BMD60N600C1

N-Channel Power MOSFET

600 V, 8 A, 600 mΩ

bestirpower

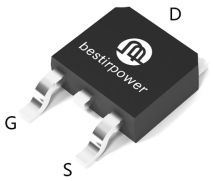
Description

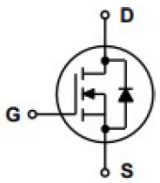
BMD60N600C1 is power MOSFET using bestirpower's advanced super junction technology that can realize very low on- resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

Features

V_{DS} @ $T_{J,max}$	I_D	$R_{DS(on),max}$	$Q_{g,typ}$
650 V	8 A	600 mΩ	15 nC

- Extremely low losses due to very low FOM Rdson*Qg and Eoss.
- Very high commutation ruggedness.





Applications

ÅPFC.
ÅSPWM.
ÅLCD TV.
ÅLighting.
ÅUPS.

RoHS compliant

HF

Absolute Maximum Ratings (T_C = 25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage[1]		600	V
V_{GSS}	Gate to Source Voltage		±30	V
I_D	Drain Current[2]	Continuous (T_C = 25℃)	8	A
		Continuous (T_C = 125℃)	3.3	
I_{DM}	Drain Current	Pulsed	24	A
P_D	Power Dissipation		62.5	W
E_{AS}	Single Pulsed Avalanche Energy[3]		81	mJ
dv/dt	MOSFET dv/dt ruggedness		50	V/ns
	Diode Recovery dv/dt ruggedness[4]		15	
T_{STG}	Storage Temperature Range		-55 to 150	℃
T_J	Maximum Operating Junction Temperature		150	℃
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds		260	℃

1) Limited by T_j max. Maximum duty cycle D=0.75.
2) Pulse width t_p limited by T_j,max.
3) V_{DD}=50V, R_G=25Ω, Starting T_j=25°C.
4) V_{DClink}=400V; $V_{DS,peak}$<$V_{(BR)DSS}$; identical low side and high side switch with identical R_G.

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, max T_C = 25°C	2	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, max T_C = 25°C	62	

Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
BMD60N600C1	BMD60N600C1	D-Pak	Tape & Reel	330 mm	16 mm	2500 units

Electrical Characteristics (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250μA	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600 V, V_{GS} = 0 V Tj=25°C	-	-	1	μA
		V_{DS} = 600 V, V_{GS} = 0 V Tj=150°C	-	-	10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	2	3	4	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 3.5A Tj=25°C	-	500	600	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f = 1MHz	-	370	-	pF
C_{oss}	Output Capacitance		-	23	-	pF
C_{rss}	Reverse Transfer Capacitance		-	1.3	-	pF
$C_{o(er)}$	Energy Related Output Capacitance[1]	V_{DS} = 0V to 400V, V_{GS} = 0V	-	16	-	pF
$C_{o(tr)}$	Time Related Output Capacitance[2]	V_{DS} = 0V to 400V, V_{GS} = 0V	-	87	-	pF
Q_g	Total Gate Charge	V_{GS} = 0-10V, V_{DD} =480V, I_D = 4A	-	15	-	nC
Q_{gs}	Gate to Source Charge		-	2.4	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	9	-	nC
Vplateau	Gate plateau voltage		-	6	-	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	3.6	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{GS} = 10V, V_{DD} = 400V, I_D=4A	-	18	-	ns
t_r	Turn-On Rise Time		-	12	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	50	-	ns
t_f	Turn-Off Fall Time		-	16	-	ns
Reverse Diode Characteristics						
I_{SD}	Continuous Diode Forward Current	T_C=25°C	-	-	8	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0V, I_F = 4A, T_f = 25°C	-	0.86	-	V
t_{rr}	Reverse Recovery Time	V_R=400V, I_F=4A di_F/dt = 100A/μs	-	200	-	ns
Q_{rr}	Reverse Recovery Charge		-	1.25	-	μC
I_{rrm}	Reverse Recovery Current		-	14	-	A

1) $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 400V.
2) $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 400V.

