



General Description

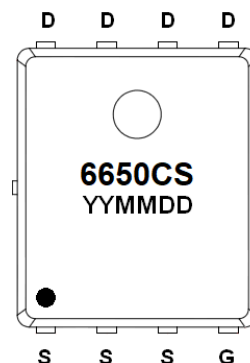
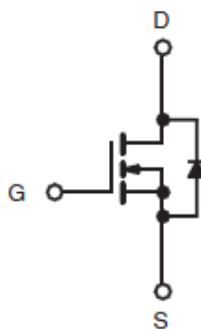
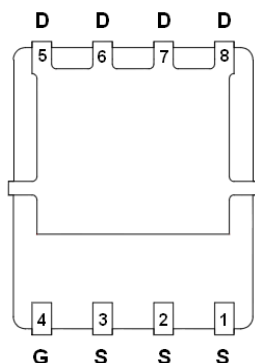
AFN6650CS, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- 40V/20A, $R_{DS(ON)}=1.05m\Omega@V_{GS}=10V$
- 40V/15A, $R_{DS(ON)}=1.45m\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- DFN5X6-8L package design

Pin Description (DFN5X6-8L)



Application

- Synchronous rectification
- High power density DC/DC
- DC/AC inverters
- Battery and load switch

Pin Define

Pin	Symbol	Description
1~3	S	Source
4	G	Gate
5~8	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN6650CSFN568RG	6650CS	DFN5X6-8L	Tape & Reel	2500 EA

※ 6650S : Parts Code

※ YYMMDD : Date Code

※ AFN6650CSFN568RG : 13" Tape & Reel ; Pb- Free ; Halogen- Free



Absolute Maximum Ratings (T_A=25°C Unless otherwise noted)

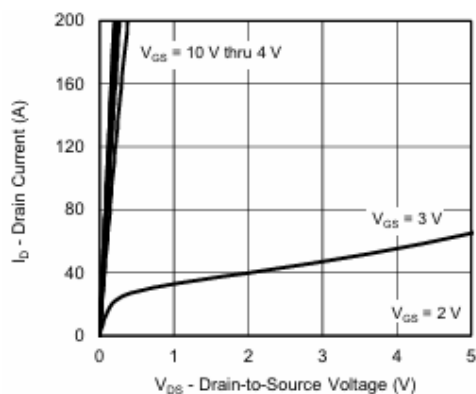
Parameter			Symbol	Typical		Unit
Drain-Source Voltage			V _{DSS}	40		V
Gate –Source Voltage			V _{GSS}	±20		V
Continuous Drain Current(T _J =150°C)	T _C =25°C	T _C =70°C	I _{DSM}	215	175	A
	T _A =25°C	T _A =70°C		54	43	
Pulsed Drain Current (t=100us)			I _{DM}	400		
Continuous Source Current(Diode Conduction)	T _C =25°C		I _S	90		
	T _A =25°C			5.6		
Single Pulse Avalanche Current	L=0.1mH		I _{AS}	40		
			E _{AS}	80		mJ
Power Dissipation	T _C =25°C	T _C =75°C	P _D	100	64	W
	T _A =25°C	T _A =75°C		6.2	4.0	
Operating Junction Temperature			T _J	-55/150		°C
Storage Temperature Range			T _{STG}			
Thermal Resistance-Junction to Ambient	t ≤ 10 s		R _{θJA}	15		°C/W
Maximum Junction-to-Case (Drain)	Steady-State		R _{θJA}	0.95		

Electrical Characteristics (T_A=25°C Unless otherwise noted)

