

1.Description

These devices are well suited for low voltage and battery powered applications where low in-line power loss and fast switching are required.

2.2Features(P-Ch)

- $V_{DS(V)} = -30V$
- $I_D = -5A (V_{GS} = -10V)$

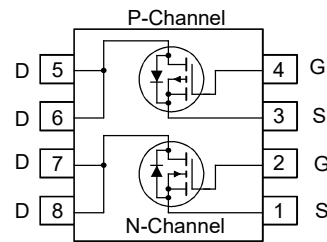
2.1Features(N-Ch)

- $V_{DS(V)} = 30V$
- $I_D = 7A (V_{GS} = 10V)$
- $R_{DS(ON)} < 28m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 40m\Omega (V_{GS} = 4.5V)$

3.Pinning information

Pin	Symbol	Description
1,3	S	SOURCE
2,4	G	GATE
5,6,7,8	D	DRAIN

SOP-8



4.Absolute Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage	V_{DS}	30	30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Drain Current – Continuous (Note 1a)	I_D	7	-5	A
– Pulsed		20	-20	
Drain-Source Avalanche Energy	E_{AS}	2	2	W
Power Dissipation for Dual Operation (Note 1a)	P_D	1.6	1.6	W
Power Dissipation for Single Operation (Note 1c)		0.9	0.9	W
(Note 3)		54	13	mJ
Storage Junction Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ C$



5. Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Ambient (Note 1a)	$R_{\theta JA}$	78	°C/W
Thermal Resistance, Junction-to-Case (Note 1)	$R_{\theta JC}$	40	°C/W



6. Electrical Characteristics $T_A=25^\circ\text{C}$

Parameter	Symbol		Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	N-Ch	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
		P-Ch	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	N-Ch	$I_D=250\mu\text{A}$, Reference to 25°C		25		mV/ $^\circ\text{C}$
		P-Ch	$I_D=-250\mu\text{A}$, Reference to 25°C		-23		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	N-Ch	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		P-Ch	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$			-1	μA
Gate-Body Leakage, Forward	I_{GSSF}	All	$V_{GS}=20\text{V}$, $V_{DS}=0\text{V}$			100	nA
Gate-Body Leakage, Reverse	I_{GSSR}	All	$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			-100	nA
Gate Threshold Voltage	$V_{GS(th)}$	N-Ch	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.9	3	V
		P-Ch	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1	-1.7	-3	V
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{GS(th)}/\Delta T_J$	N-Ch	$I_D=250\mu\text{A}$, Reference to 25°C		-4.5		mV/ $^\circ\text{C}$
		P-Ch	$I_D=-250\mu\text{A}$, Reference to 25°C		4.5		mV/ $^\circ\text{C}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	N-Ch	$V_{GS}=10\text{V}$, $I_D=7\text{A}$		19	28	m Ω
			$V_{GS}=4.5\text{V}$, $I_D=6\text{A}$		24	40	m Ω
		P-Ch	$V_{GS}=-10\text{V}$, $I_D=-5\text{A}$		42	52	m Ω
			$V_{GS}=-4.5\text{V}$, $I_D=-4\text{A}$		65	80	m Ω
On-State Drain Current	$I_{D(on)}$	N-Ch	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	20			A
		P-Ch	$V_{GS}=-10\text{V}$, $V_{DS}=-5\text{V}$	-20			A
Forward Transconductance	g_{FS}	N-Ch	$V_{DS}=5\text{V}$, $I_D=7\text{A}$		25		S
		P-Ch	$V_{DS}=-5\text{V}$, $I_D=-5\text{A}$		10		S
Input Capacitance	C_{iss}	N-Ch	$V_{DS}=15\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		575		pF
		P-Ch			528		pF
Output Capacitance	C_{oss}	N-Ch			145		pF
		P-Ch			132		pF
Reverse Transfer Capacitance	C_{rss}	N-Ch	$V_{DS}=-15\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		65		pF
		P-Ch			70		pF



