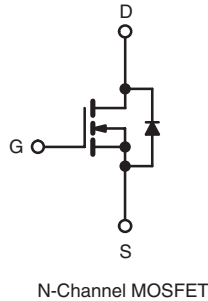
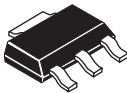


Power MOSFET

PRODUCT SUMMARY

V_{DS} (V)	250	
$R_{DS(on)}$ (Ω)	$V_{GS} = 10\text{ V}$	2.0
Q_g (Max.) (nC)	8.2	
Q_{gs} (nC)	1.8	
Q_{gd} (nC)	4.5	
Configuration	Single	

SOT-223


FEATURES

- Surface Mount
- Available in Tape and Reel
- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Lead (Pb)-free Available


RoHS*
COMPLIANT

DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOT-223 package is designed for surface-mounting using vapor phase, infrared, or wave soldering techniques. Its unique package design allows for easy automatic pick-and-place as with other SOT or SOIC packages but has the added advantage of improved thermal performance due to an enlarged tab for heatsinking. Power dissipation of greater than 1.25 W is possible in a typical surface mount application.

ORDERING INFORMATION

Package	SOT-223	SOT-223
Lead (Pb)-free	IRFL214PbF	IRFL214TRPbF ^a
	SiHFL214-E3	SiHFL214T-E3 ^a
SnPb	IRFL214	IRFL214TR ^a
	SiHFL214	SiHFL214T ^a

Note

a. See device orientation.

ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V_{DS}	250	V
Gate-Source Voltage			V_{GS}	± 20	
Continuous Drain Current	V_{GS} at 10 V	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	0.79	A
		$T_C = 100\text{ }^{\circ}\text{C}$		0.50	
Pulsed Drain Current ^a			I_{DM}	6.3	
Linear Derating Factor				0.025	W/ $^{\circ}\text{C}$
Linear Derating Factor (PCB Mount) ^e				0.017	
Single Pulse Avalanche Energy ^b			E_{AS}	50	mJ
Repetitive Avalanche Current ^a			I_{AR}	0.79	A
Repetitive Avalanche Energy ^a			E_{AR}	0.31	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$		P_D	3.1	W
Maximum Power Dissipation (PCB Mount) ^e	$T_A = 25\text{ }^{\circ}\text{C}$			2.0	

* Pb containing terminations are not RoHS compliant, exemptions may apply

ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

PARAMETER	SYMBOL	LIMIT	UNIT
Peak Diode Recovery dV/dt^c	dV/dt	4.8	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d	

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. $V_{DD} = 50\text{ V}$, starting $T_J = 25\text{ }^{\circ}\text{C}$, $L = 128\text{ mH}$, $R_G = 25\text{ }\Omega$, $I_{AS} = 0.79\text{ A}$ (see fig. 12).
c. $I_{SD} \leq 2.7\text{ A}$, $dI/dt \leq 65\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, $T_J \leq 150\text{ }^{\circ}\text{C}$.
d. 1.6 mm from case.
e. When mounted on 1" square PCB (FR-4 or G-10 material).

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mount) ^a	R_{thJA}	-	-	60	$^{\circ}\text{C}/\text{W}$
Maximum Junction-to-Case (Drain)	R_{thJC}	-	-	40	

Note

- a. When mounted on 1" square PCB (FR-4 or G-10 material).

