

N-channel 250V 295mΩ Power MOSFET

Description

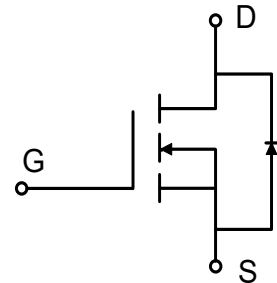
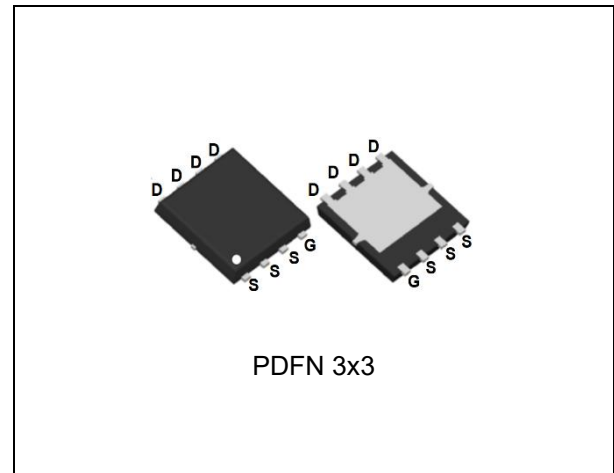
WMOS™ JN is suitable for applications which require superior power density and outstanding efficiency.

Features

- Gate charge minimized
- Typ. $R_{DS(on)} = 295\text{ m}\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

Switching applications



Absolute Maximum Ratings

Parameter	Symbol	WMQ09N25JN	Unit
Drain-source voltage	V_{DS}	250	V
Continuous drain current ¹⁾ ($T_C = 25^\circ\text{C}$)	I_D	7	A
($T_C = 100^\circ\text{C}$)		4.2	A
Pulsed drain current ²⁾	I_{DM}	21	A
Gate-source voltage	V_{GS}	± 20	V
Avalanche energy, single pulse ³⁾	E_{AS}	17	mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.1	mJ
Avalanche current, repetitive ²⁾	I_{AR}	0.7	A
Power dissipation ($T_C = 25^\circ\text{C}$)	P_D	23	W
- Derate above 25°C		0.18	W/ $^\circ\text{C}$
Operating and storage temperature range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Continuous diode forward current	I_S	7	A
Diode pulse current	$I_{S,pulse}$	21	A

Thermal Characteristics

Parameter	Symbol	WMQ09N25JN	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	5.5	$^\circ\text{C/W}$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$

Electrical Characteristics $T_c = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0 V, I _D =1 mA	250	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I _{DSS}	V _{DS} =250 V, V _{GS} =0V, T _J = 25°C T _J = 125°C	- -	- 30	1 -	μA
Gate leakage current, forward	I _{GSSF}	V _{GS} =20V, V _{DS} =0V	-	-	500	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =3A T _J = 25°C	- -	 295	 360	 mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1 MHz	-	191	-	pF
Output capacitance	C _{oss}		-	8	-	
Reverse transfer capacitance	C _{rss}		-	0.4	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 100V, I _D = 3A R _G = 4.7Ω, V _{GS} =10V	-	3	-	ns
Rise time	t _r		-	4	-	
Turn-off delay time	t _{d(off)}		-	8	-	
Fall time	t _f		-	3	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =160V, I _D =3A, V _{GS} =0 to 10V	-	1.7	-	nC
Gate to drain charge	Q _{gd}		-	0.8	-	
Gate charge total	Q _g		-	3.9	-	
Gate plateau voltage	V _{plateau}		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =3A	-	-	1.2	V
Reverse recovery time	t _{rr}	V _R =50V, I _F =3A, dI _F /dt=100A/μs	-	75	-	ns
Reverse recovery charge	Q _{rr}		-	0.2	-	μC
Peak reverse recovery current	I _{rrm}		-	5.7	-	A

Notes:

- Limited by $T_{j\max}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $I_{AS} = 0.7\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, starting $T_j = 25^\circ\text{C}$.