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-30V P-Channel MOSFET

Gate Resistance	R_G	N-Ch	$V_{GS}=15\text{mV}$, $f=1\text{MHz}$		2.1		Ω
		P-Ch			6		Ω
Turn-On Delay Time	$t_{D(on)}$	N-Ch	N-Ch:		8	16	ns
		P-Ch			7	14	ns
Turn-On Rise Time	t_r	N-Ch	$V_{DD}=15\text{V}$, $I_D=1\text{A}$, $V_{GS}=10\text{V}$, $R_{GEN}=6\Omega$		5	10	ns
		P-Ch			13	24	ns
Turn-Off Delay Time	$t_{D(off)}$	N-Ch	P-Ch: $V_{DD}=-15\text{V}$, $I_D=-1\text{A}$, $V_{GS}=-10\text{V}$, $R_{GEN}=6\Omega$		23	37	ns
		P-Ch			14	25	ns
Turn-Off Fall Time	t_f	N-Ch			3	6	ns
		P-Ch			9	17	ns
Total Gate Charge	Q_g	N-Ch	N-Ch:		11.4	16	nC
		P-Ch			9.6	13	nC
Gate-Source Charge	Q_{gs}	N-Ch	$V_{DS}=15\text{V}$, $I_D=7\text{A}$, $V_{GS}=10\text{V}$ P-Ch:		1.7		nC
		P-Ch			2.2		nC
Gate-Drain Charge	Q_{gd}	N-Ch	$V_{DS}=-15\text{V}$, $I_D=-5\text{A}$, $V_{GS}=-10\text{V}$		2.1		nC
		P-Ch			1.7		nC
Maximum Continuous Drain-Source Diode Forward Current	I_S	N-Ch				1.3	A
		P-Ch				-1.3	A
Maximum Pulsed Drain-Source Diode Forward Current (Note 2)	I_{SM}	N-Ch				20	A
		P-Ch				-20	A
Drain-Source Diode Forward Voltage	V_{SD}	N-Ch	$V_{GS}=0\text{V}$, $I_S=1.3\text{A}$ (Note 2)		0.75	1.2	V
		P-Ch	$V_{GS}=0\text{V}$, $I_S=-1.3\text{A}$ (Note 2)		-0.88	-1.2	V
Diode Reverse Recovery Time	t_{rr}	N-Ch	N-Ch: $I_F=7\text{A}$, $dI_F/dt=100\text{A}/\mu\text{s}$		19		ns
		P-Ch			19		ns
Diode Reverse Recovery Charge	Q_{rr}	N-Ch	P-Ch: $I_F=-5\text{A}$, $dI_F/dt=100\text{A}/\mu\text{s}$		9		nC
		P-Ch			6		nC

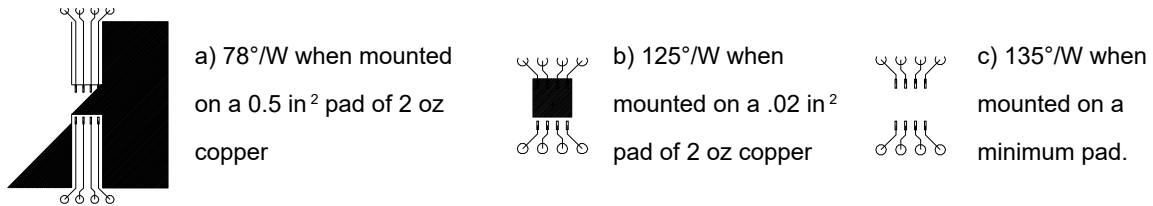


30V N-Channel MOSFET
-30V P-Channel MOSFET

Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.

$R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < $300\mu s$, Duty Cycle < 2.0%

3. Starting $T_J=25^{\circ}C$, $L=3mH$, $I_{AS}=6A$, $V_{DD}=30V$, $V_{GS}=10V$ (Q1).

Starting $T_J=25^{\circ}C$, $L=3mH$, $I_{AS}=3A$, $V_{DD}=30V$, $V_{GS}=10V$ (Q2)



30V N-Channel MOSFET
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7.1 Typical Characteristics