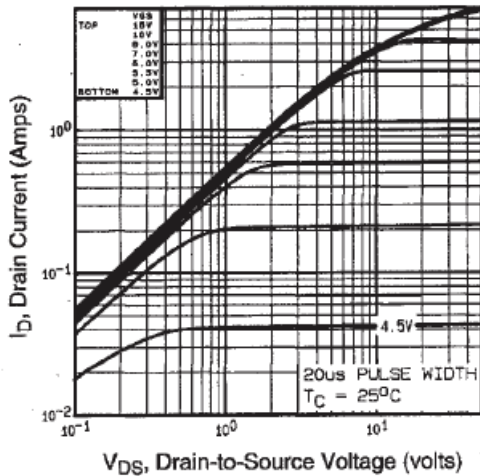
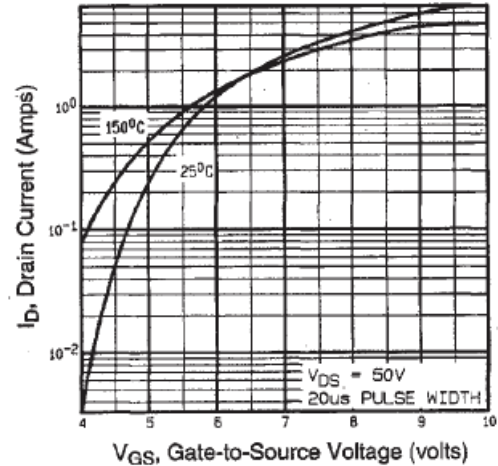
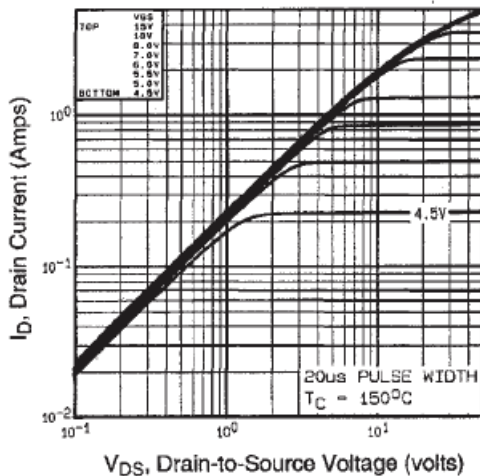
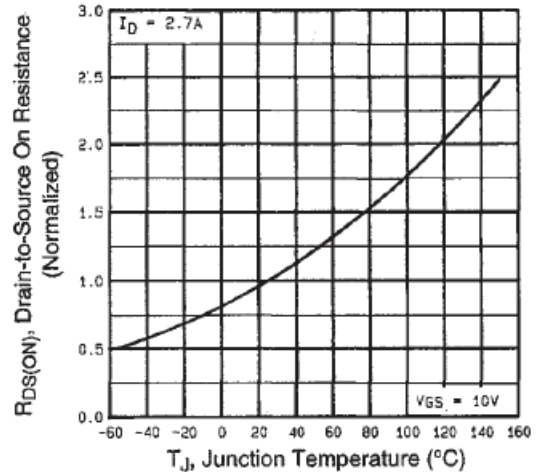
SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	250	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^{\circ}\text{C}$, $I_D = 1\text{ mA}$	-	0.39	-	$\text{V}/^{\circ}\text{C}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 250\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	25	μA
		$V_{DS} = 200\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$	-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 0.47\text{ A}^b$	-	-	2.0	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 50\text{ V}$, $I_D = 0.47\text{ A}$	0.50	-	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1.0\text{ MHz}$, see fig. 5	-	140	-	pF
Output Capacitance	C_{oss}		-	42	-	
Reverse Transfer Capacitance	C_{rss}		-	9.6	-	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$, $I_D = 2.7\text{ A}$, $V_{DS} = 200\text{ V}$, see fig. 6 and 13 ^b	-	-	8.2	nC
Gate-Source Charge	Q_{gs}		-	-	1.8	
Gate-Drain Charge	Q_{gd}		-	-	4.5	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 125\text{ V}$, $I_D = 2.7\text{ A}$, $R_G = 24\text{ }\Omega$, $R_D = 45\text{ }\Omega$, see fig. 10 ^b	-	7.0	-	ns
Rise Time	t_r		-	7.6	-	
Turn-Off Delay Time	$t_{d(off)}$		-	16	-	
Fall Time	t_f		-	7.0	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact 	-	4.0	-	nH
Internal Source Inductance	L_S		-	6.0	-	

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	0.79	A
Pulsed Diode Forward Current ^a	I_{SM}		-	-	6.3	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}$, $I_S = 0.79\text{ A}$, $V_{GS} = 0\text{ V}^b$	-	-	2.0	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}$, $I_F = 2.7\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}^b$	-	190	390	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	0.64	1.3	μC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)				

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. Pulse width $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS 25°C , unless otherwise noted