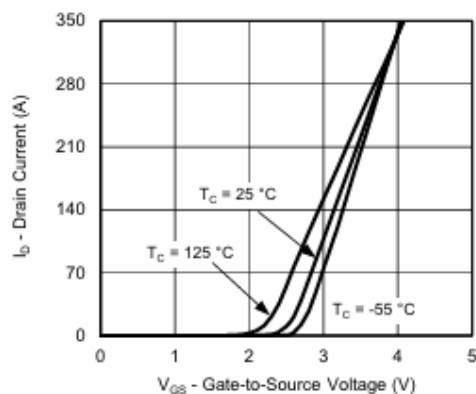
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	40	46		V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	1.7	2.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V			1	uA
		V _{DS} =32V, V _{GS} =0V T _J =85°C			10	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =10V	30			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		0.88	1.05	mΩ
		V _{GS} =4.5V, I _D =15A		1.19	1.45	
Forward Transconductance	g _{FS}	V _{DS} =10, I _D =20A		130		S
Diode Forward Voltage	V _{SD}	I _S =10A, V _{GS} =0V		0.7	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =4.5V I _D ≡20A		45	75	nC
Gate-Source Charge	Q _{gs}			23		
Gate-Drain Charge	Q _{gd}			7		
Gate Resistance	R _g	f=1MHz	0.2	1.0	1.6	Ω
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz		7300		pF
Output Capacitance	C _{oss}			1500		
Reverse Transfer Capacitance	C _{rss}			116		
Turn-On Time	t _{d(on)}	V _{DD} =20V, R _L =1Ω I _D ≡20A, V _{GEN} =10V R _G =1Ω		20	40	ns
	t _r			8	16	
Turn-Off Time	t _{d(off)}			45	90	
	t _f			8	16	



