

85V 140A N-Channel Enhancement Mode Power MOSFET

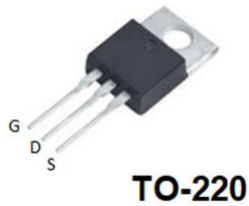
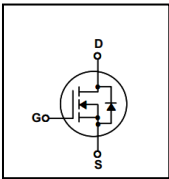
General Description

This Power MOSFET has been developed using advanced SGT process, which is specifically designed to minimize input capacitance and gate charge. This device is ideal for high-efficiency switching and synchronous rectification.

FEATURES

- $R_{DS(ON)} \leq 4.9m\Omega$ @ $V_{GS}=10V, I_D=50A$
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

SYMBOL



ASSEMBLY MESSAGE

Product Name	Marking	Package	Packaging
BXS049N08P	BX049N08P	TO-220	Tube

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ C$ unless otherwise noted)

Parameter		Symbol	Rating	Unit
			TO-220	
Drain-Source Voltage		V_{DSS}	85	V
Drain Current	Continuous ($T_C = 25^\circ C$)	I_D	140	A
	Continuous ($T_C = 100^\circ C$)		79	A
Drain Current	Pulsed (Note1)	I_{DM}	560	A
Gate-Source Voltage		V_{GSS}	± 20	V
Power Dissipation	$T_C = 25^\circ C$	P_D	189	W
Avalanche Energy	Single Pulse	E_{AS}	190	mJ
Maximum Junction Temperature		T_J	150	$^\circ C$
Storage Temperature Range		T_{STG}	-55 to 150	$^\circ C$

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.	Unit
		TO-220	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.66	°C / W

ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise Noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	85	96		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=85V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current, Forward	I_{GSS}	$V_{GS}=20V$			100	nA
Gate-Body Leakage Current, Reverse		$V_{GS}=-20V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$		3.8	4.9	m Ω
		$V_{GS}=10V, I_D=50A$		4	4.9	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=40V, V_{GS}=0V,$ $f=1.0MHz$	-	4021	-	pF
Output Capacitance	C_{OSS}		-	510	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	28	-	pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=40V, I_D=60A, V_{GS} =$ $10V, R_G=1\Omega$	-	20	-	ns
Turn-ON Rise Time	t_R		-	60	-	ns
Turn-OFF Delay Time	$t_{D(OFF)}$		-	39	-	ns
Turn-OFF Fall-Time	t_F		-	11	-	ns
Total Gate Charge(Note2)	Q_G	$V_{DS} =40V, V_{GS} =10V, I_D$ $=60A$	-	72	-	nC
Gate Source Charge	Q_{GS}		-	22	-	nC
Gate Drain Charge	Q_{GD}		-	23	-	nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	-		1.2	V
Diode Continuous Forward Current	I_S		-		140	A
Reverse Recovery Time	t_{RR}	$V_{GS} = 0 V, I_F = I_S$	-	65	-	nS
Reverse Recovery Charge	Q_{RR}	$di/dt=100 A/\mu s$ (Note4,5)	-	136	-	nC