Fig. 1 - Typical Output Characteristics

Fig. 3 - Typical Transfer Characteristics

Fig. 2 - Typical Output Characteristics

Fig. 4 - Normalized On-Resistance vs. Temperature

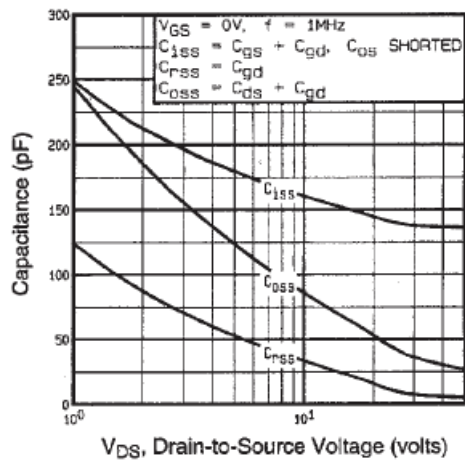


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

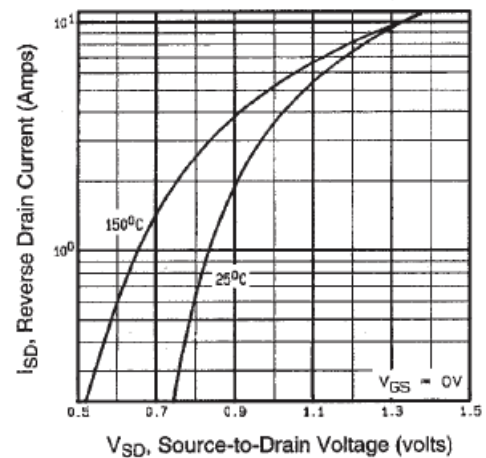


Fig. 7 - Typical Source-Drain Diode Forward Voltage

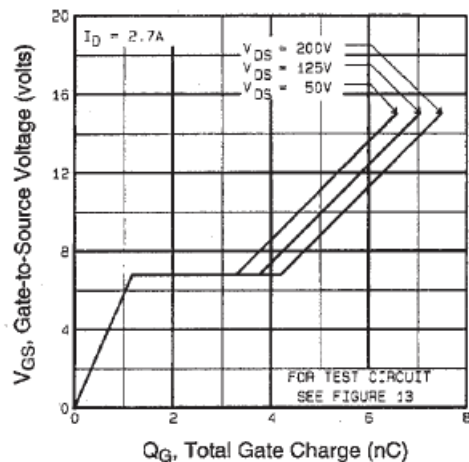


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

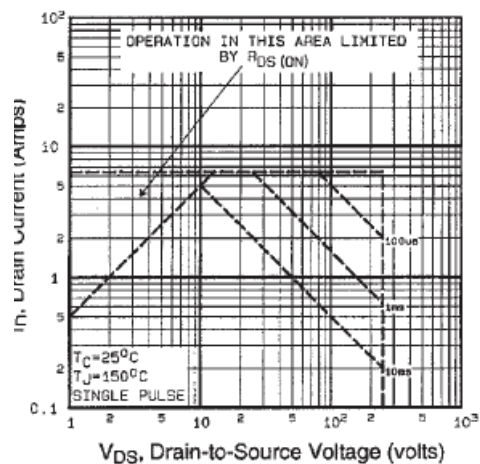


