General Description

The WSF4022 is the highest performance trench Dual N-Ch MOSFET with extreme high cell density,which provide excellent R_{DSON} and gate charge for most of the synchronous buck converter applications .

The WSF4022 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

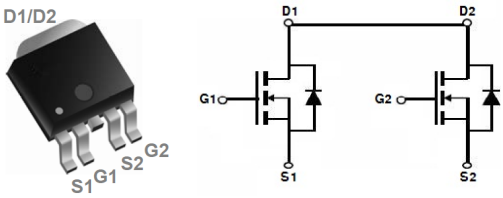
Product Summery

B_{VDSS}	R_{DSON}	I_D
40V	21mΩ	20A

Applications

- For Fan Pre-driver H-Bridge.
- Motor Control.
- Synchronous Rectification.

TO-252-4L Pin Configuration



Absolute Maximum Ratings @TA=25℃ unless otherwise noted

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		40	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current (Continuous) *AC	T_C=25°C	20*	A
I_D	Drain Current (Continuous) *AC	T_C=100°C	20*	A
I_D	Drain Current (Continuous) *AC	T_A=25°C	12.2	A
I_D	Drain Current (Continuous) *AC	T_A=70°C	10.2	A
I_{DM} [a]	Pulsed Drain Current	T_C=25°C	80*	A
E_{AS} [b]	Single Pulse Avalanche Energy	L=0.5mH	25	mJ
I_{AS} [b]	Avalanche Current	L=0.5mH	17.8	A
P_D	Maximum Power Dissipation	T_C=25°C	39.4	W
P_D	Maximum Power Dissipation	T_C=100°C	19.7	W
P_D	Power Dissipation	T_A=25°C	6.4	W
P_D	Power Dissipation	T_A=70°C	4.2	W
T_J	Operating Junction Temperature Range		175	℃
T_{STG}	Operating Temperature/ Storage Temperature		-55~175	℃
$R_{\theta JA}$ [b]	Thermal Resistance Junction-Ambient	Steady State [c]	60	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case		3.8	℃/W

Note *：Limited by package.
Note a：Pulse width limited by max. junction temperature.
Note b：UIS tested and pulse width limited by maximum junction temperature 175℃(initial temperature Tj=25℃).
Note c：Surface Mounted on 1in2 pad area, t =999sec.

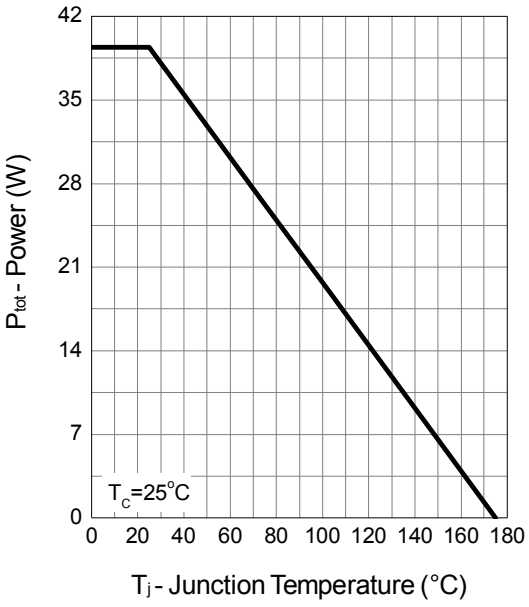
Electrical Characteristics @T_A=25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32V, V_{GS} = 0V			1	μA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32V, V_{GS} = 0V, T_J=85°C			30	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_{DS} = 250μA	1.1	1.6	2.5	V
$R_{DS(on)}$ [d]	Drain-Source On-state Resistance	V_{GS} = 10V, I_D = 10A		16	21	mΩ
		V_{GS} = 4.5V, I_D = 5A		18	25	mΩ
Gate Charge[e]						
Qg	Total Gate Charge	V_{DS}=20V,V_{GS}=4.5V, I_D=10A		7.5		nC
Qgs	Gate-Source Charge			3.24		nC
Qgd	Gate-Drain Charge			2.75		nC
Dynamic[e]						
Ciss	Input Capacitance	V_{GS}=0V, V_{DS}=20V, f=1MHz		815		pF
Coss	Output Capacitance			95		pF
Crss	Reverse Transfer Capacitance			60		pF
td (on)	Turn-on Delay Time	V_{DD}=20V, V_{GEN}=10V, I_{DS}=1A,R_G=6Ω,R_L=20Ω.		7.8		ns
tr	Turn-on Rise Time			6.9		ns
td(off)	Turn-off Delay Time			22.4		ns
tf	Turn-off Fall Time			4.8		ns
Diode						
V_{SD} [d]	Diode Forward Voltage	I_{SD}=1A, V_{GS}=0V		0.75	1.1	V
trr	Input Capacitance	I_{DS}=10A, dI_{SD}/dt=100A/μs		13		ns
Qrr	Output Capacitance			8.7		nC