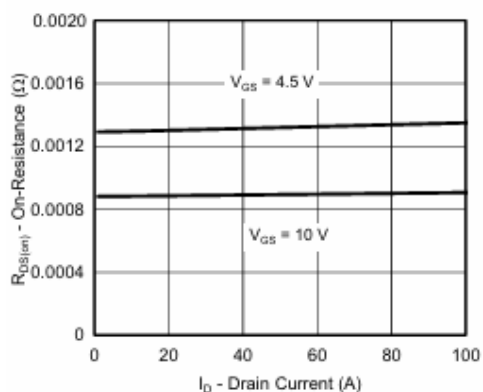
Typical Characteristics



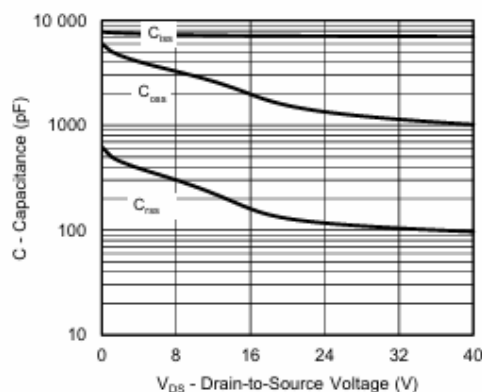
Output Characteristics



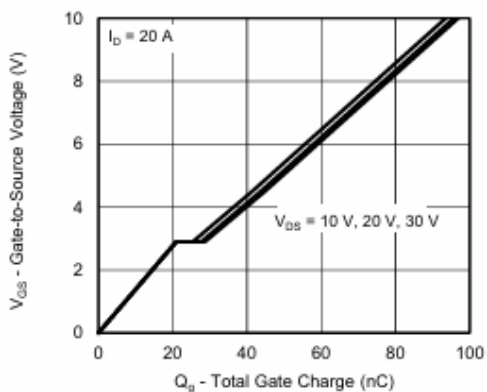
Transfer Characteristics



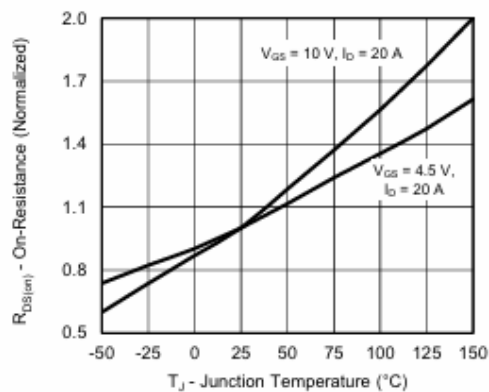
On-Resistance vs. Drain Current



Capacitance



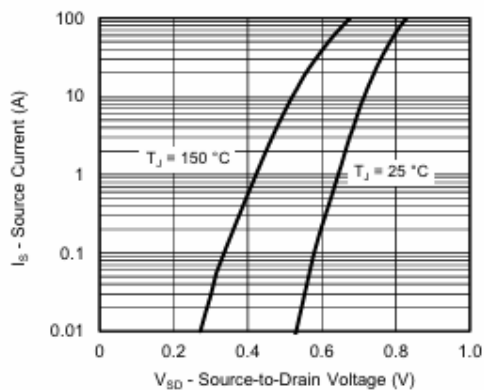
Gate Charge



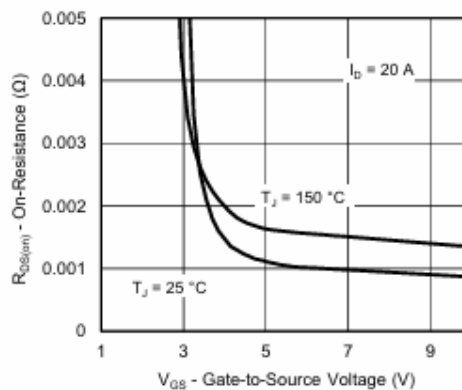
On-Resistance vs. Junction Temperature



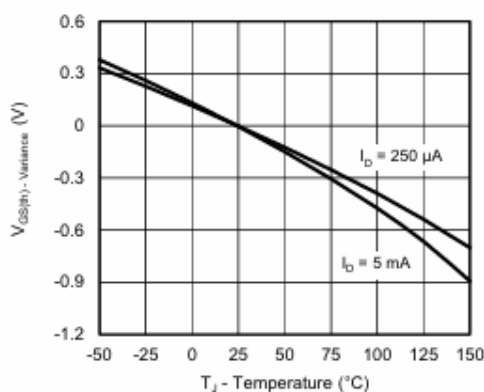
Typical Characteristics



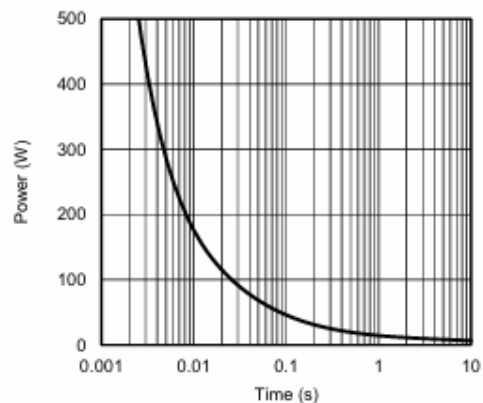
Source-Drain Diode Forward Voltage



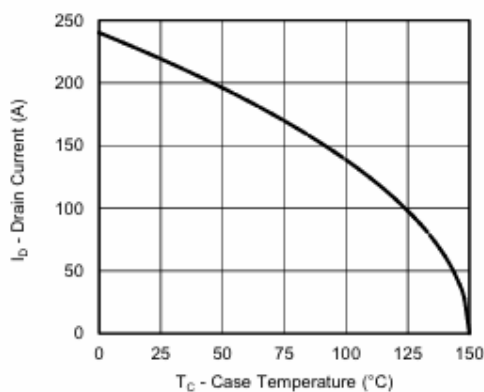
On-Resistance vs. Gate-to-Source Voltage



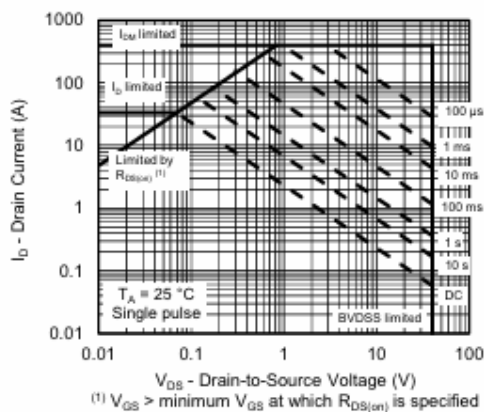
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