Note: 2. Essentially independent of operating temperature-

TYPICAL CHARACTERISTICS

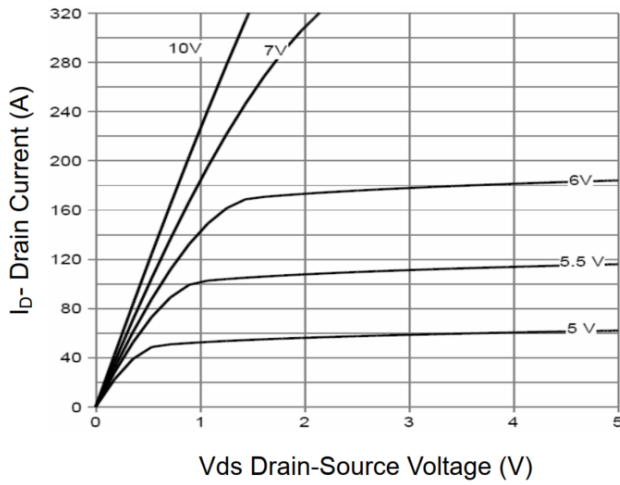


Figure 1 Output Characteristics

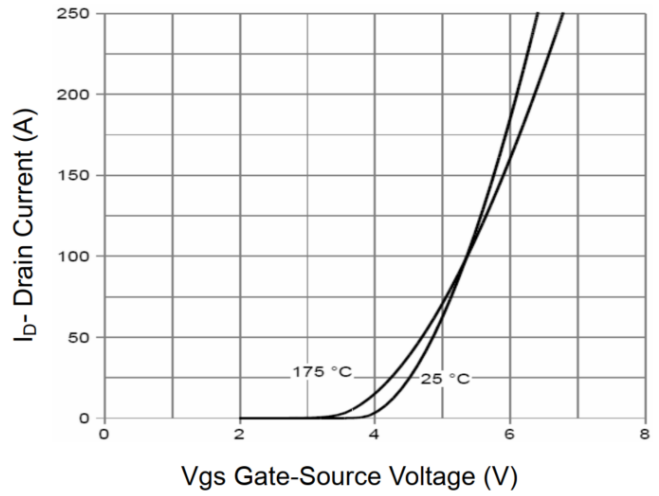


Figure 2 Transfer Characteristics

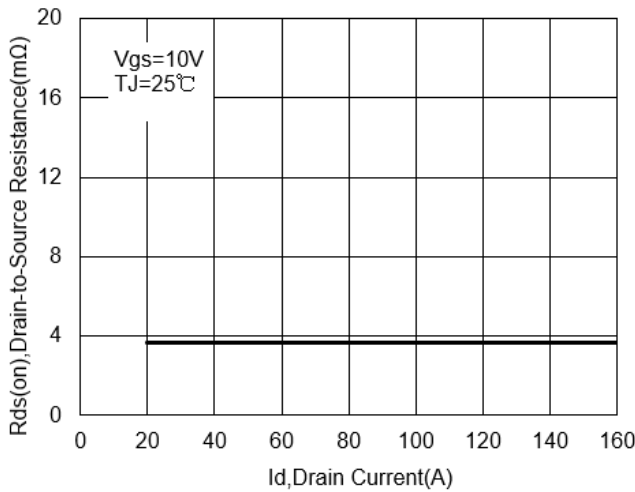


