Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.022 at V_{GS} = 10 V	7.5
	0.030 at V_{GS} = 4.5 V	6.5

SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 at 1 A	2.0

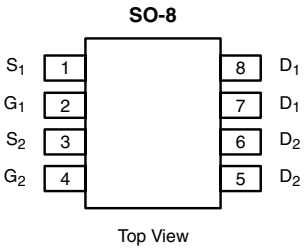
FEATURES

- LITTLE FOOT® *Plus* Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100 % R_g Tested

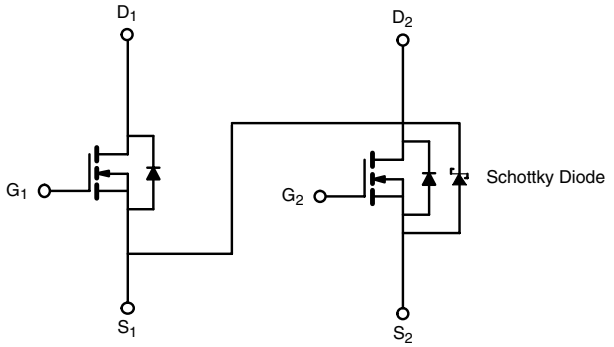
Pb-free
RoHS COMPLIANT

APPLICATIONS

- Asymmetrical Buck-Boost DC/DC Converter



Ordering Information: Si4830ADY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	7.5	5.7	A
	T_A = 70 °C		6.0	4.6	
Pulsed Drain Current		I_{DM}	30		
Continuous Source Current (Diode Conduction)[a]		I_S	1.7	0.9	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	2.0	1.1	W
	T_A = 70 °C		1.3	0.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS							
			MOSFET		SCHOTTKY		
Parameter		Symbol	Typ	Max	Typ	Max	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	52	62.5	53	62.5	°C/W
	Steady State		93	110	93	110	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	35	40	35	40	

Notes:
a. Surface Mounted on 1" x 1" FR4 board.

MOSFET SPECIFICATIONS T_J = 25 °C, unless otherwise noted

Parameter	Symbol	Test Conditions		Min	Typ[a]	Max	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		1.4		3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V				± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	Ch-1			1	µA
			Ch-2			100	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 85 °C	Ch-1			15	
			Ch-2			2000	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V		20			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 7.5 A			0.017	0.022	Ω
		V_{GS} = 4.5 V, I_D = - 6.5 A			0.024	0.030	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 7.5 A			19		S
Diode Forward Voltage[b]	V_{SD}	I_S= 1 A, V_{GS} = 0 V	Ch-1		0.75	1.2	V
			Ch-2		0.47	0.5	
Dynamic[a]							
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 7.5 A			7	11	nC
Gate-Source Charge	Q_{gs}				2.9		
Gate-Drain Charge	Q_{gd}				2.5		
Gate Resistance	R_g			0.5	1.5	2.4	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 15 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 6 Ω			9	15	ns
Rise Time	t_r				10	17	
Turn-Off DelayTime	$t_{d(off)}$				19	30	
Fall Time	t_f				9	15	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.7 A, di/dt = 100 µs	Ch-1		35	55	
			Ch-2		32	55	

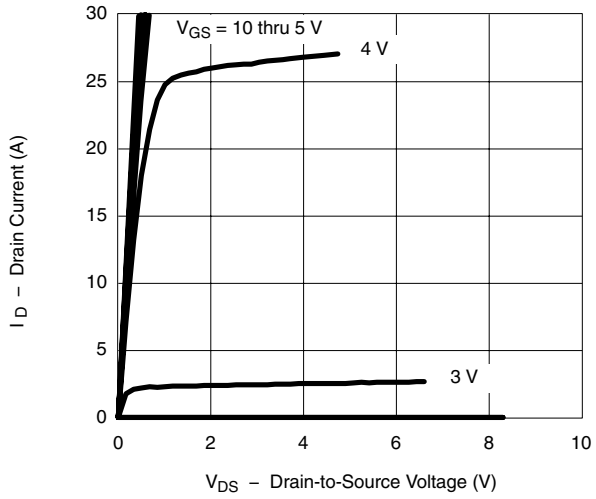
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