Typical Performance Characteristics

Figure 1. Power dissipation

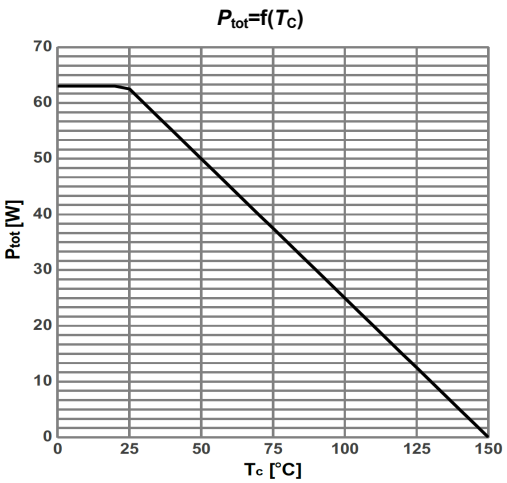


Figure 2. Max. transient thermal impedance

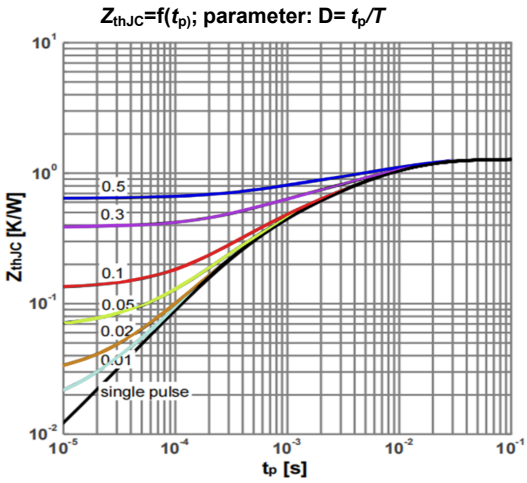


Figure 3: Safe operating area

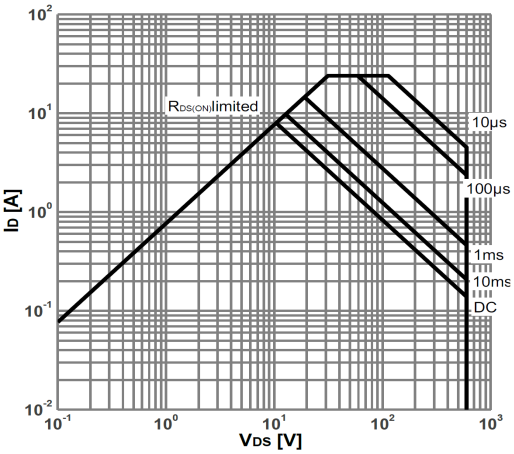


Figure 4: Typ. output characteristics

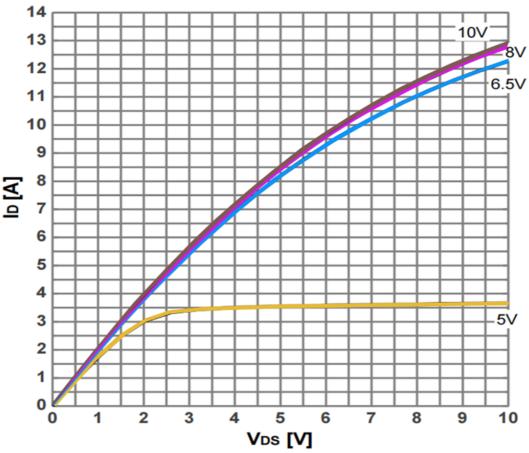


Figure 5:Typ. output characteristics

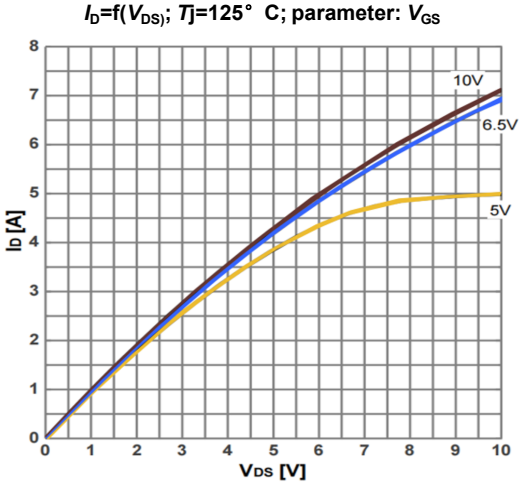
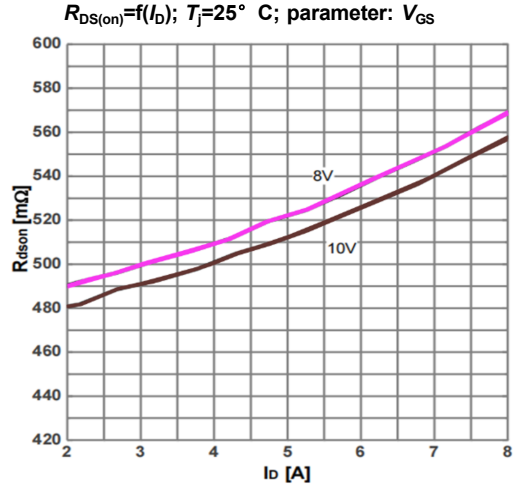