Fig. 8 - Maximum Safe Operating Area

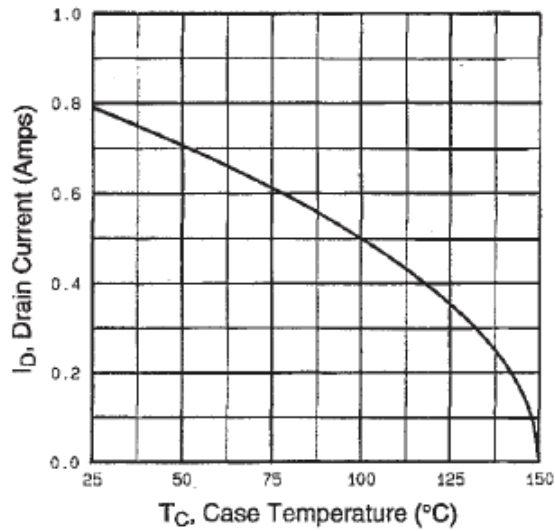


Fig. 9 - Maximum Drain Current vs. Case Temperature

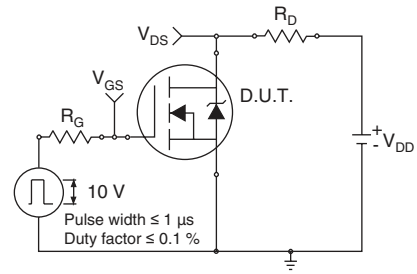


Fig. 10a - Switching Time Test Circuit

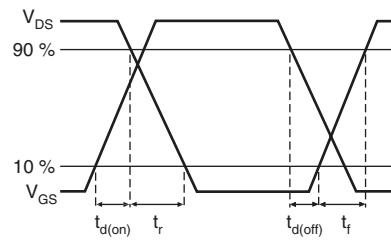


Fig. 10b - Switching Time Waveforms

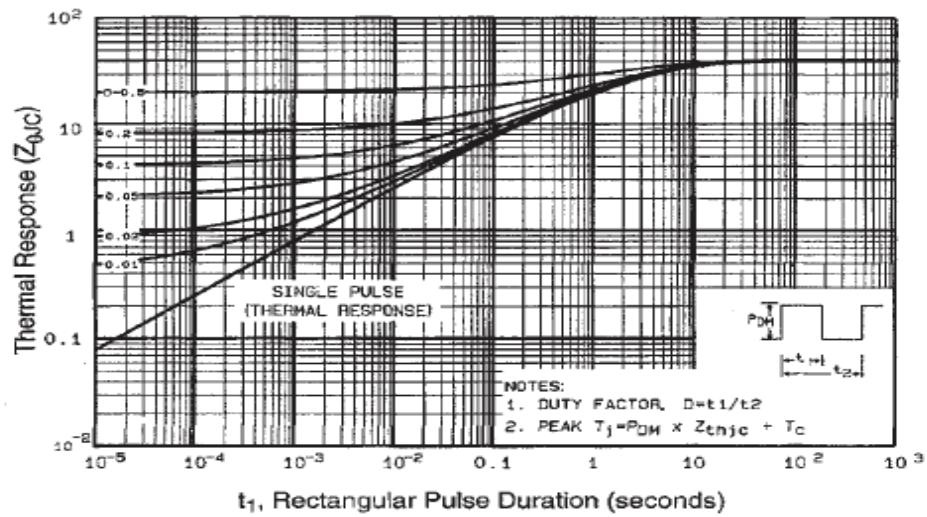


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

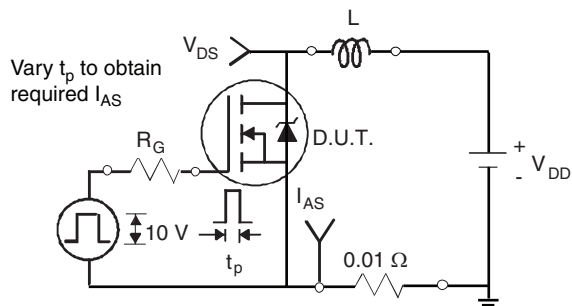


Fig. 12a - Unclamped Inductive Test Circuit

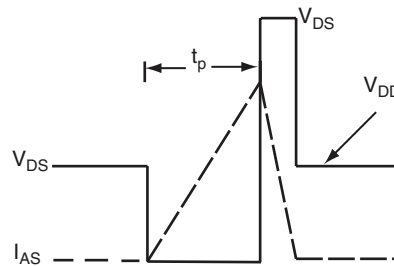