SCHOTTKY SPECIFICATIONS T_J = 25 °C, unless otherwise noted

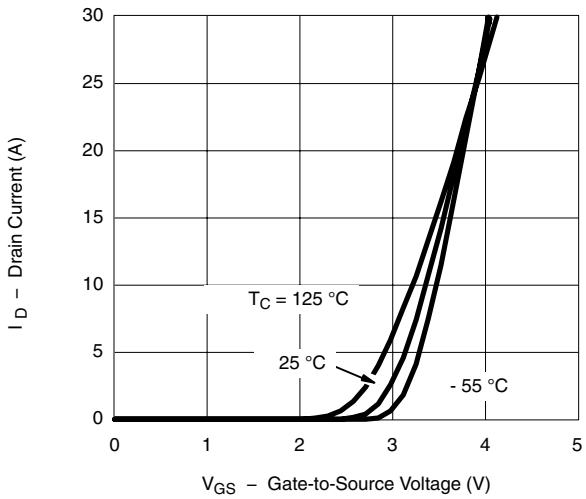
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	I_F = 1.0 A		0.47	0.50	V
		I_F = 1.0 A, T_J = 125 °C		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	V_r = 30 V		0.004	0.100	mA
		V_r = 30 V, T_J = 100 °C		0.7	10	
		V_r = - 30 V, T_J = 125 °C		3.0	20	
Junction Capacitance	C_T	V_r = 10 V		50		pF

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

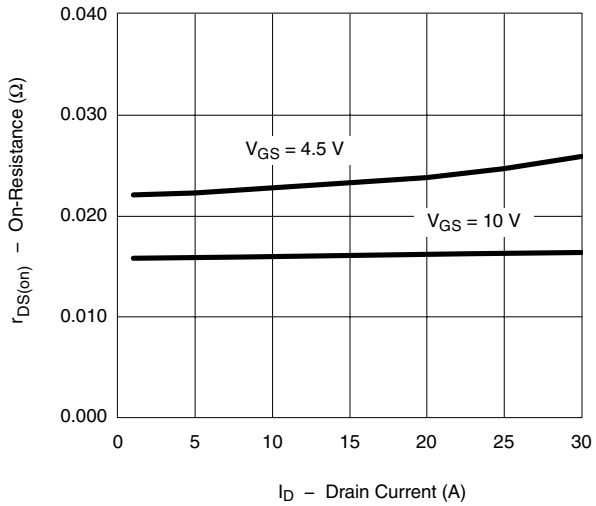
MOSFET TYPICAL CHARACTERISTICS 25 °C unless noted



