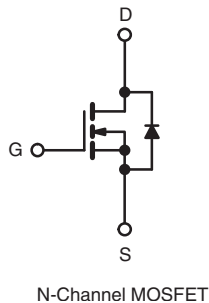
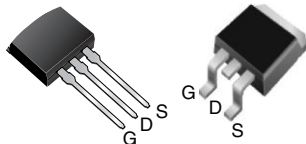


Power MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	60	
$R_{DS(on)}$ (Ω)	$V_{GS} = 5\text{ V}$	0.05
Q_g (Max.) (nC)	35	
Q_{gs} (nC)	7.1	
Q_{gd} (nC)	25	
Configuration	Single	

I²PAK (TO-262)

D²PAK (TO-263)



FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Advanced Process Technology
- Surface Mount (IRLZ34S, SiHLZ34S)
- Low-Profile Through-Hole (IRLZ34L, SiHLZ34L)
- 175 °C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Compliant to RoHS Directive 2002/95/EC



RoHS*
COMPLIANT
HALOGEN
FREE
Available

DESCRIPTION

Third generation Power MOSFETs from Vishay utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that Power MOSFETs are known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The D²PAK is a surface mount power package capable of accommodating die sizes up to HEX-4. It provides the highest power capability and the lowest possible on-resistance in any existing surface mount package. The D²PAK is suitable for high current applications because of its low internal connection resistance and can dissipate up to 2.0 W in a typical surface mount application.

The through-hole version (IRLZ34L, SiHLZ34L) is available for low-profile applications.

ORDERING INFORMATION

Package	D ² PAK (TO-263)	I ² PAK (TO-262)
Lead (Pb) free and Halogen-free	SiHLZ34S-GE3	-
Lead (Pb) free	-	IRLZ34LPbF
	-	SiHLZ34L-E3

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

PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V_{DS}	60	V	
Gate-Source Voltage	V_{GS}	± 10		
Continuous Drain Current	V_{GS} at 5 V	$T_C = 25\text{ }^\circ\text{C}$	30	A
		$T_C = 100\text{ }^\circ\text{C}$	21	
Pulsed Drain Current ^a	I_{DM}	110		
Linear Derating Factor		0.59	W/°C	
Single Pulse Avalanche Energy ^b	E_{AS}	128	mJ	
Maximum Power Dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$	88	W
Maximum Power Dissipation (PCB Mount) ^e		$T_A = 25\text{ }^\circ\text{C}$	3.7	
Peak Diode Recovery dV/dt^c	dV/dt	4.5	V/ns	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	°C	
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d		

Notes


- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 25\text{ V}$, Starting $T_J = 25\text{ }^\circ\text{C}$, $L = 285\text{ }\mu\text{H}$, $R_g = 25\text{ }\Omega$, $I_{AS} = 30\text{ A}$ (see fig. 12).
- $I_{SD} \leq 30\text{ A}$, $dI/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, $T_J \leq 175\text{ }^\circ\text{C}$.
- 1.6 mm from case.
- When mounted on 1" square PCB (FR-4 or G-10 material).

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

THERMAL RESISTANCE RATINGS					
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mount) ^a	R _{thJA}	-	-	40	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	-	-	1.7	

Note

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

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA		60	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA		-	0.07	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		1.0	-	2.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 10 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V		-	-	25	μA
		V _{DS} = 48 V, V _{GS} = 0 V, T _J = 150 °C		-	-	250	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 5 V	I _D = 18 A ^b	-	-	0.05	Ω
		V _{GS} = 4 V	I _D = 15 A ^b	-	-	0.07	
Forward Transconductance	g _{fs}	V _{DS} = 25 V, I _D = 18 A		12	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1.0 MHz, see fig. 5		-	1600	-	pF
Output Capacitance	C _{oss}			-	660	-	
Reverse Transfer Capacitance	C _{rss}			-	170	-	
Total Gate Charge	Q _g	V _{GS} = 5 V	I _D = 30 A, V _{DS} = 48 V, see fig. 6 and 13 ^b	-	-	35	nC
Gate-Source Charge	Q _{gs}			-	-	7.1	
Gate-Drain Charge	Q _{gd}			-	-	25	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 30 V, I _D = 30 A, R _g = 6 Ω, R _D = 1 Ω, see fig. 10 ^b		-	14	-	ns
Rise Time	t _r			-	170	-	
Turn-Off Delay Time	t _{d(off)}			-	30	-	
Fall Time	t _f			-	56	-	
Internal Source Inductance	L _S	Between lead, and center of die contact		-	7.5	-	nH
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	30	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	110	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = 30 A, V _{GS} = 0 V ^b		-	-	1.6	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 30 A, dI/dt = 100 A/μs ^b		-	120	180	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	700	1300	nC
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 ≤ 300 μs; duty cycle ≤ 2 %.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