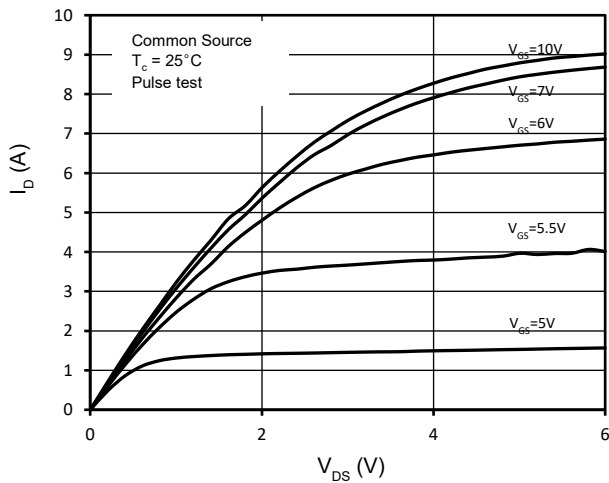


Figure 1. On-Region Characteristics

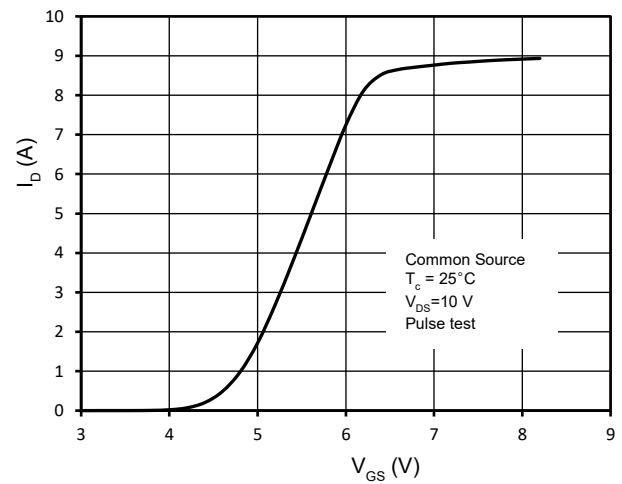


Figure 2. Transfer Characteristics

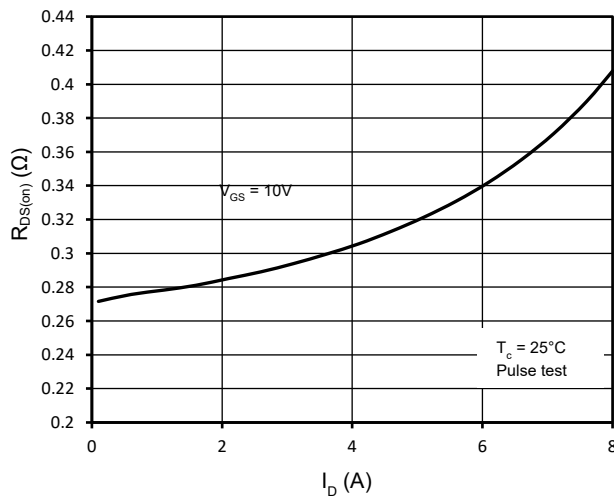


Figure 3. Static Drain-Source On Resistance