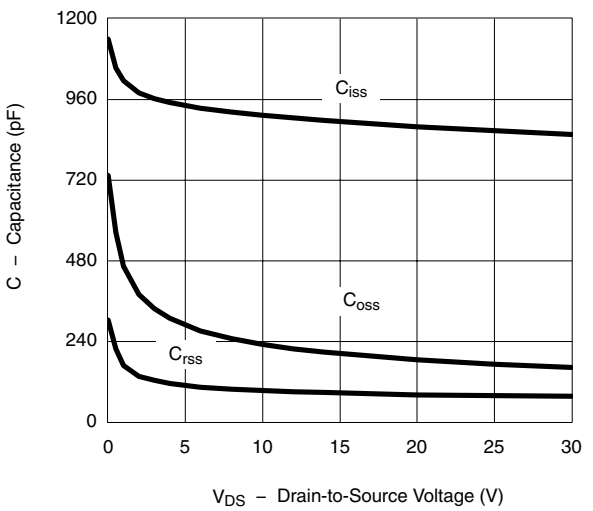
Output Characteristics



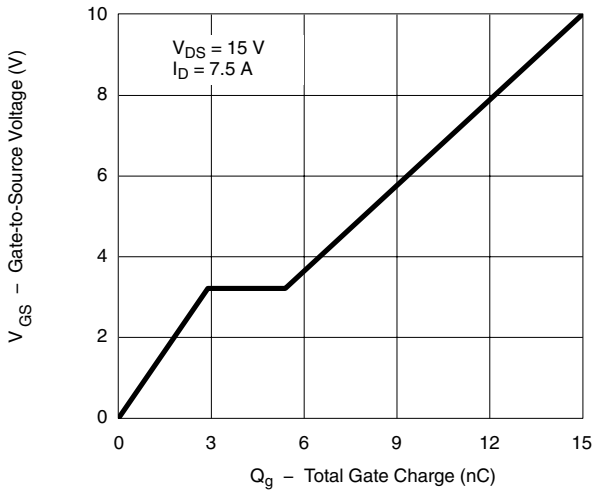
Transfer Characteristics



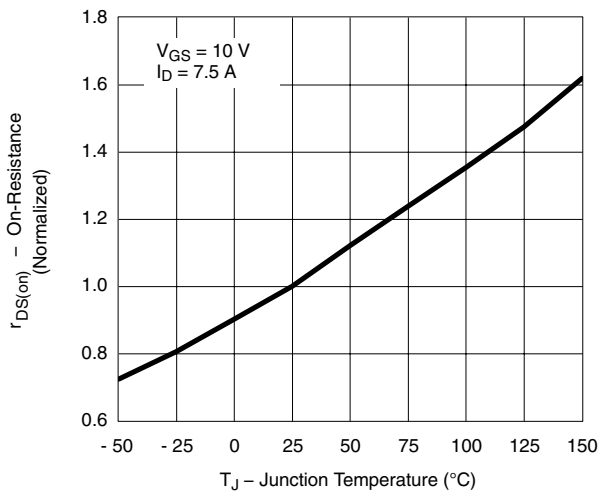
On-Resistance vs. Drain Current



Capacitance

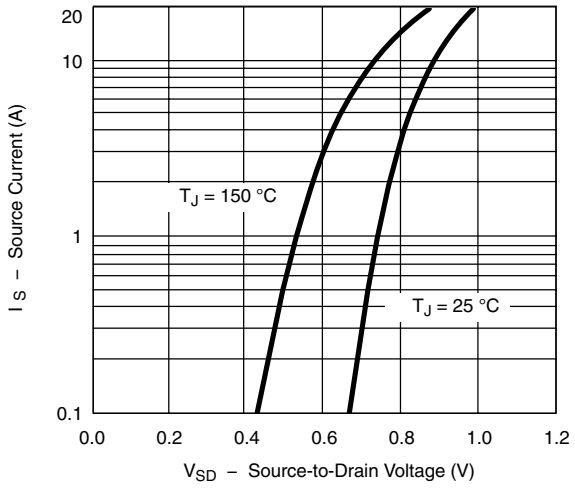


Gate Charge

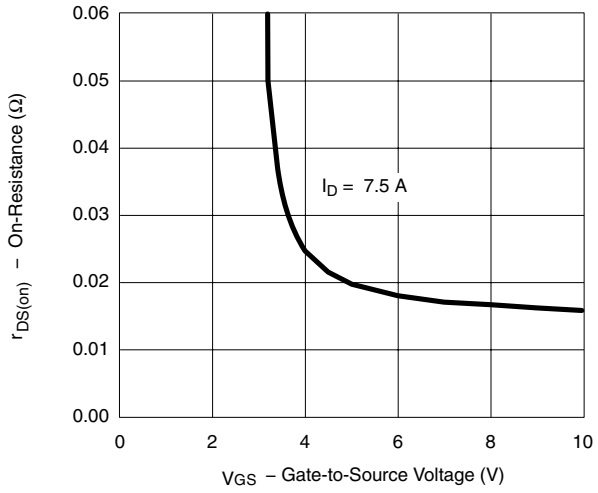


On-Resistance vs. Junction Temperature

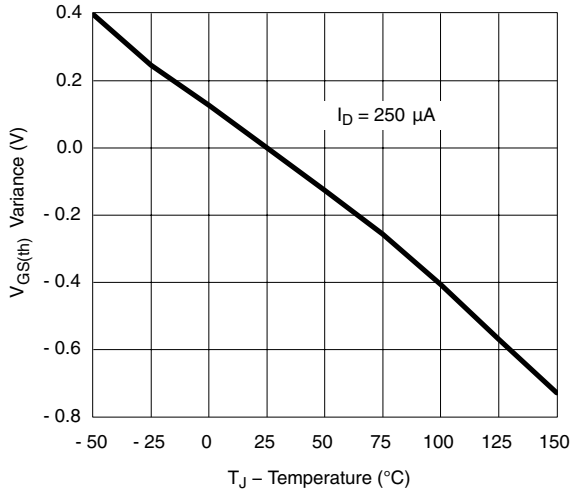
MOSFET TYPICAL CHARACTERISTICS 25 °C unless noted