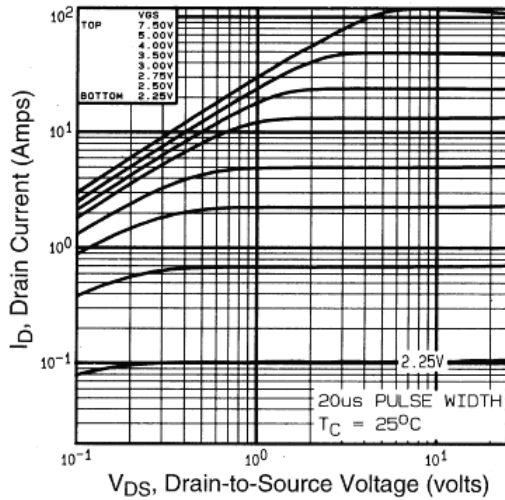


Fig. 1 - Typical Output Characteristics, $T_C = 25\text{ }^\circ\text{C}$

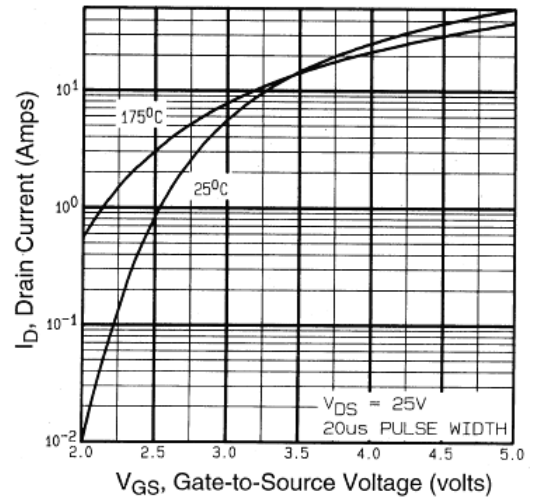


Fig. 3 - Typical Transfer Characteristics

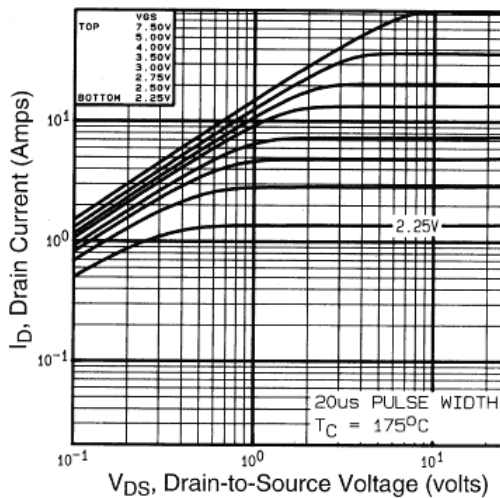


Fig. 2 - Typical Output Characteristics, $T_C = 175\text{ }^\circ\text{C}$

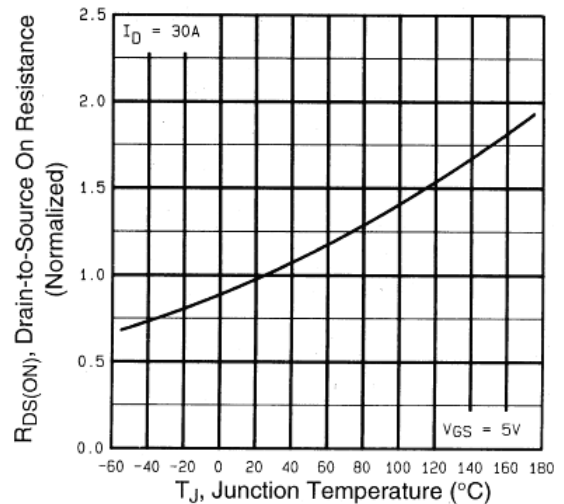


Fig. 4 - Normalized On-Resistance vs. Temperature

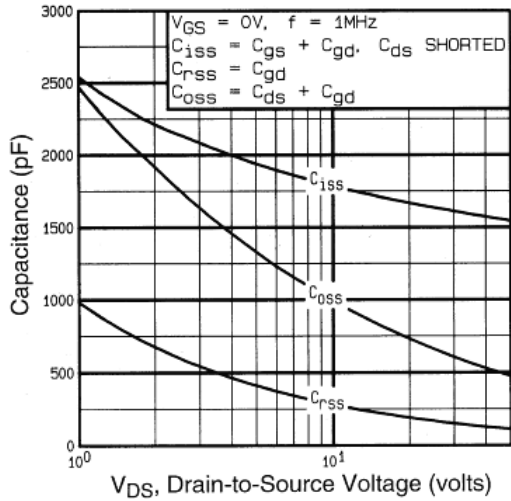