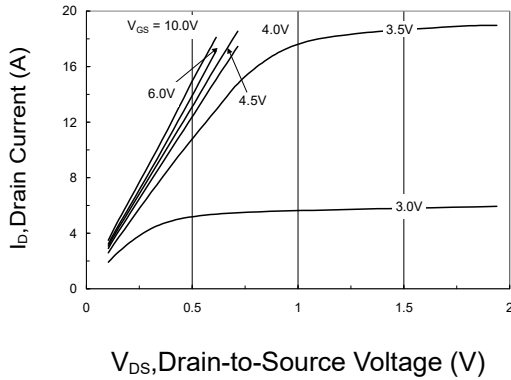


Figure 1: Output Characteristics

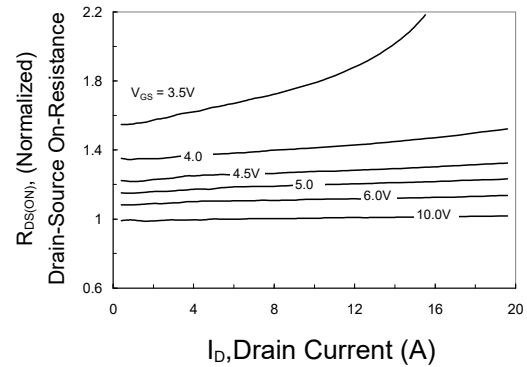


Figure 2: On-Resistance Variation with Drain Current and Gate Voltage

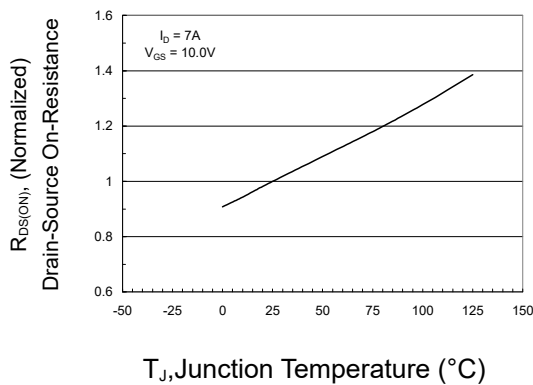


Figure 3: On-Resistance Variation with Temperature

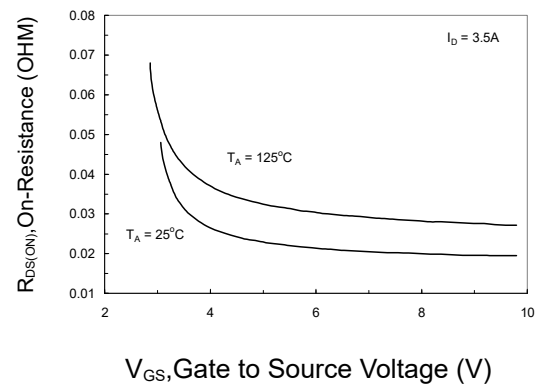


Figure 4: On-Resistance Variation with Gate-to-Source Voltage.

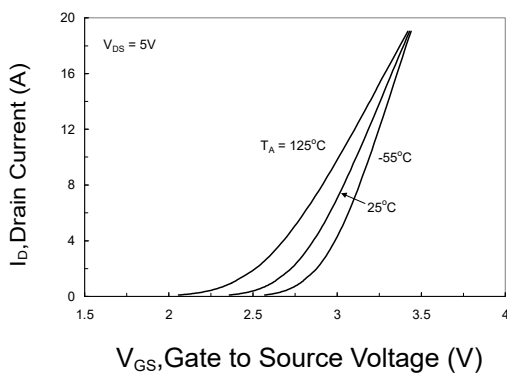


Figure 5: Transfer Characteristics

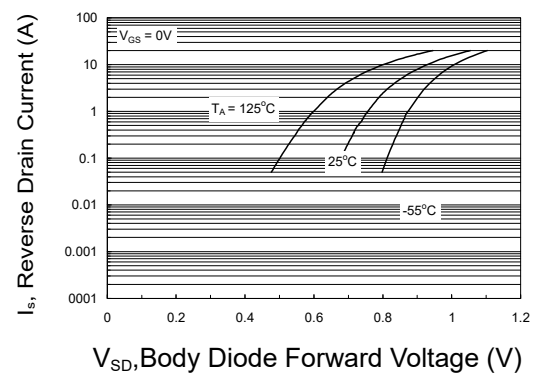


Figure 6: Body Diode Forward Voltage Variation with Source Current and Temperature