Figure 6: Typ. drain-source on-state resistance



Typical Performance Characteristics

Figure 7: drain-source on-state resistance

$R_{DS(on)}=f(T_j)$; $I_D=3.5A$; $V_{GS}=10V$

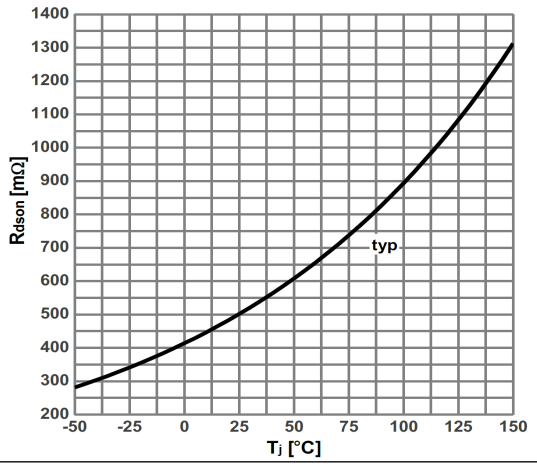


Figure 8: Typ. transfer characteristics

$I_D=f(V_{GS})$; $V_{DS}=20V$; parameter: T_j

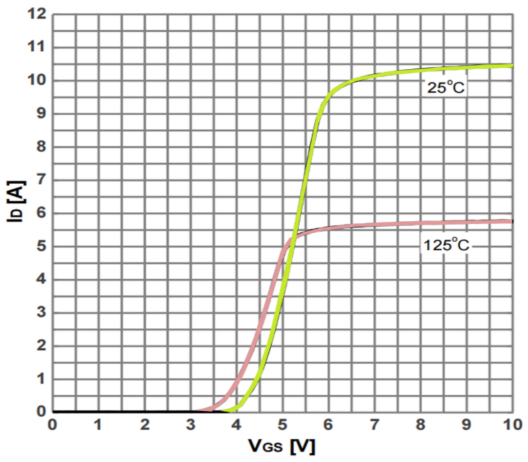


Figure 9:Typ. gate charge