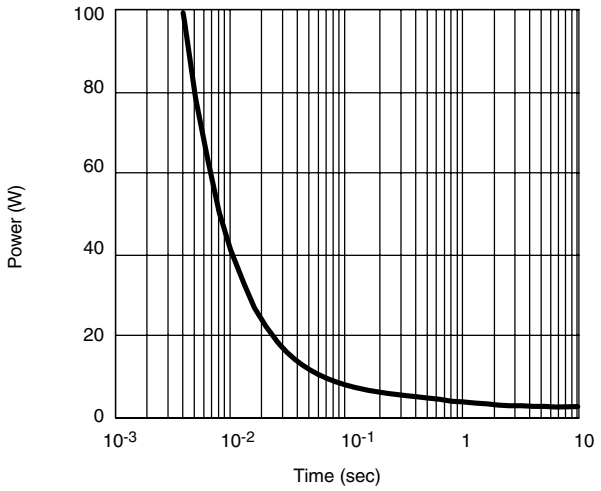
Source-Drain Diode Forward Voltage



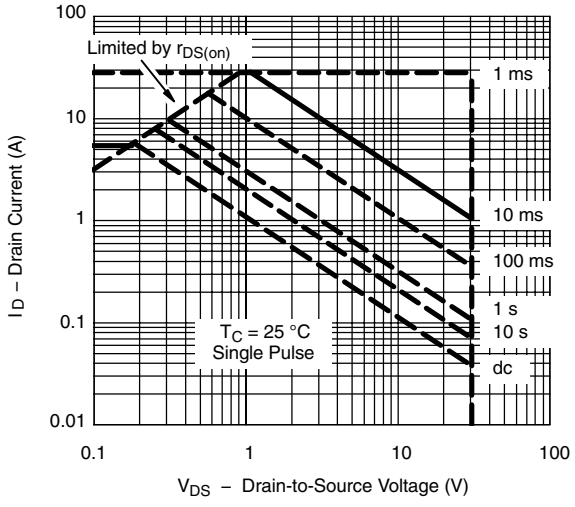
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