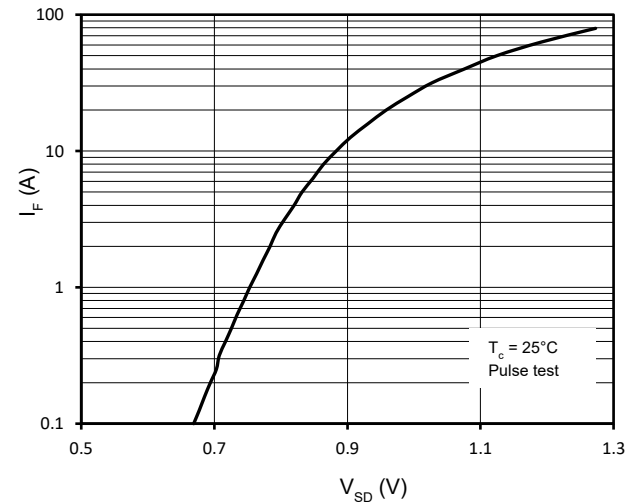
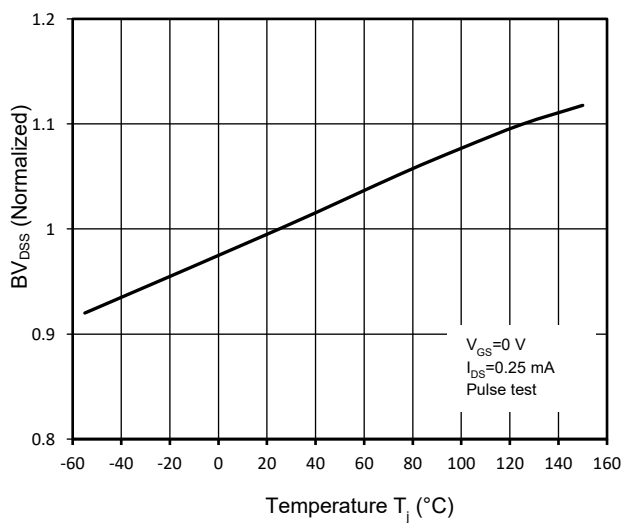
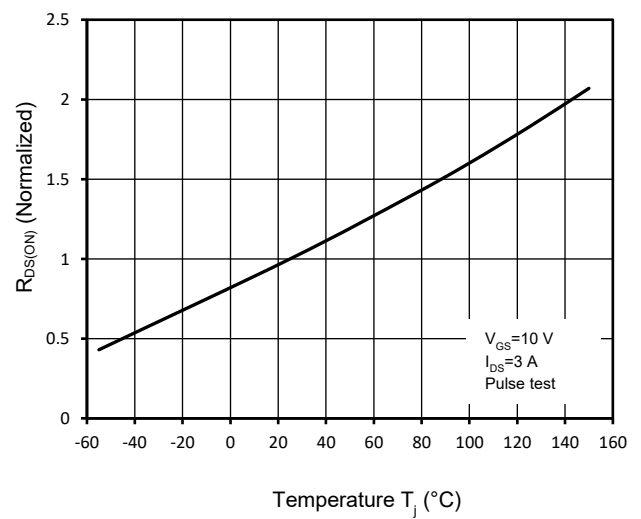


Figure 4. Body-Diode Forward Characteristics

Figure 5. Normalized BV_{DS} vs. TemperatureFigure 6. Normalized $R_{DS(on)}$ vs. Temperature