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

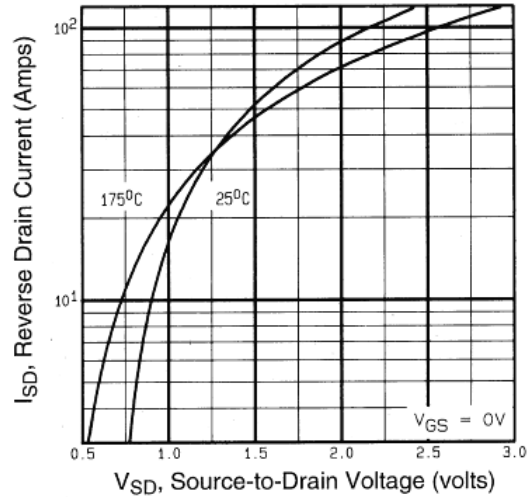


Fig. 7 - Typical Source-Drain Diode Forward Voltage

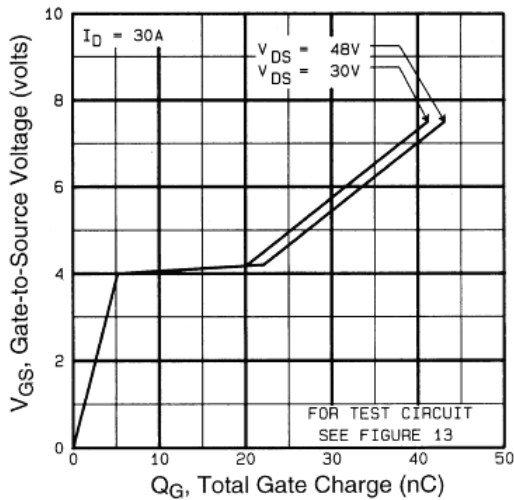


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

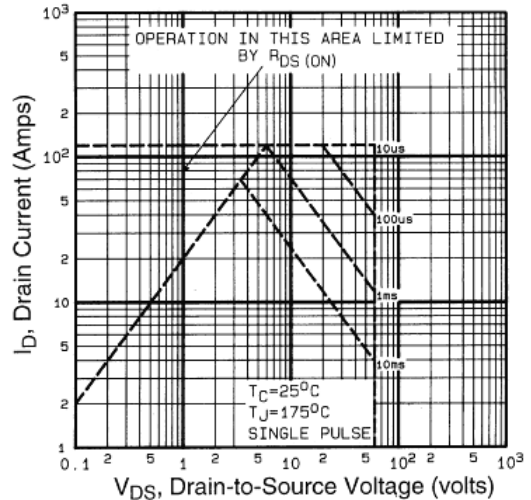


Fig. 8 - Maximum Safe Operating Area

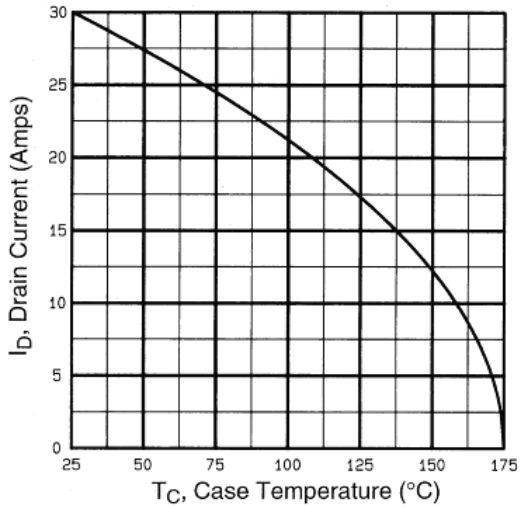


Fig. 9 - Maximum Drain Current vs. Case Temperature

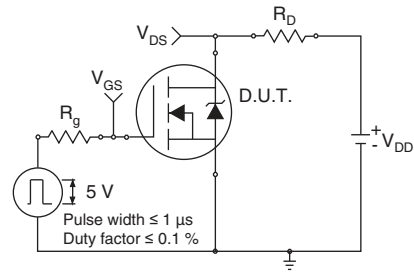


Fig. 10a - Switching Time Test Circuit