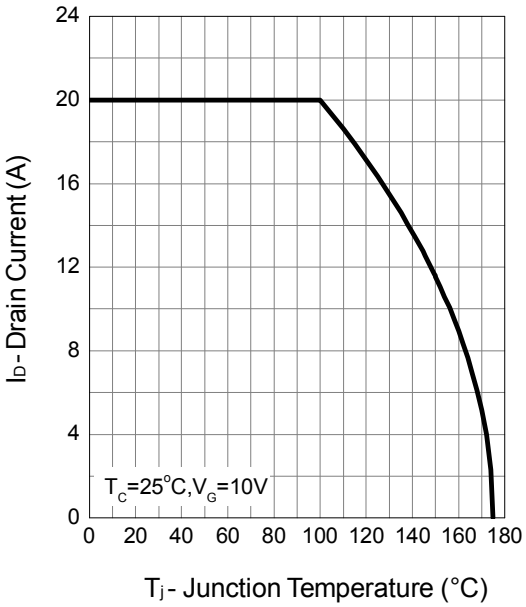
Note d：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e：Guaranteed by design, not subject to production testing.

Typical Characteristics

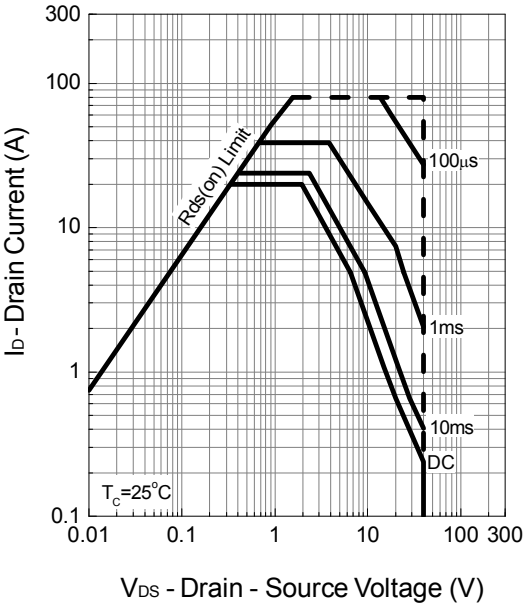
Power Dissipation



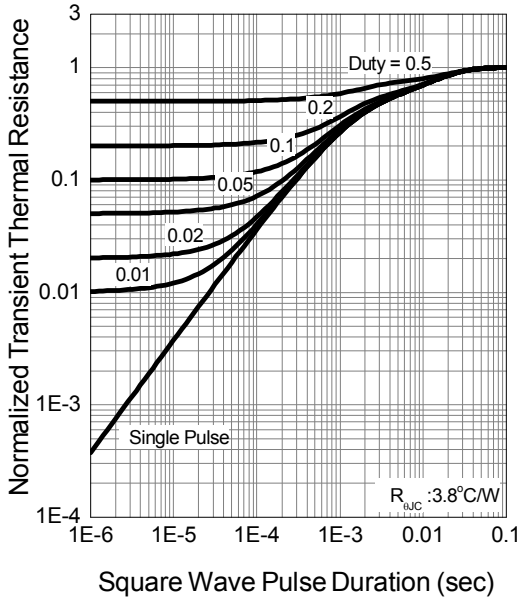
Drain Current



Safe Operation Area