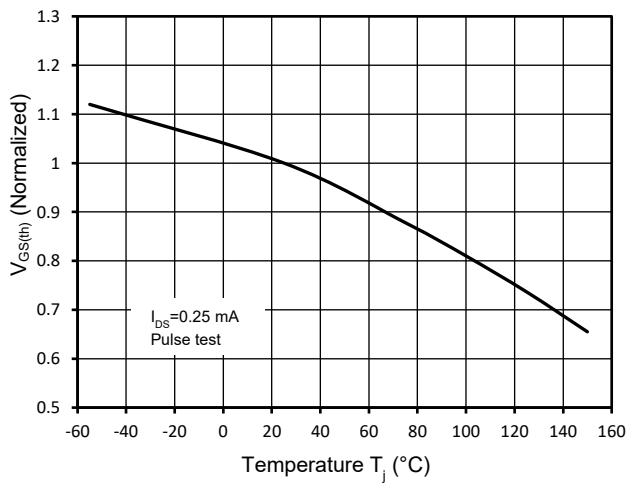


Figure 7. Threshold Voltage vs. Temperature

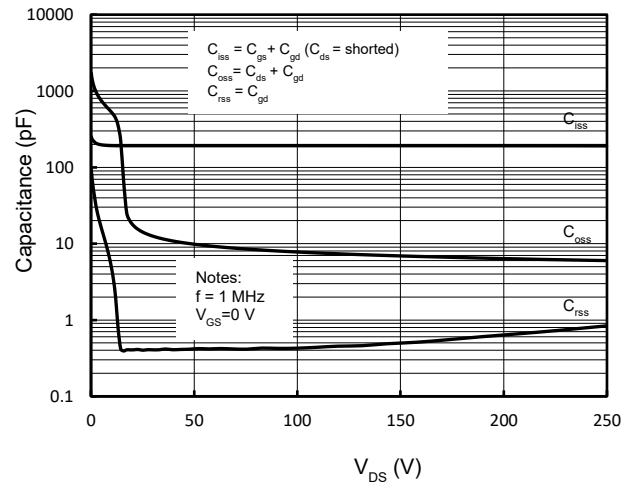


Figure 8. Capacitance Characteristics

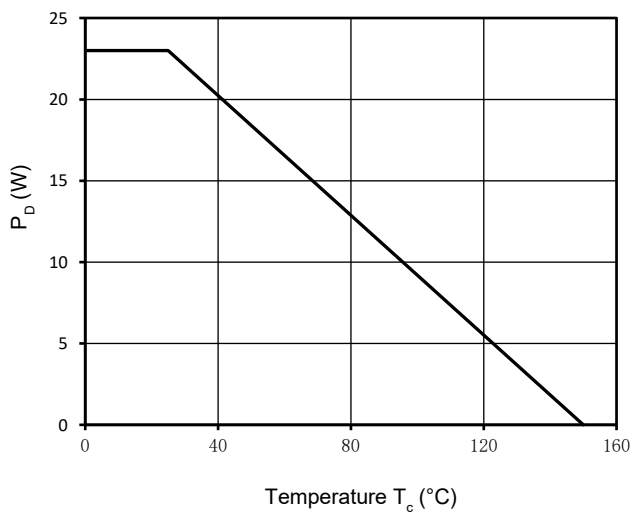


Figure 9. Power Dissipation

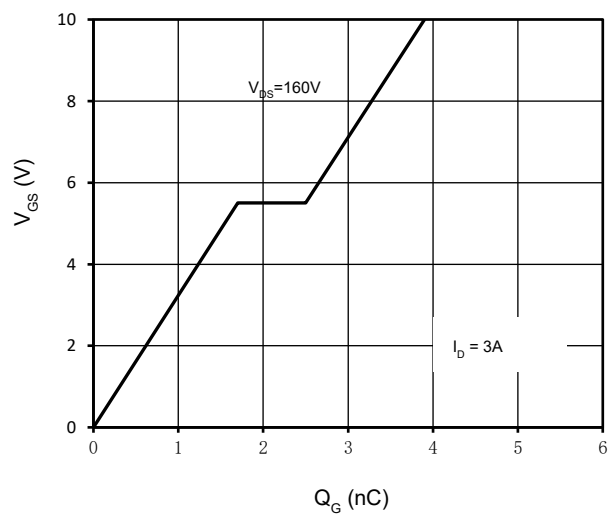