Figure 3. Rdson-Drain Current

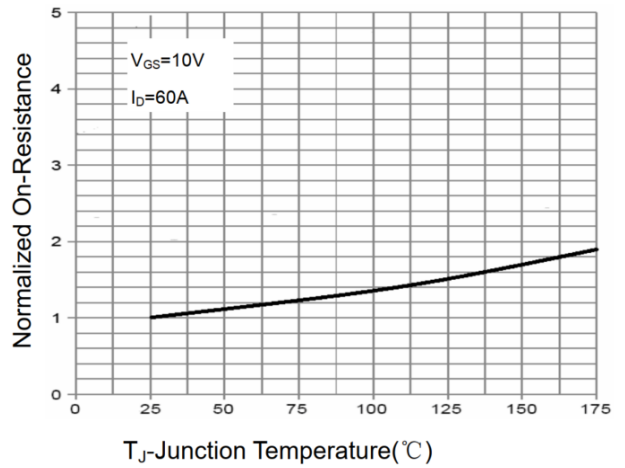


Figure 4 Rdson-Junction Temperature

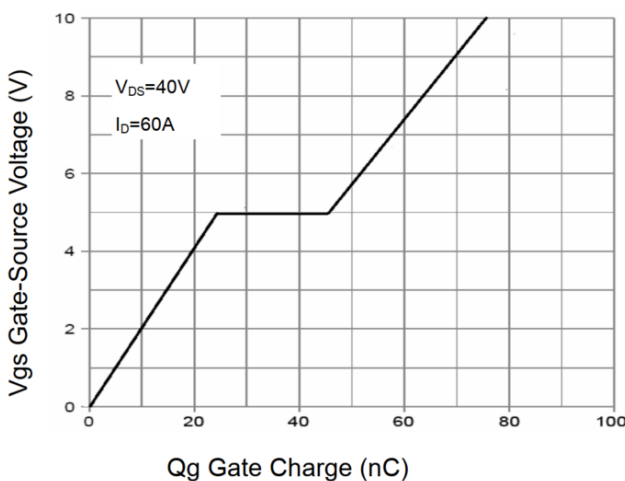


Figure 5 Gate Charge

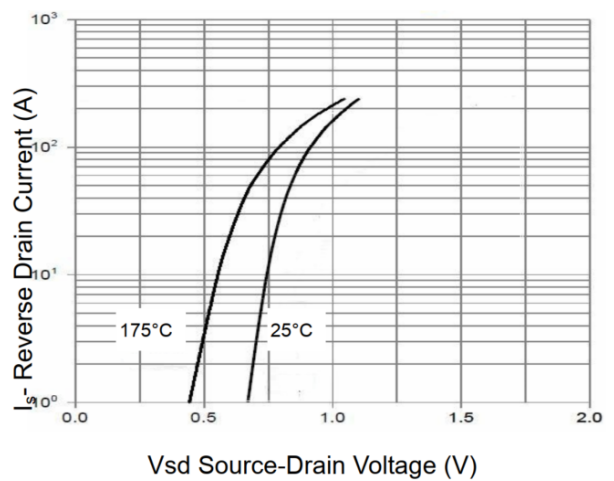


Figure 6 Source-Drain Diode Forward

TYPICAL CHARACTERISTICS(Cont.)