$V_{GS}=f(Q_{gate})$; $I_D=4A$ pulsed; $V_{DS}=480V$

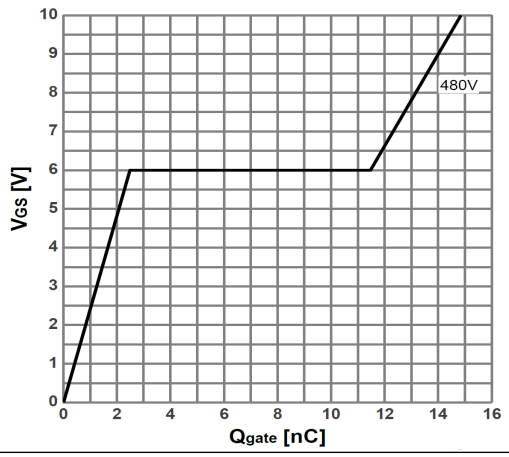


Figure 10:Forward characteristics of reverse diode

$I_F=f(V_{SD})$; parameter: T_j

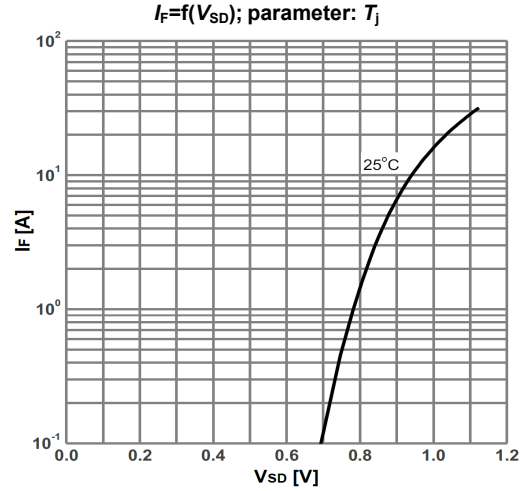


Figure 11:Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j)$; $I_D=250\mu A$

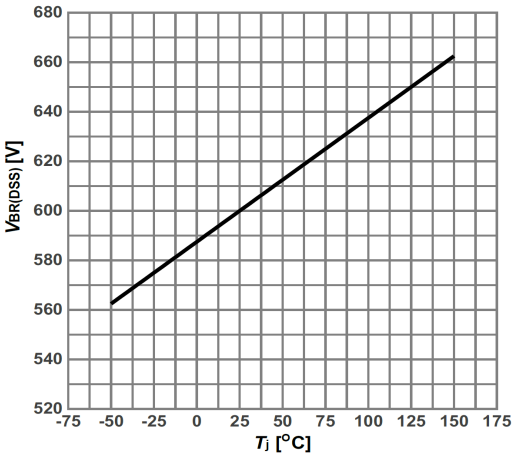
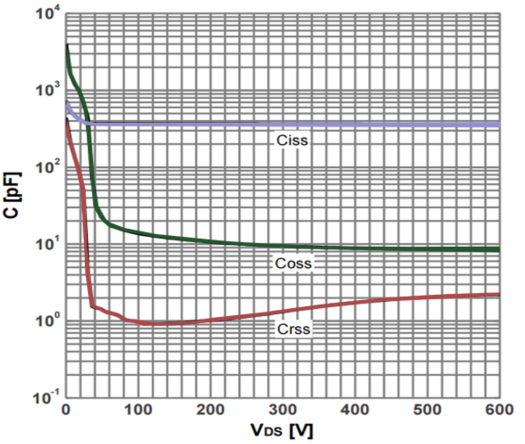