Figure 10. Gate Charge Characteristics

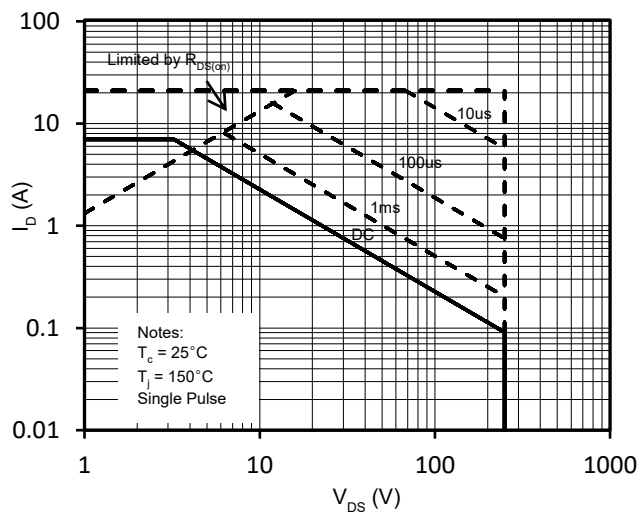


Figure 11. Maximum Safe Operating Area

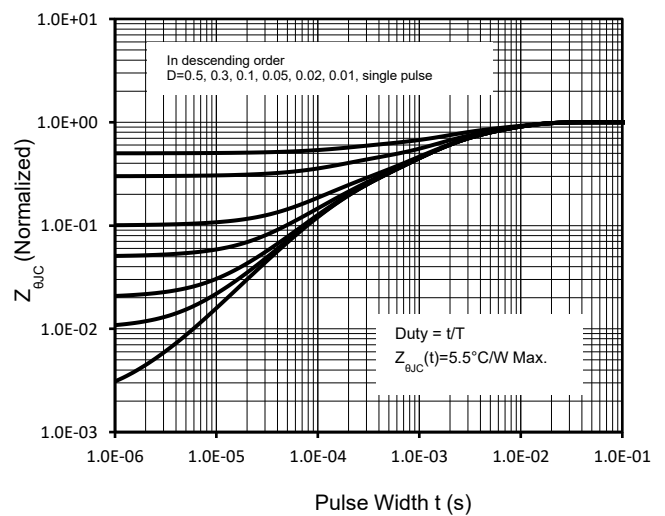
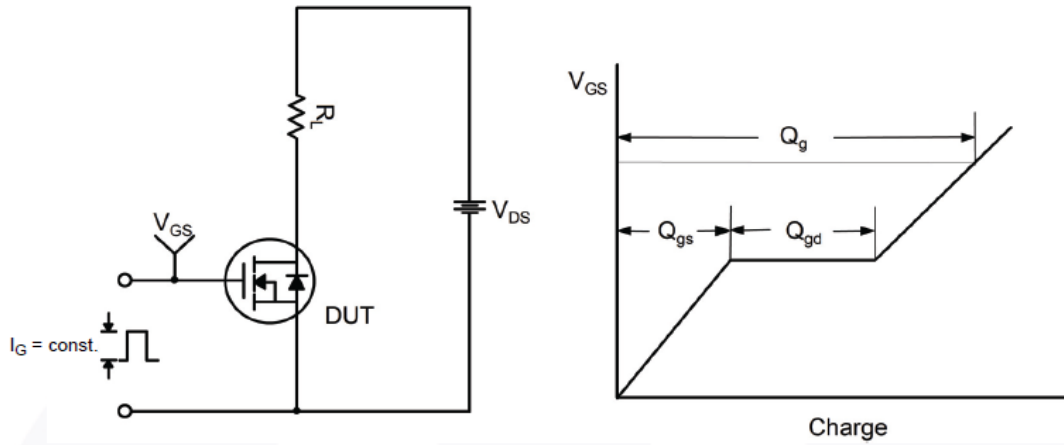
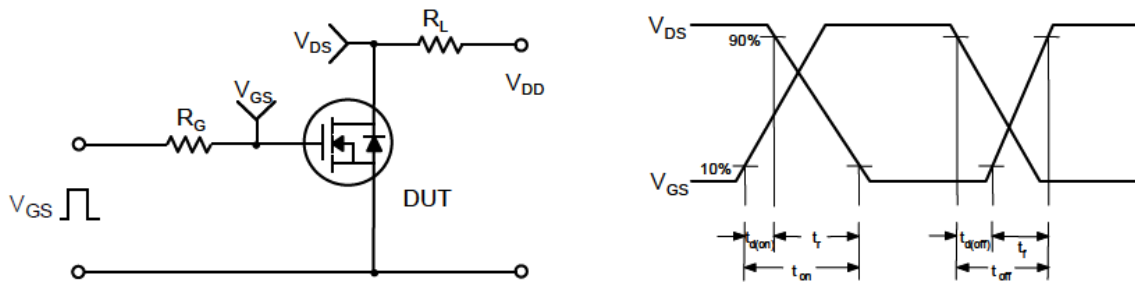