Fig. 12b - Unclamped Inductive Waveforms

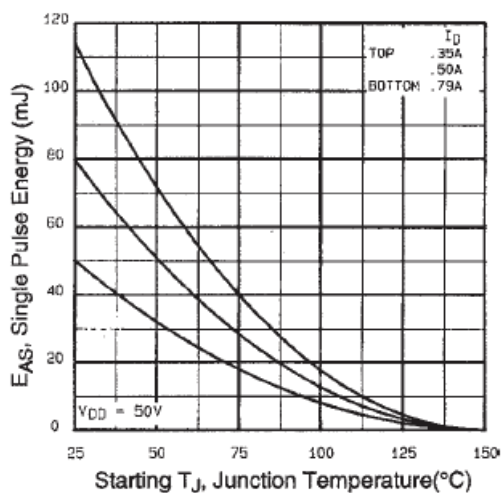


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

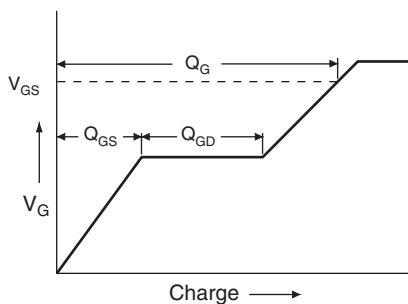


Fig. 13a - Basic Gate Charge Waveform

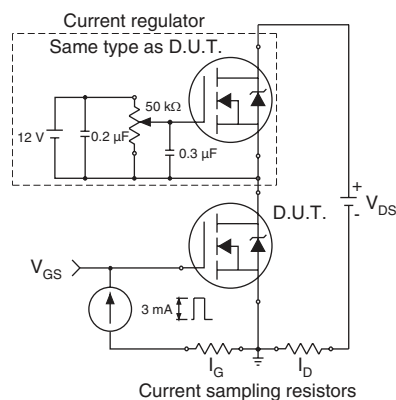


Fig. 13b - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit

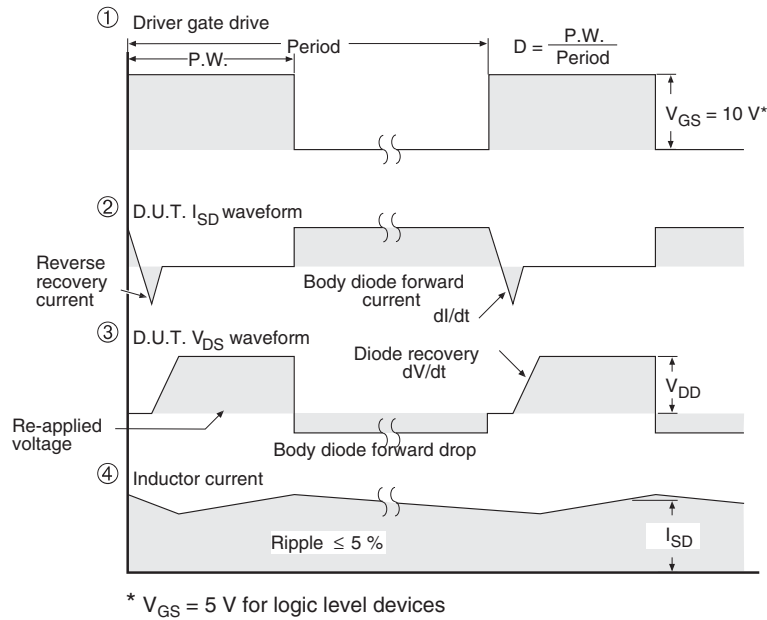
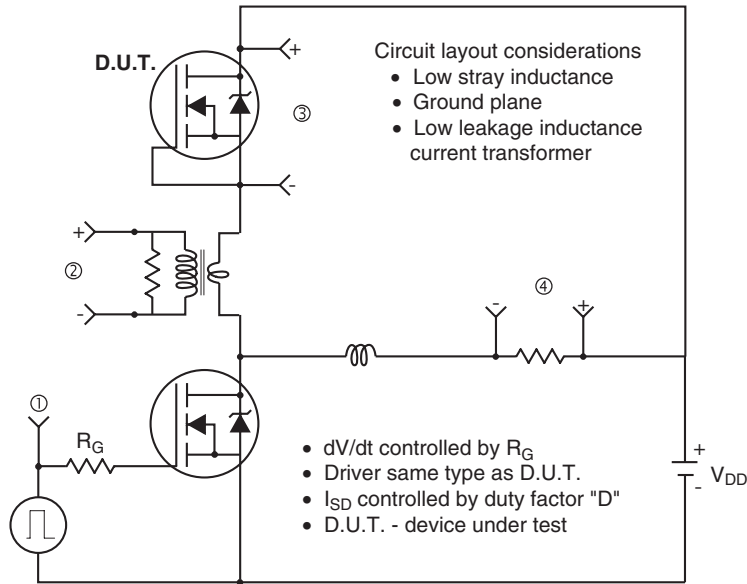


Fig.14 - For N-Channel

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