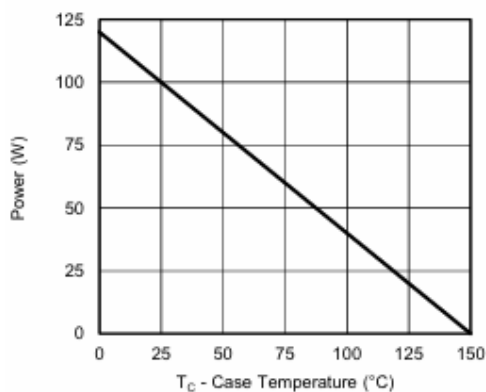
Current Derating ^a



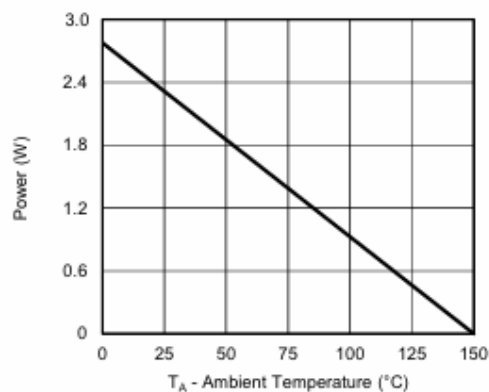
Safe Operating Area



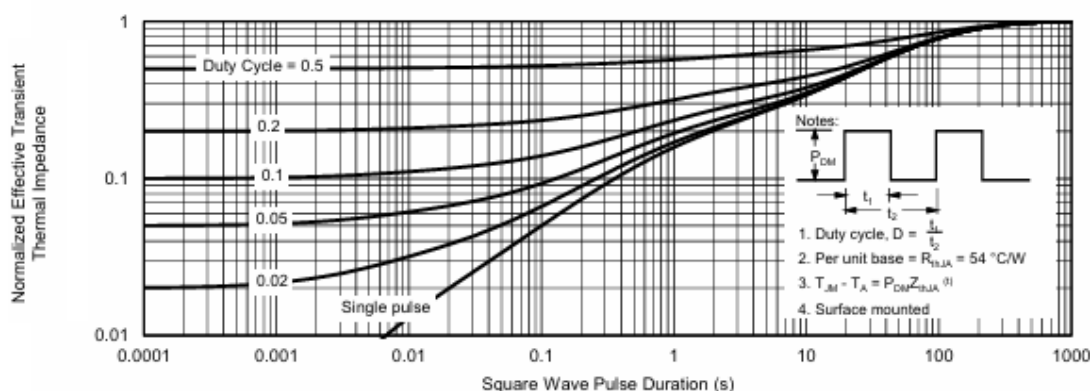
Typical Characteristics



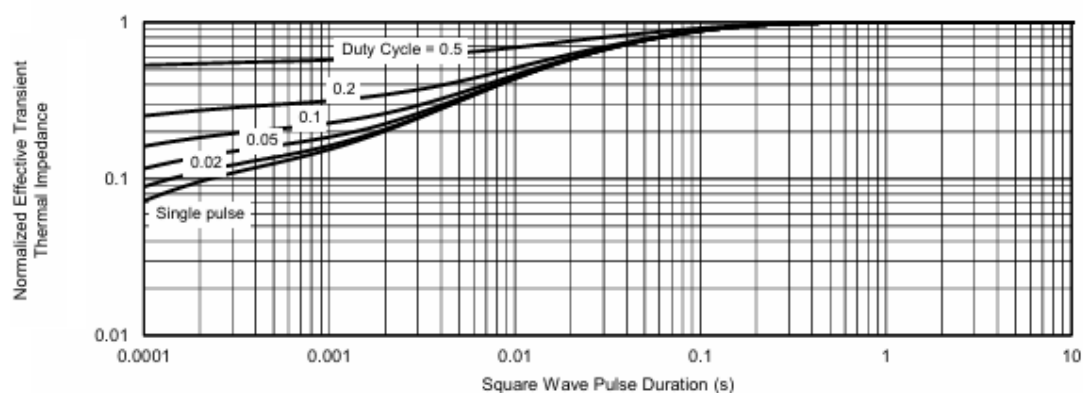
Power, Junction-to-Case



Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