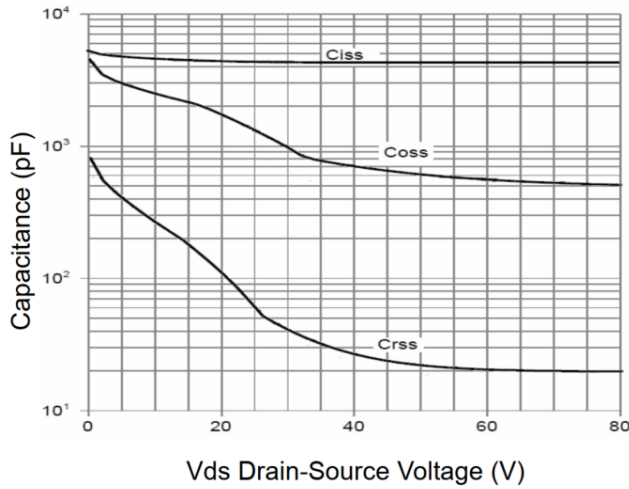


Figure 7 Capacitance vs Vds

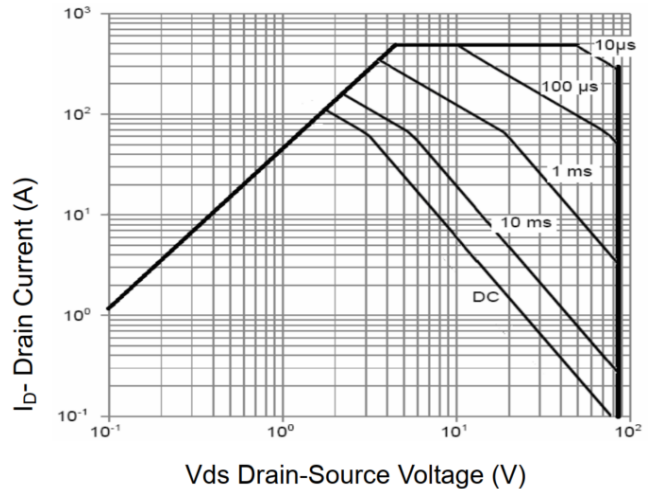


Figure 8 Safe Operation Area

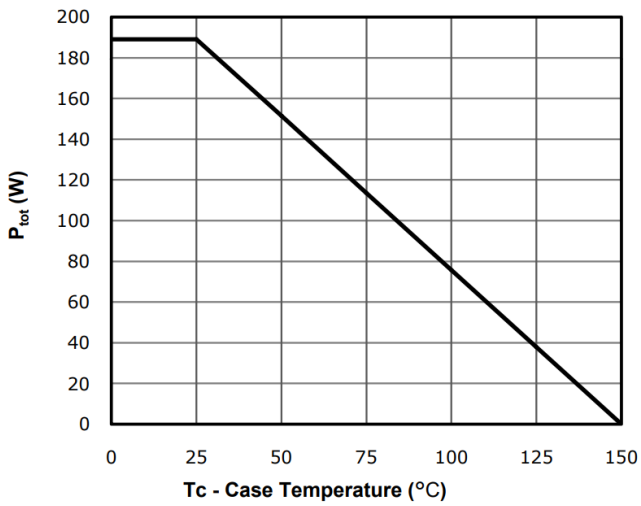
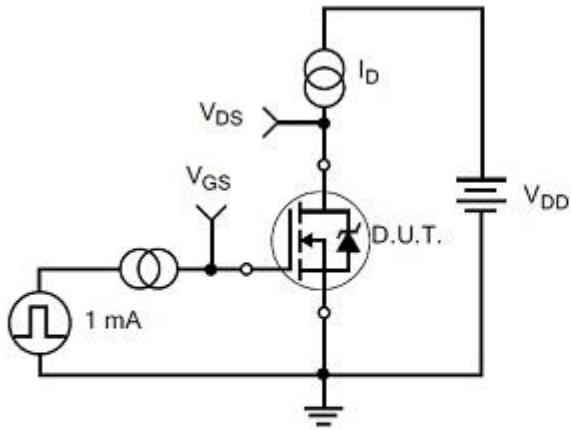
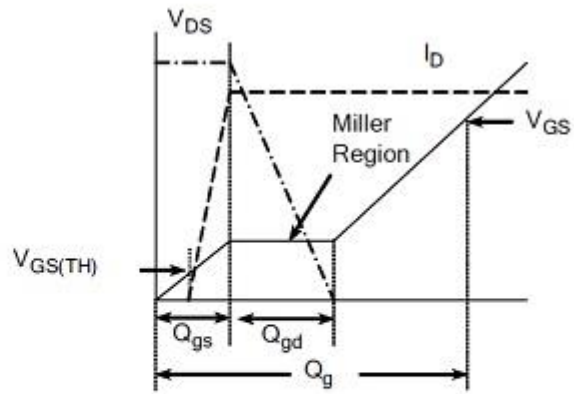