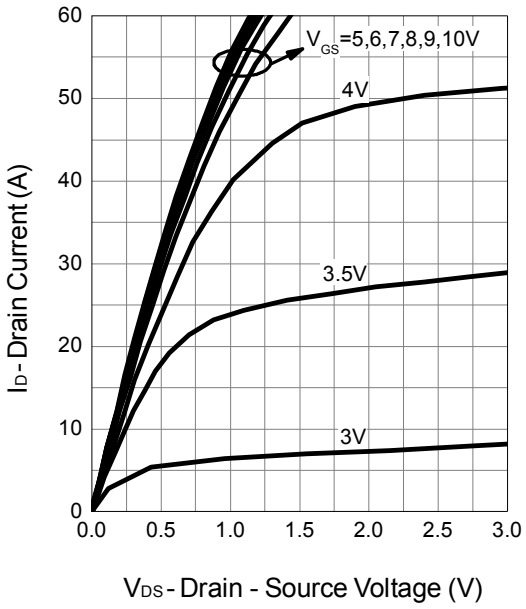


Thermal Transient Impedance

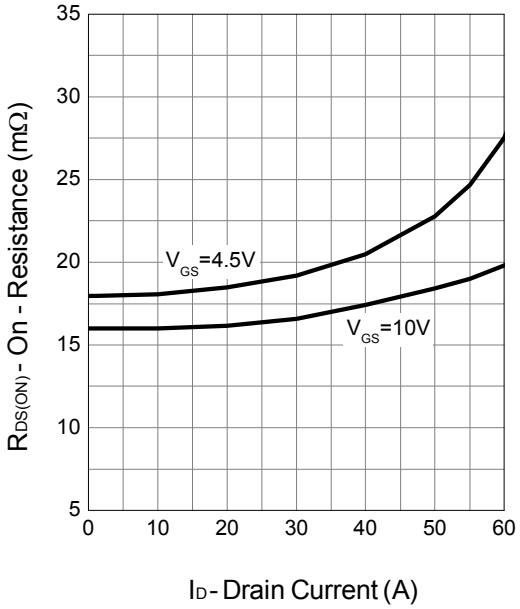


Typical Characteristics

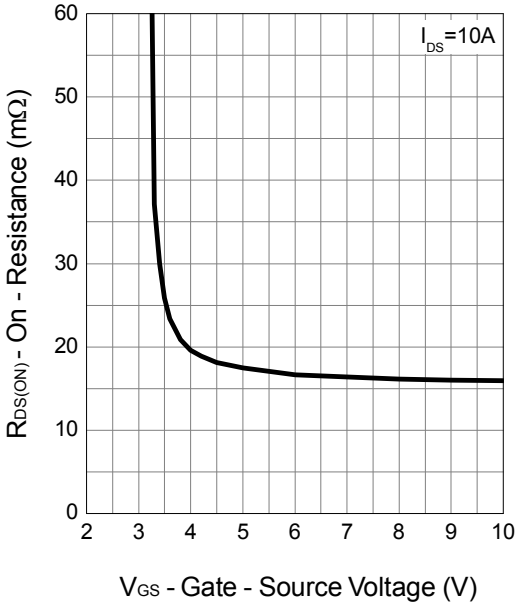
Output Characteristics



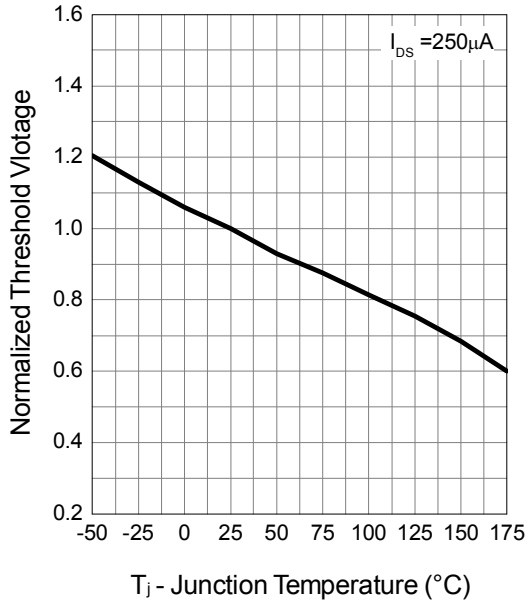
Drain-Source On Resistance



Gate-Source On Resistance

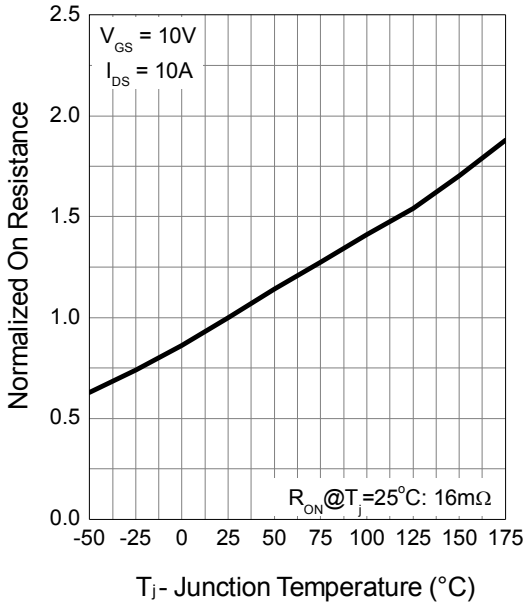