7.2 Typical Characteristics

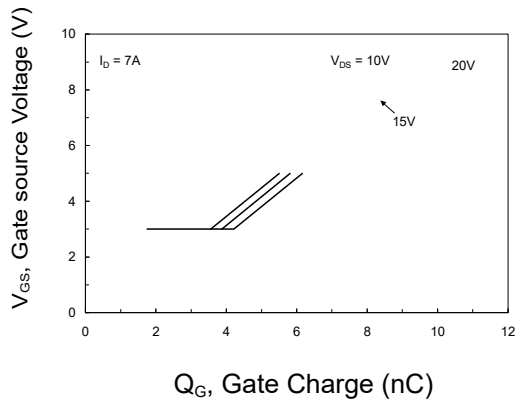


Figure 7: Gate Charge Characteristics

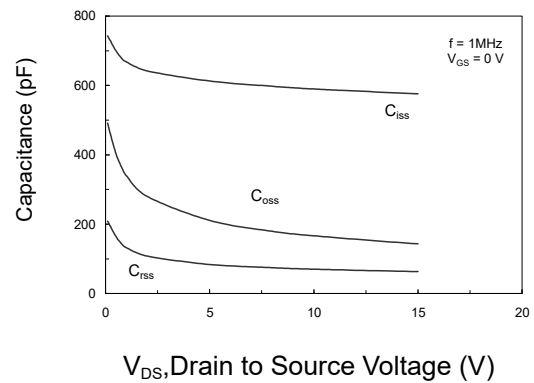


Figure 8: Capacitance Characteristics

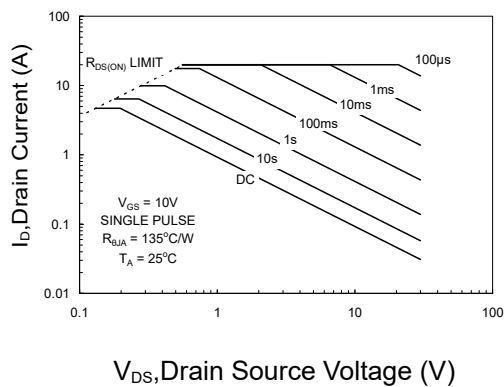


Figure 9: Maximum Safe Operating Area

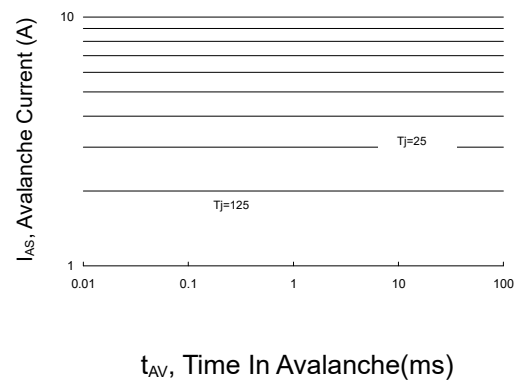


Figure 10: Unclamped Inductive Switching Capability Figure

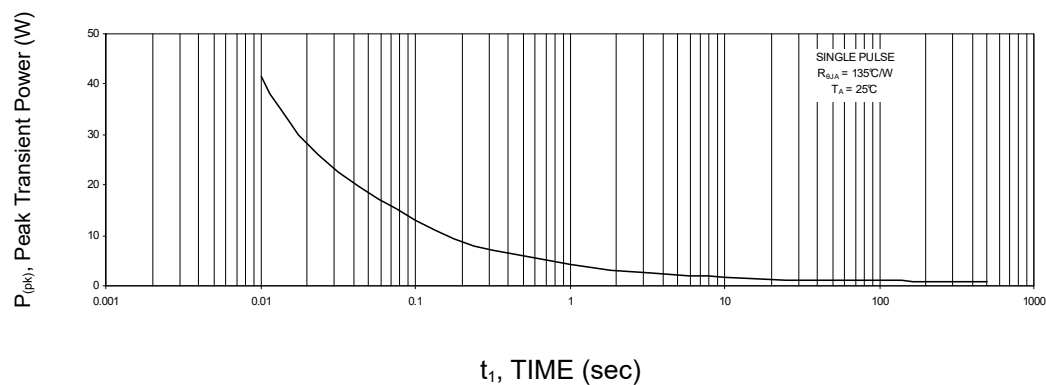


Figure 11: Single Pulse Maximum Power Dissipation



30V N-Channel MOSFET
-30V P-Channel MOSFET

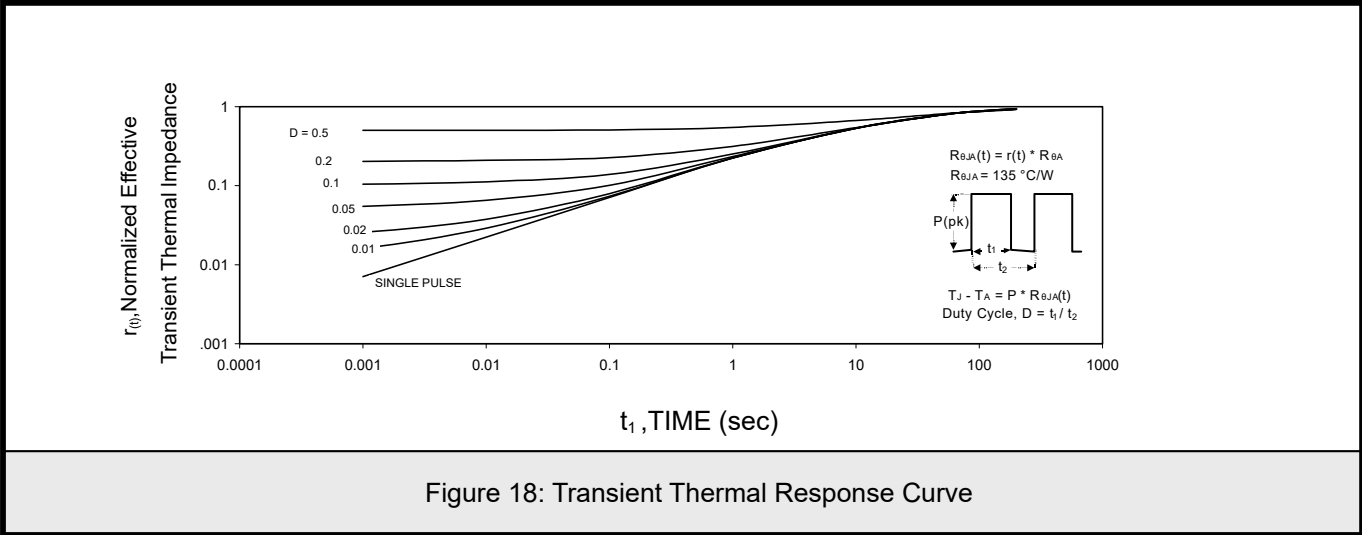
7.3Typical Characterisitics

Figure 12: Output Characteristics	Figure 13: On-Resistance Variation with Drain Current and Gate Voltage