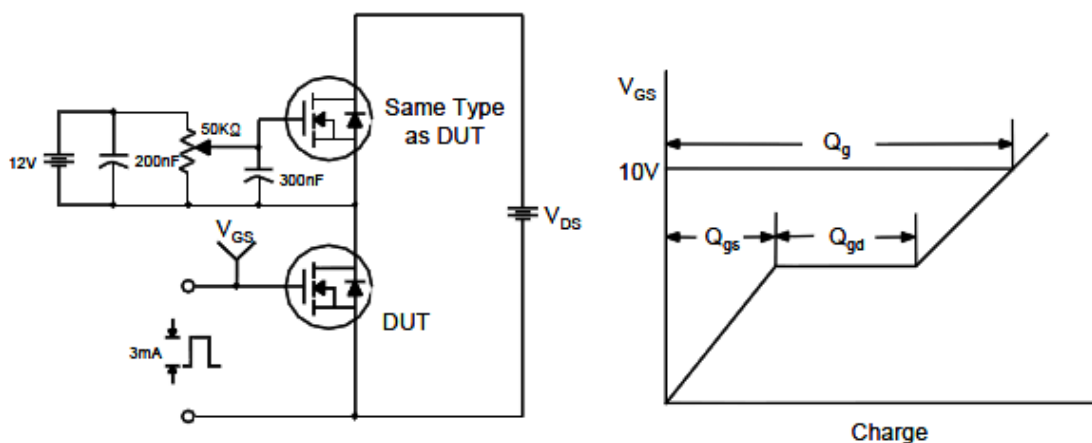


Normalized Thermal Transient Impedance, Junction-to-Case

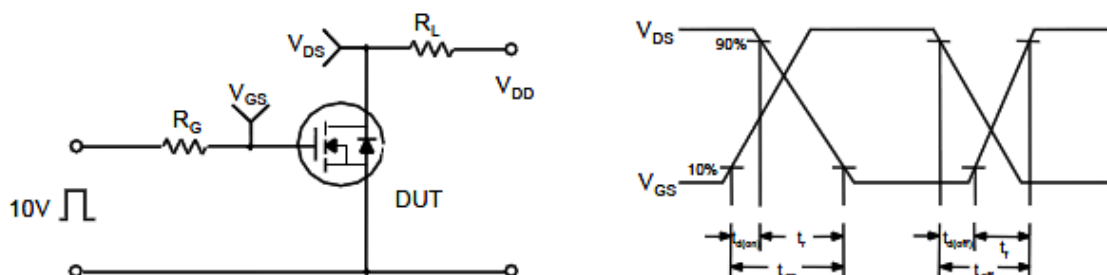


Typical Characteristics

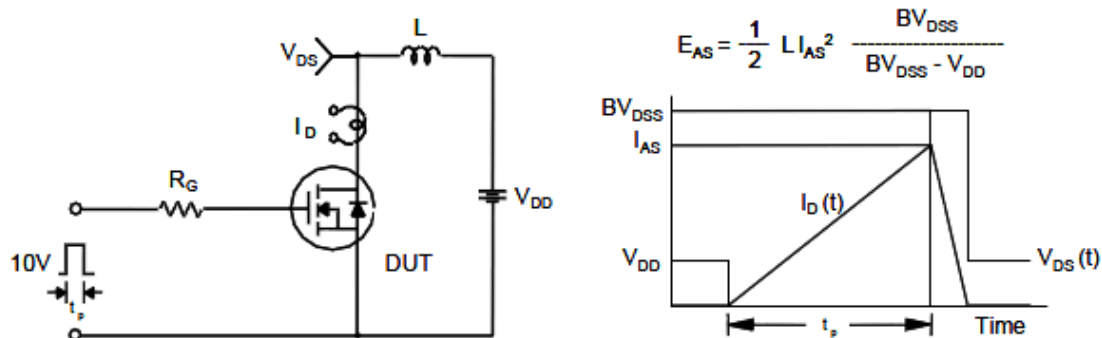
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