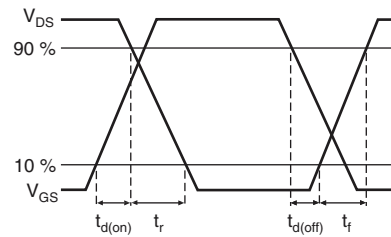


Fig. 10b - Switching Time Waveforms

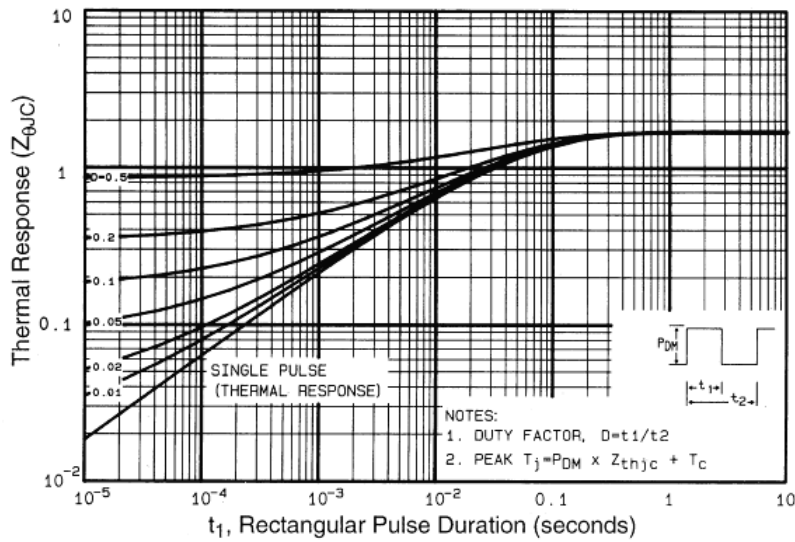


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

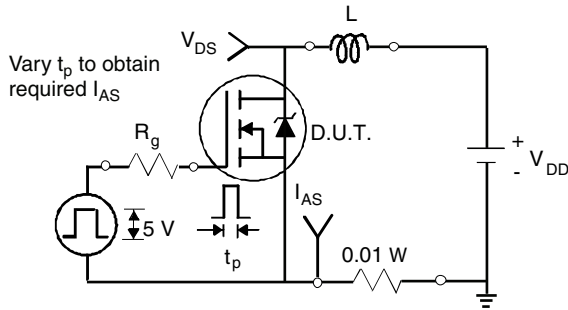


Fig. 12a - Unclamped Inductive Test Circuit

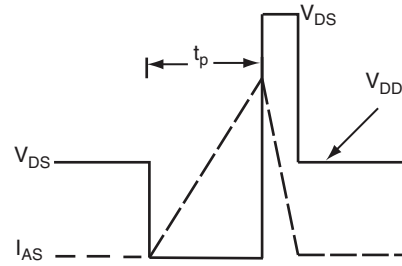


Fig. 12b - Unclamped Inductive Waveforms

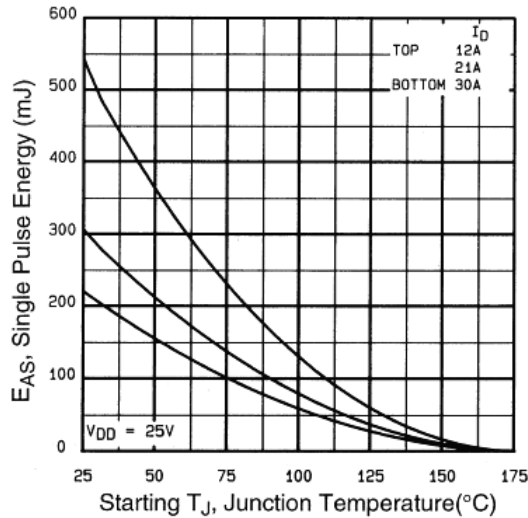


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