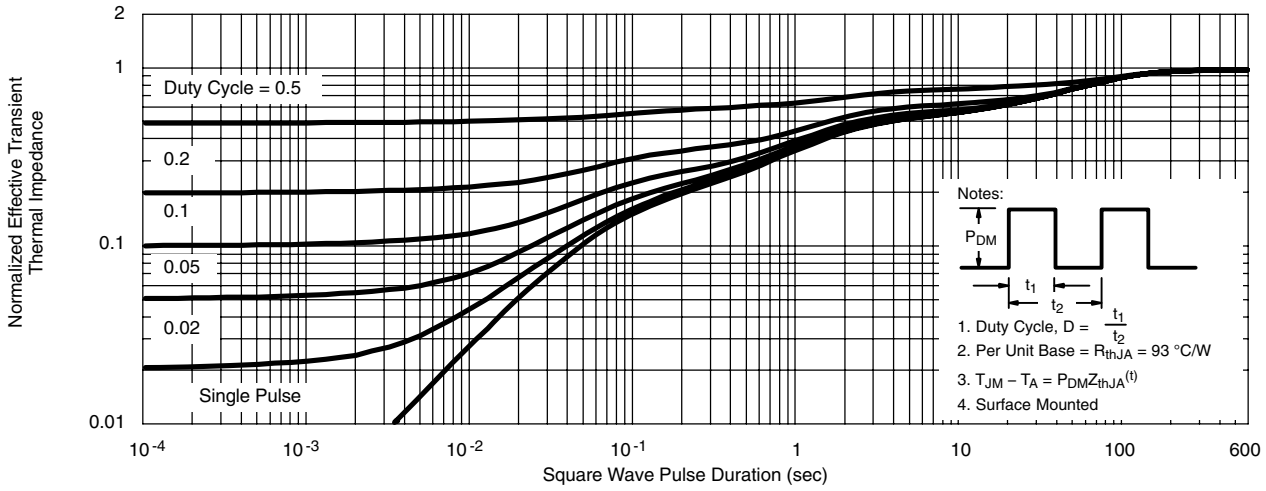


Single Pulse Power, Junction-to-Ambient

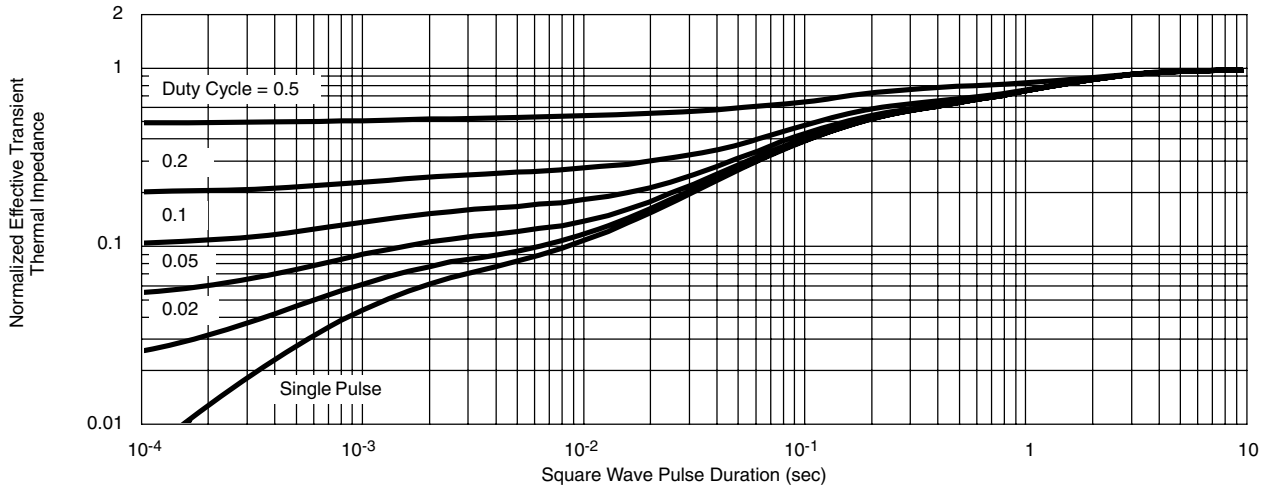


Safe Operating Area, Junction-to-Foot

MOSFET TYPICAL CHARACTERISTICS 25 °C unless noted

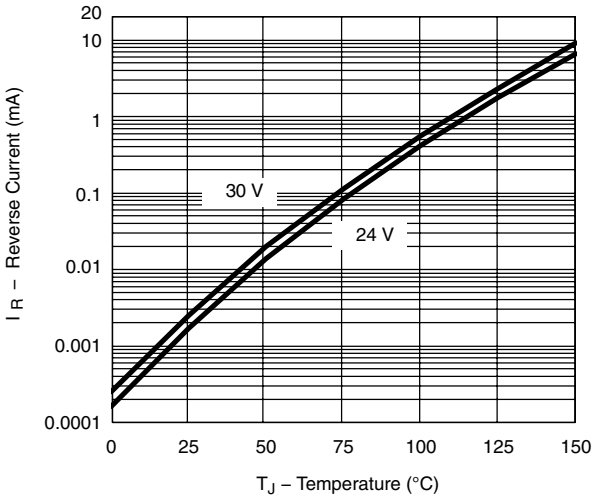


Normalized Thermal Transient Impedance, Junction-to-Ambient

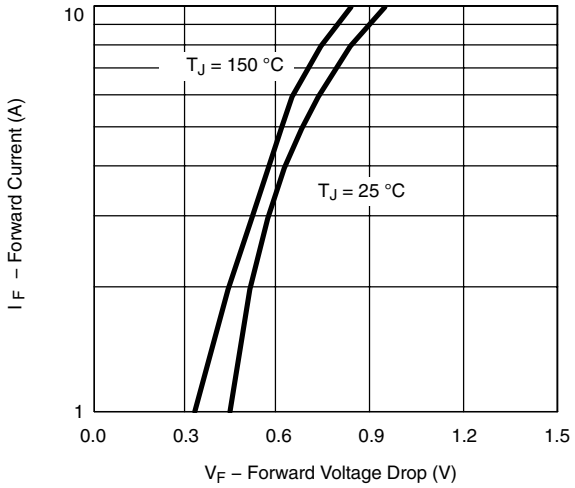


Normalized Thermal Transient Impedance, Junction-to-Foot

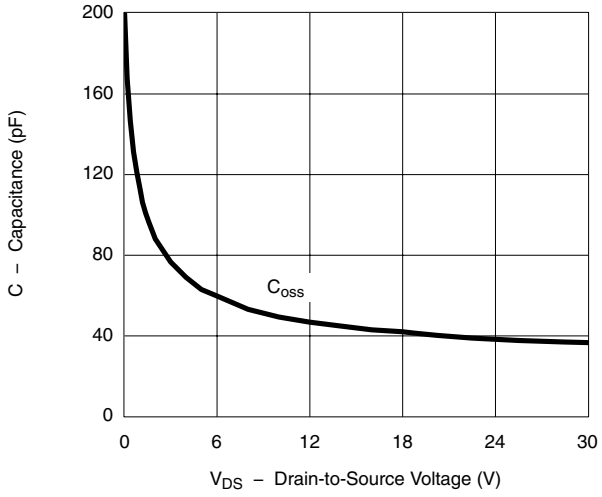
MOSFET TYPICAL CHARACTERISTICS 25 °C unless noted



Reverse Current vs. Junction Temperature



Forward Voltage Drop



Capacitance

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