Gate Threshold Voltage

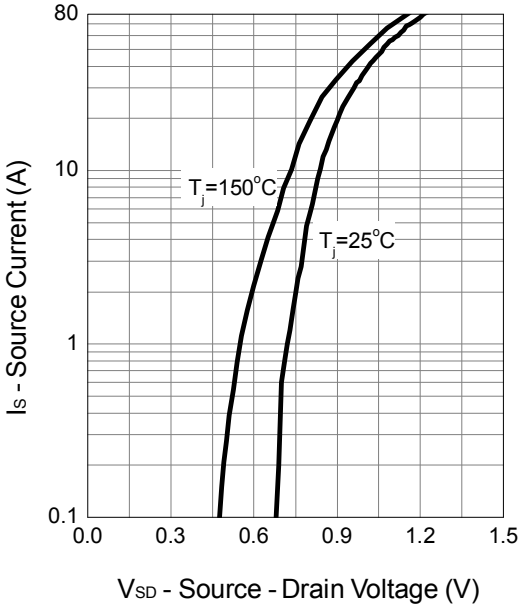


Typical Characteristics

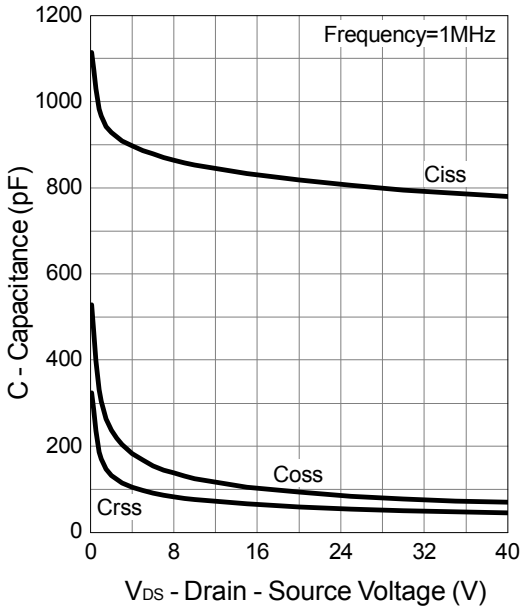
Drain-Source On Resistance



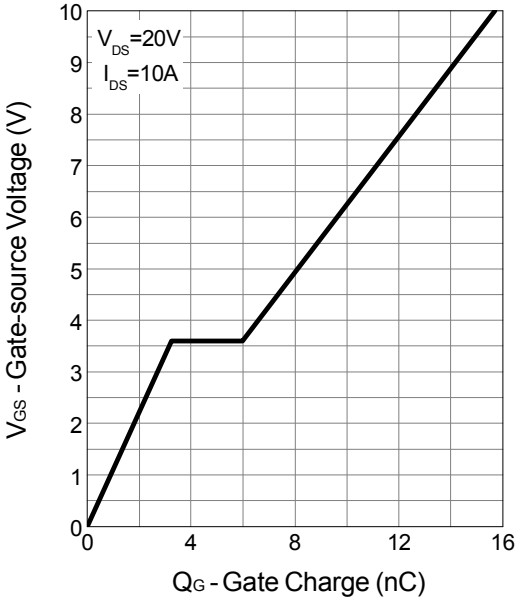
Source-Drain Diode Forward



Capacitance

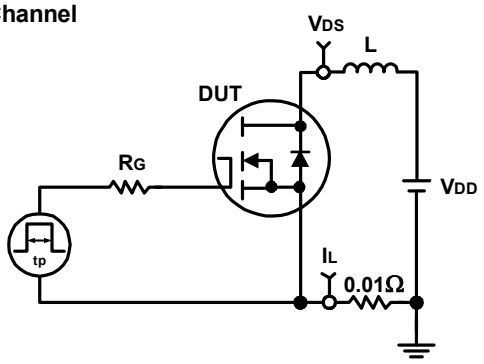


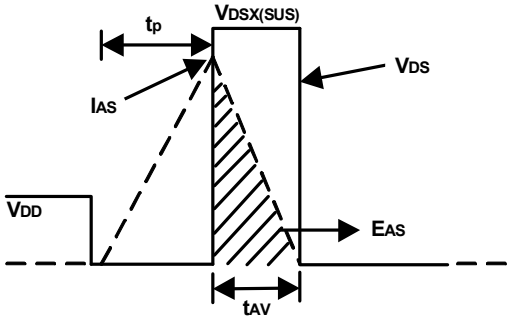