Figure 12. Transient Thermal Response Curve

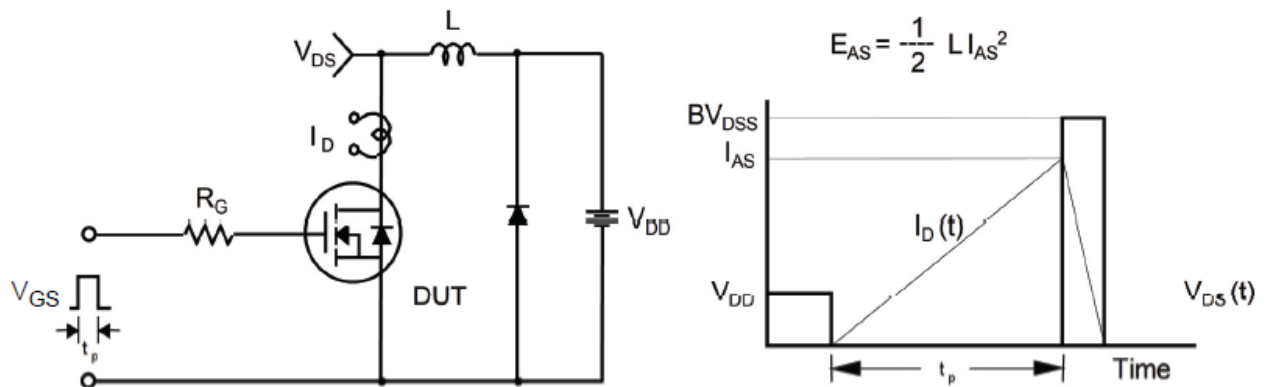
Gate Charge Test Circuit & Waveform



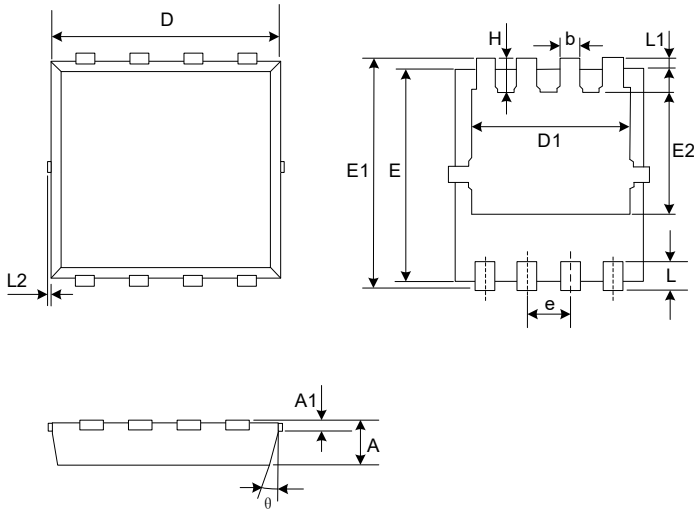
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for PDFN 3x3



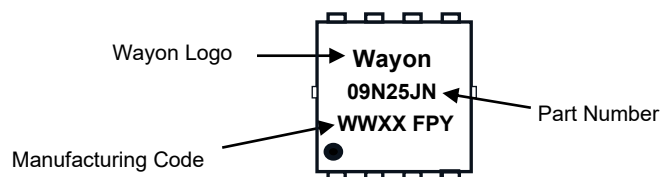
COMMON DIMENSIONS

SYMBOL	MIN	MAX
A	0.70	0.90
A1	0.10	0.25
D	2.90	3.30
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

Ordering Information

Part	Package	Marking	Packing method
WMQ09N25JN	PDFN 3x3	09N25JN	Tape and Reel

Marking Information



Contact Information

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