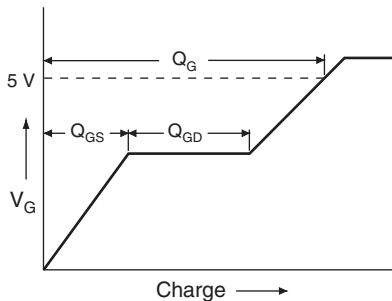


Fig. 13a - Basic Gate Charge Waveform

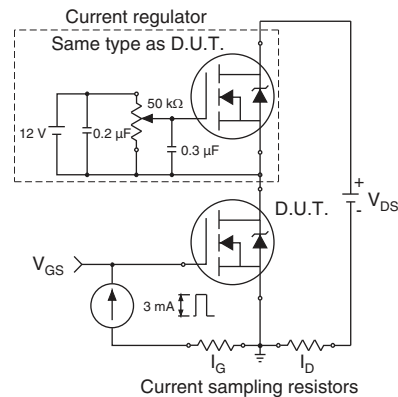
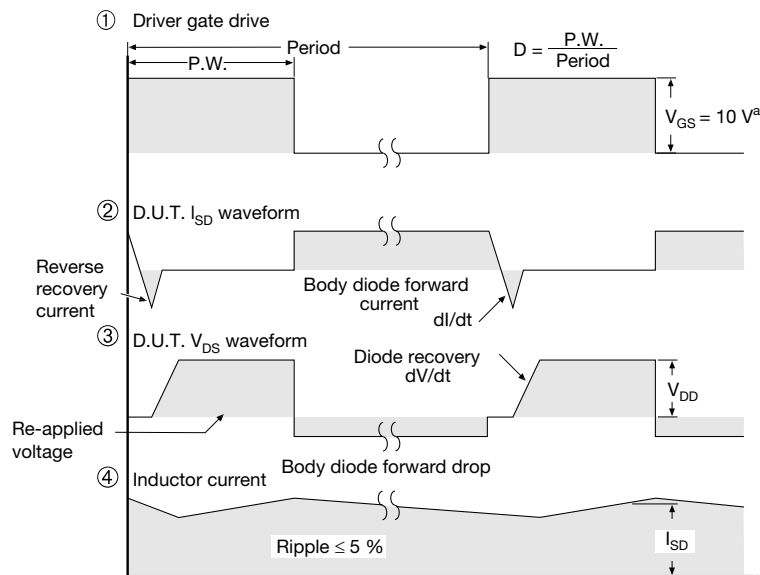
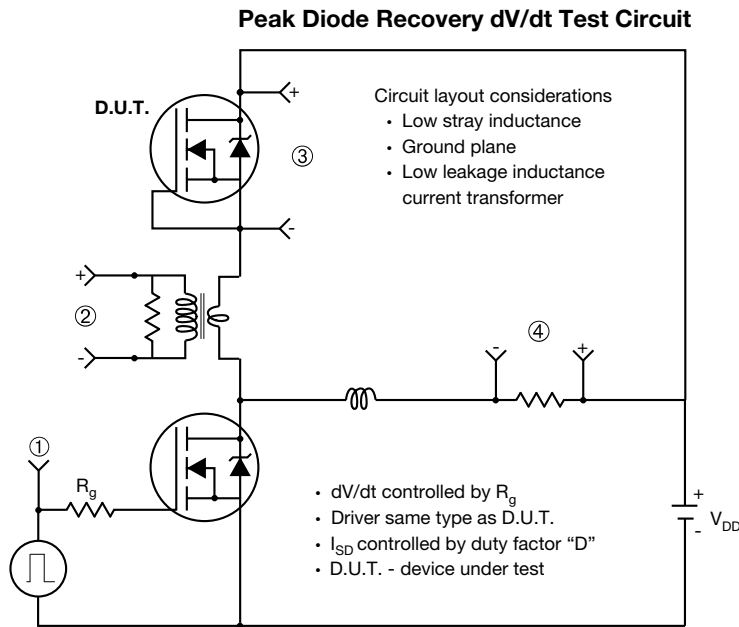


Fig. 13b - Gate Charge Test Circuit



Note

a. $V_{GS} = 5\text{ V}$ for logic level devices

Fig. 14 - For N-Channel

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RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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