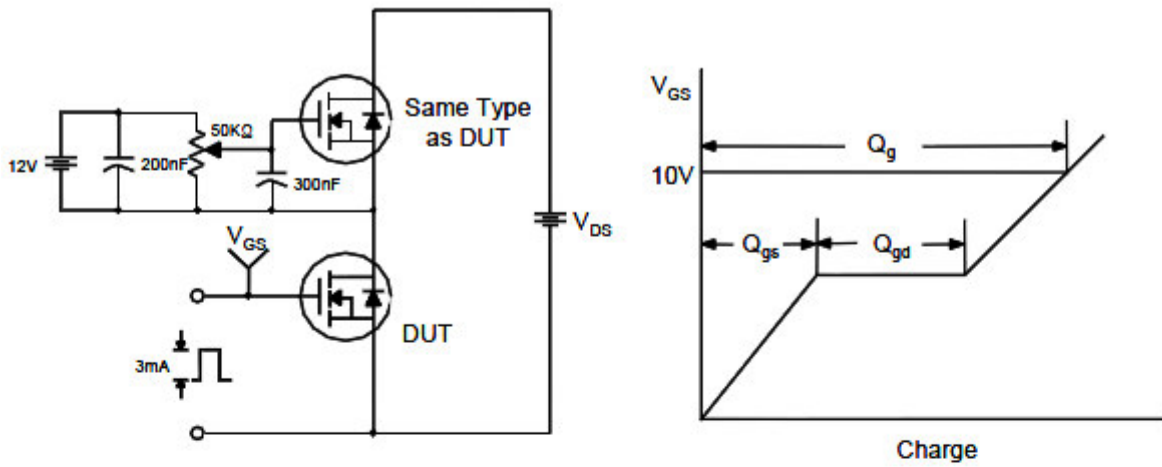
On-Resistance vs. Junction Temperature

## Typical Performance Characteristics(continue)

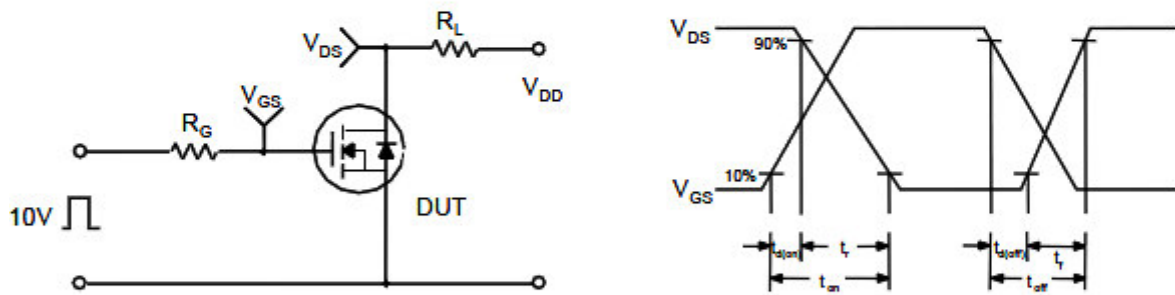


## Typical Characteristics

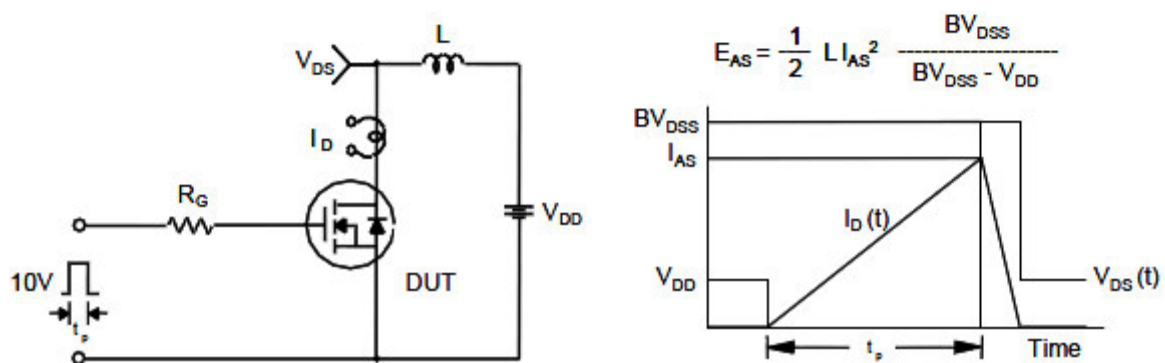
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

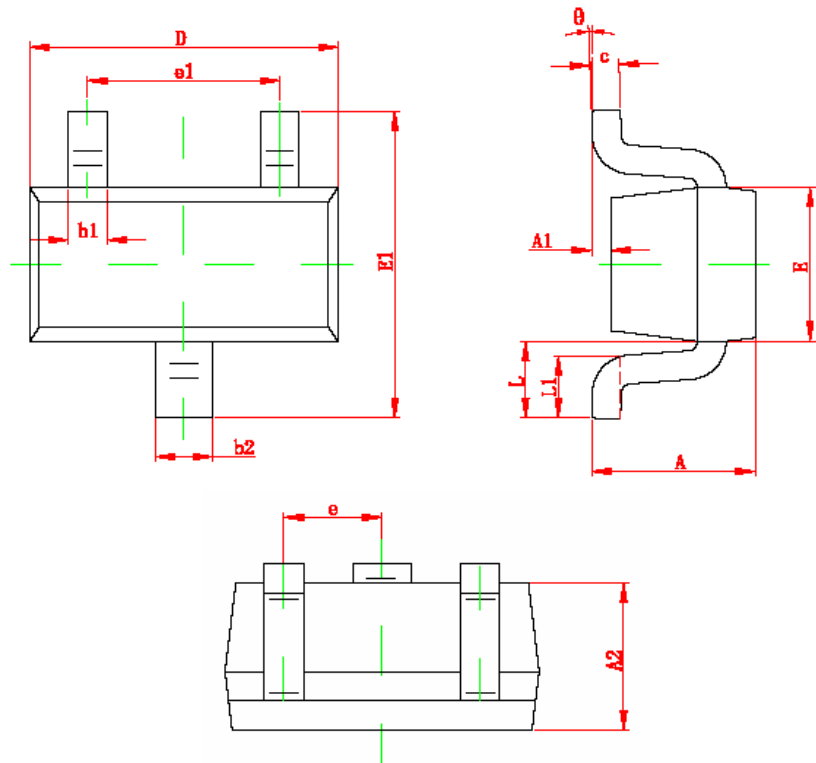


Unclamped Inductive Switching Test Circuit & Waveforms



## Package Dimension

### SOT-523







Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.325	0.010	0.013
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.750	0.850	0.030	0.033
E1	1.450	1.750	0.057	0.069
e	0.500(TYP)		0.020(TYP)	
e1	0.900	1.100	0.035	0.043
L	0.550(REF)		0.022(REF)	
L1	0.280	0.440	0.011	0.017
θ	0°	4°	0°	4°




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