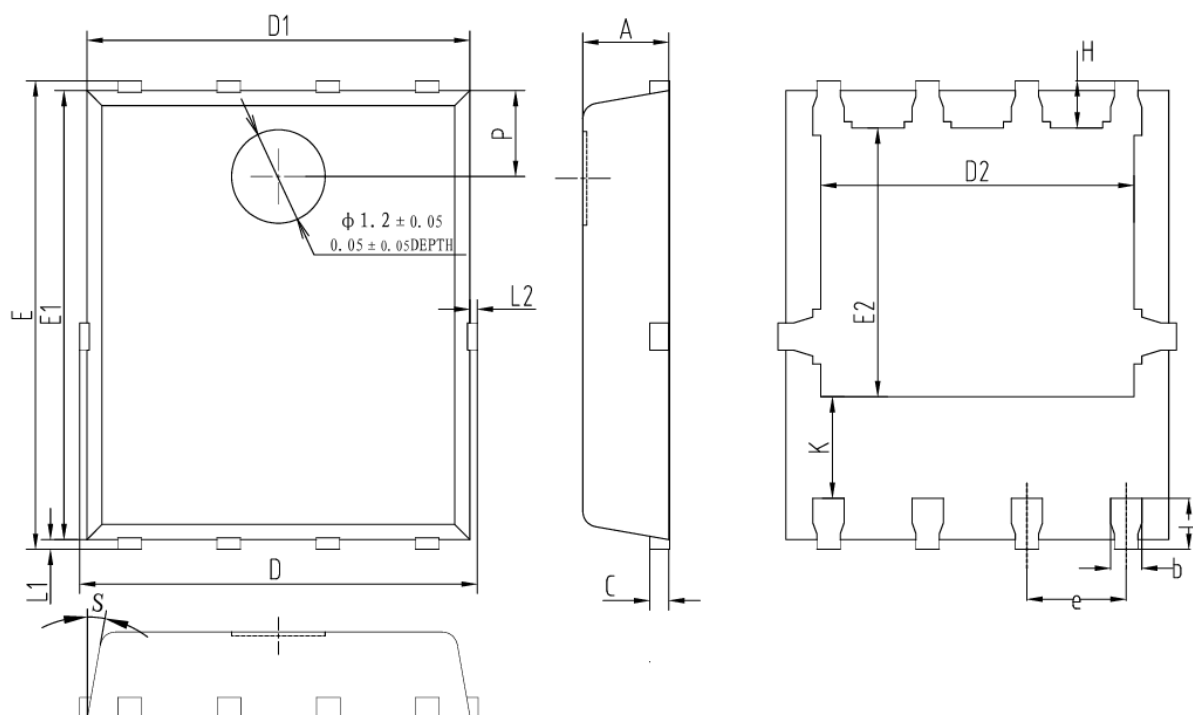


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (DFN5X6-8L)



COMMON DIMENSIONS (UNIT of MEASURE=MILLIMETER)											
SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX
A	1.00	1.10	1.20	e	1.17	1.27	1.37	L	0.55	0.65	0.75
b	0.35	0.40	0.45	E	5.90	6.00	6.10	L1	0	0.10	0.20
c	0.19	0.25	0.30	E1	5.70	5.75	5.80	L2	0	0.10	0.20
D	4.80	5.10	5.20	E2	3.35	3.45	3.55	P	1.00	1.10	1.20
D1	4.80	4.90	5.00	H	0.50	0.60	0.70	S	8°	10°	12°
D2	3.90	4.00	4.10	K	1.20	1.30	1.40				

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