Figure 9 Power De-rating

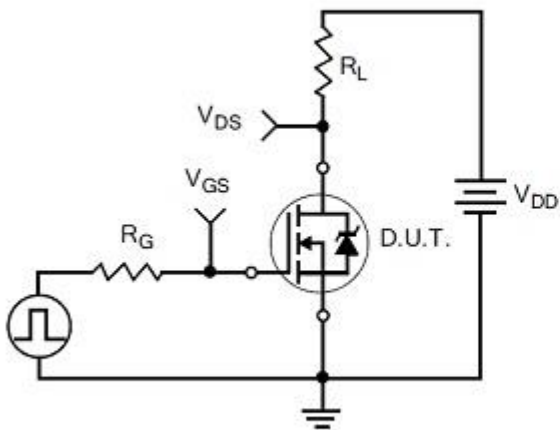
TEST CIRCUITS AND WAVEFORMS



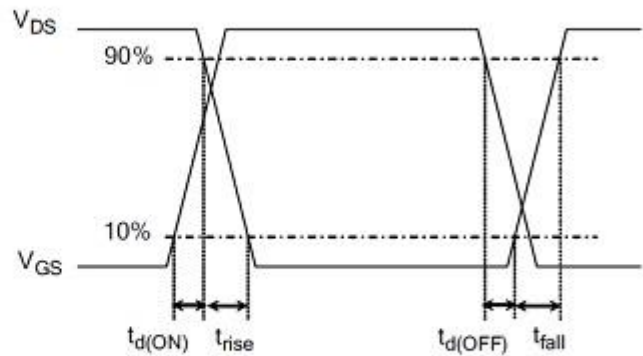
Gate Charge Test Circuit



Gate Charge Waveform

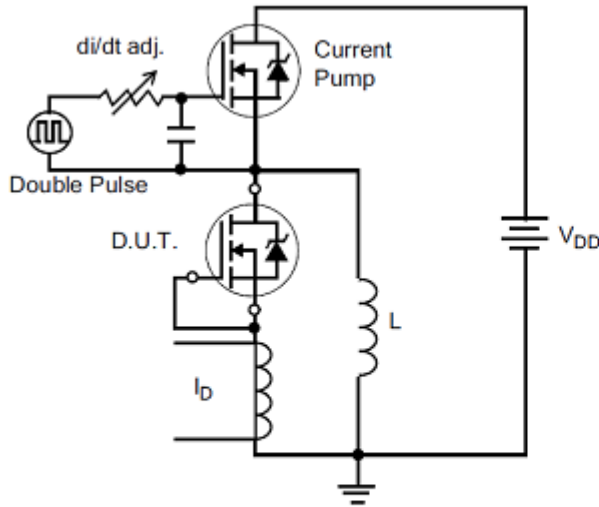


Resistive Switching Test Circuit

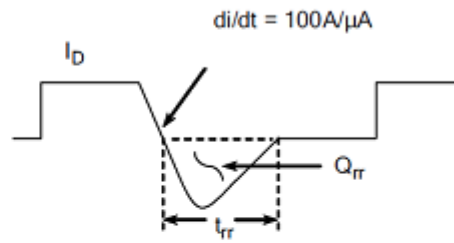


Resistive Switching Waveforms

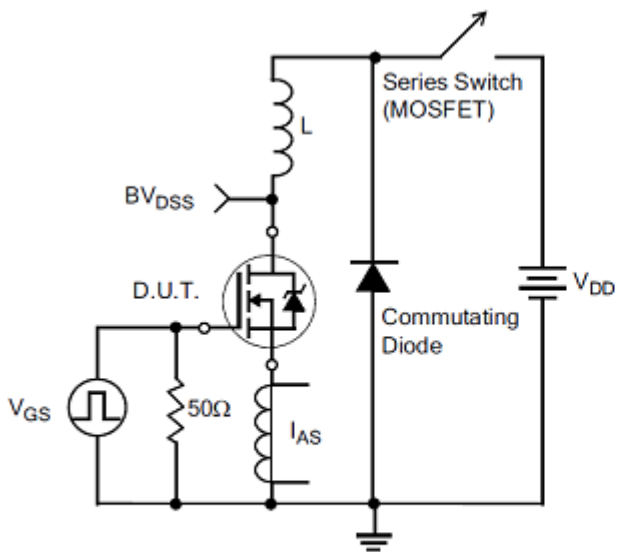
TEST CIRCUITS AND WAVEFORMS(Cont.)



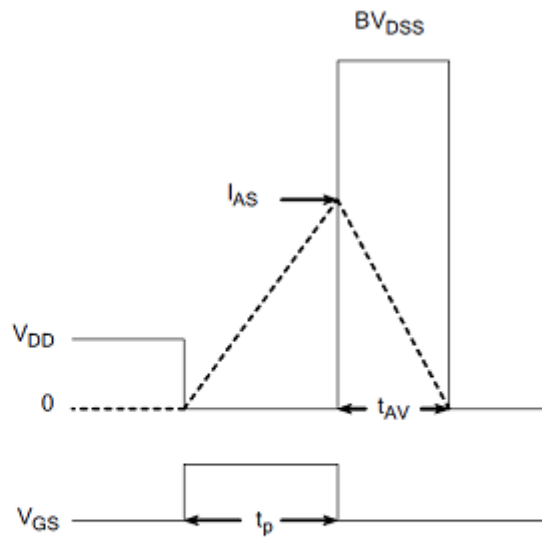
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