Figure 14: On-Resistance Variation with Temperature	Figure 15: On-Resistance Variation with Gate-to-Source Voltage.
Figure 16: Transfer Characteristics	Figure 17: Body Diode Forward Voltage Variation with Source Current and Temperature



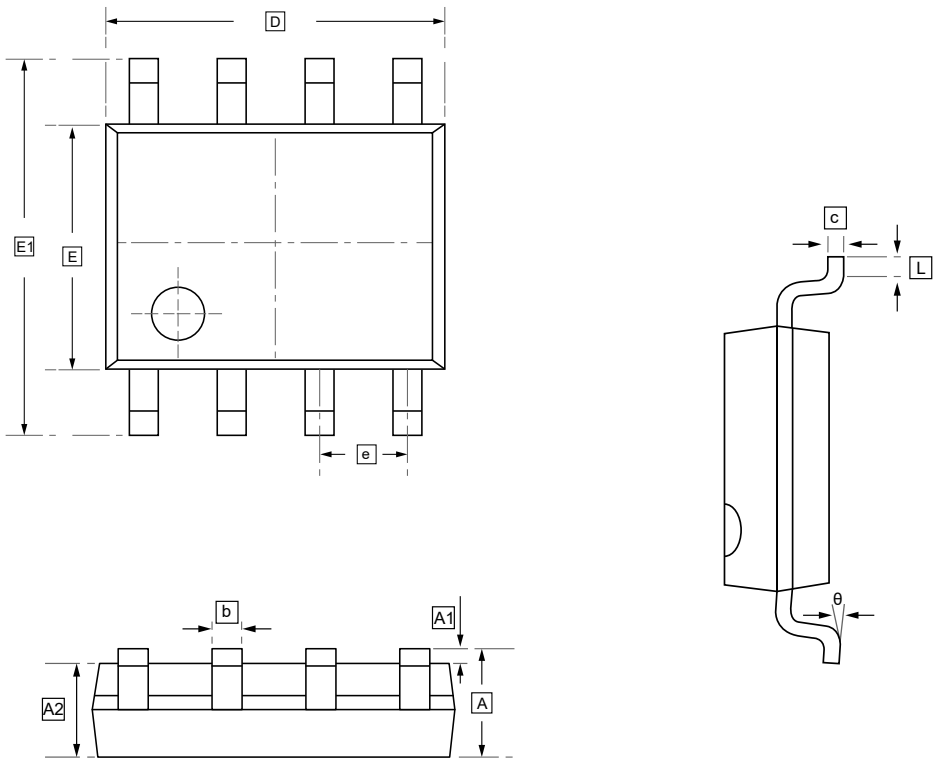
30V N-Channel MOSFET
-30V P-Channel MOSFET

7.4Typical Characterisitics





8.SOP-8 Package Outline Dimensions



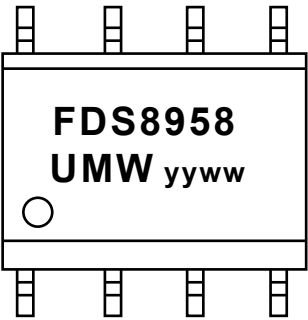
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°



30V N-Channel MOSFET
-30V P-Channel MOSFET

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDS8958A	SOP-8	3000	Tape and reel



10.Disclaimer

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