Gate Charge



Avalanche Test Circuit and Waveforms

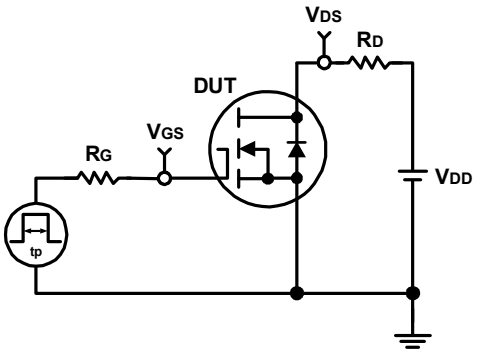
N Channel

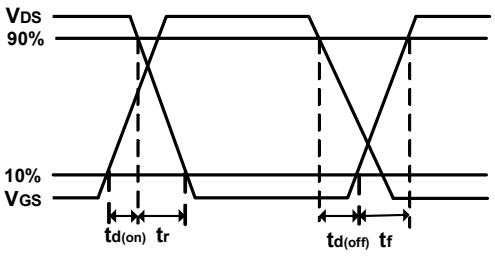


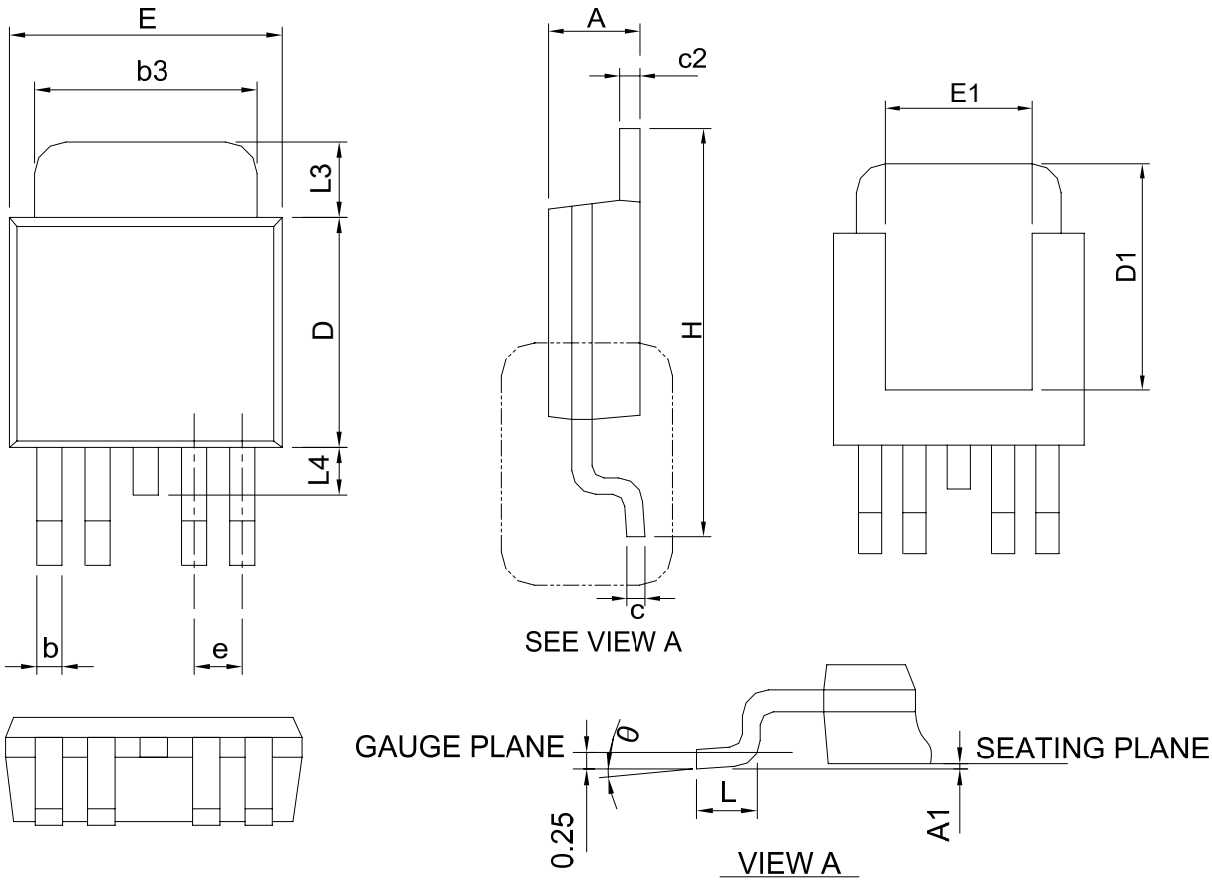


Switching Time Test Circuit and Waveforms

N Channel

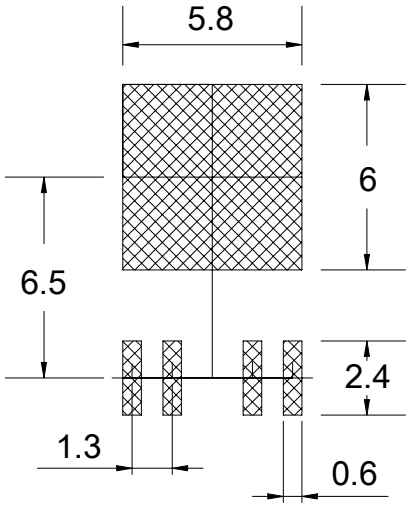






SYMBOL	TO-252-4			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.2	-	0.008
b	0.50	0.71	0.020	0.028
b3	4.32	5.46	0.170	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	1.30 BSC		0.051 BSC	
H	9.40	10.41	0.370	0.410
L	1.40	1.78	0.055	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



UNIT: mm

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