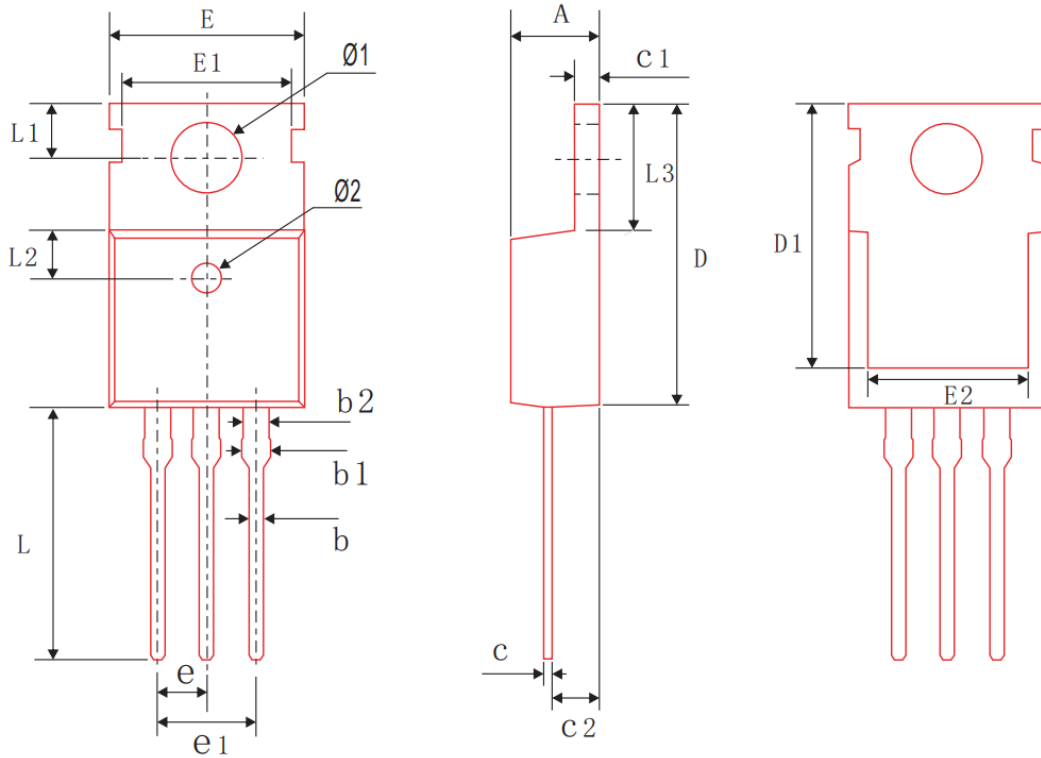
Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Unclamped Inductive Switching Waveforms

TO-220 Package



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
b	0.70	0.80	0.90
b1	---	---	1.42
b2	1.17	1.27	1.37
c	0.40	0.50	0.60
C1	1.25	1.30	1.35
C2	2.20	2.40	2.60
D	15.45	15.65	15.85
D1	13.20	13.40	13.60
E	9.80	10.0	10.2
E1	8.60	8.70	8.80
E2	7.80	8.00	8.20
e1	4.88	5.08	5.28
L	12.95	13.15	13.35
L1	2.70	2.80	2.90
L2	2.40	2.50	2.60
L3	6.30	6.50	6.70
Ø1	3.50	3.60	3.70
Ø2	1.35	1.50	1.65
e	2.54BSC		

Revision history

Document revision history

Date	Revision	Changes
25-Oct-2020	1.0	First release

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