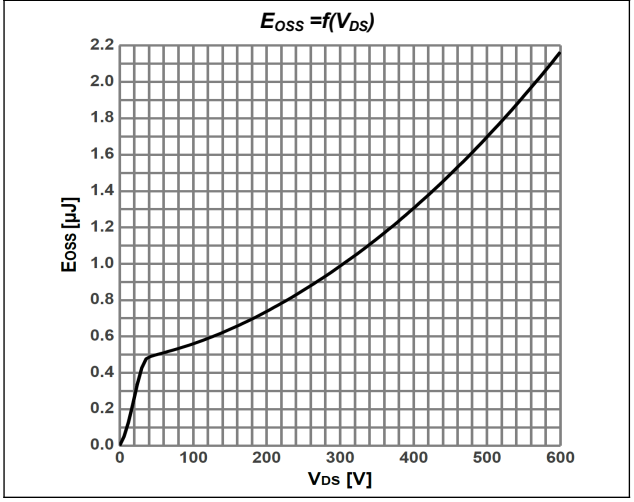
Figure 12:Typ. capacitances

$C=f(V_{DS})$; $V_{GS}=0V$; f=1MHz



Typical Performance Characteristics

Figure 13:Typ. Coss stored energy



Test Circuits

Figure 14:Diode Characteristics

Test circuit for diode characteristics and Diode recovery waveform

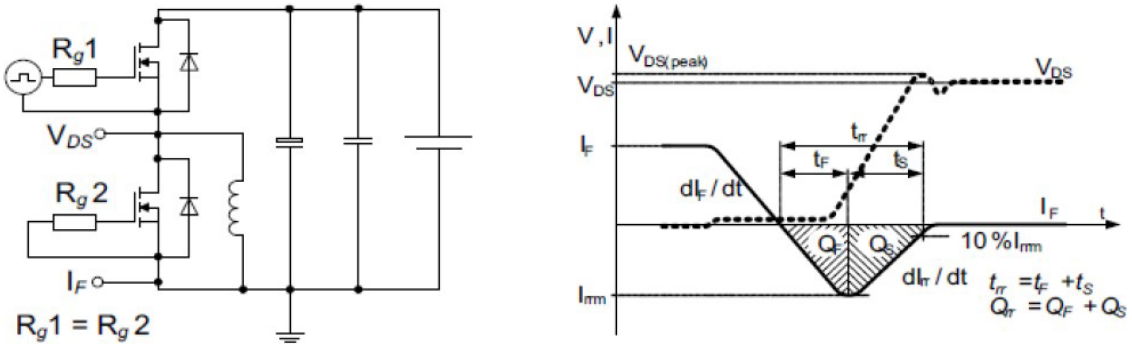


Figure 15:Switching Times

Switching times test circuit for inductive load and Switching times waveform

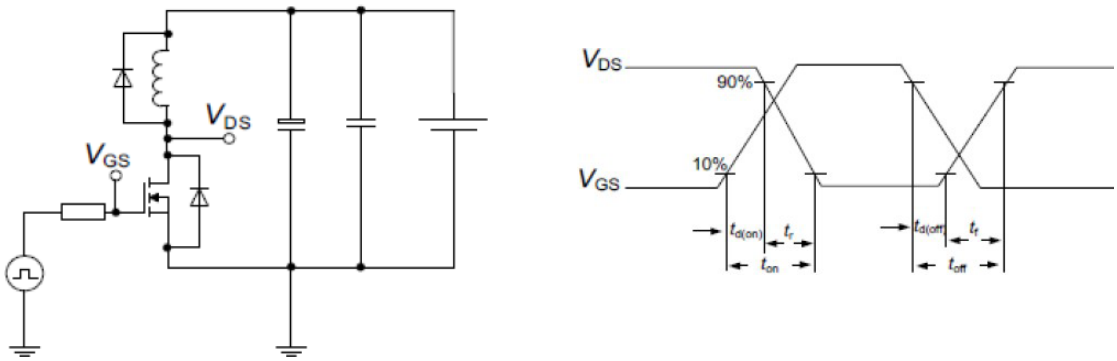
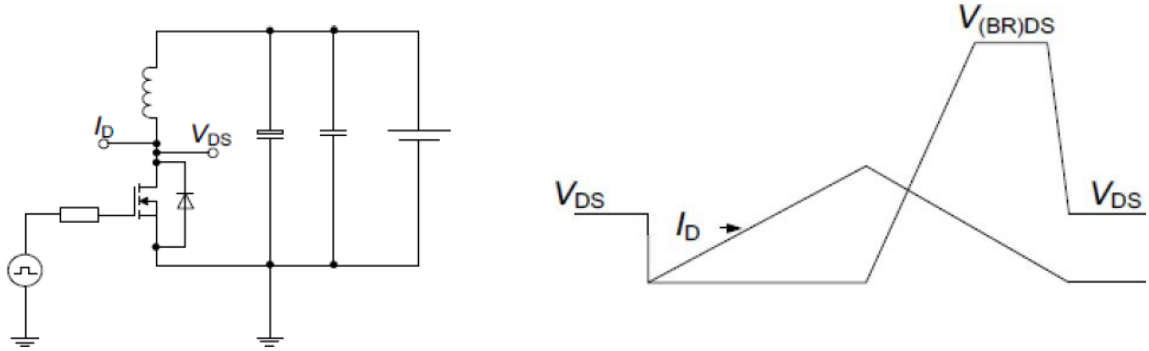


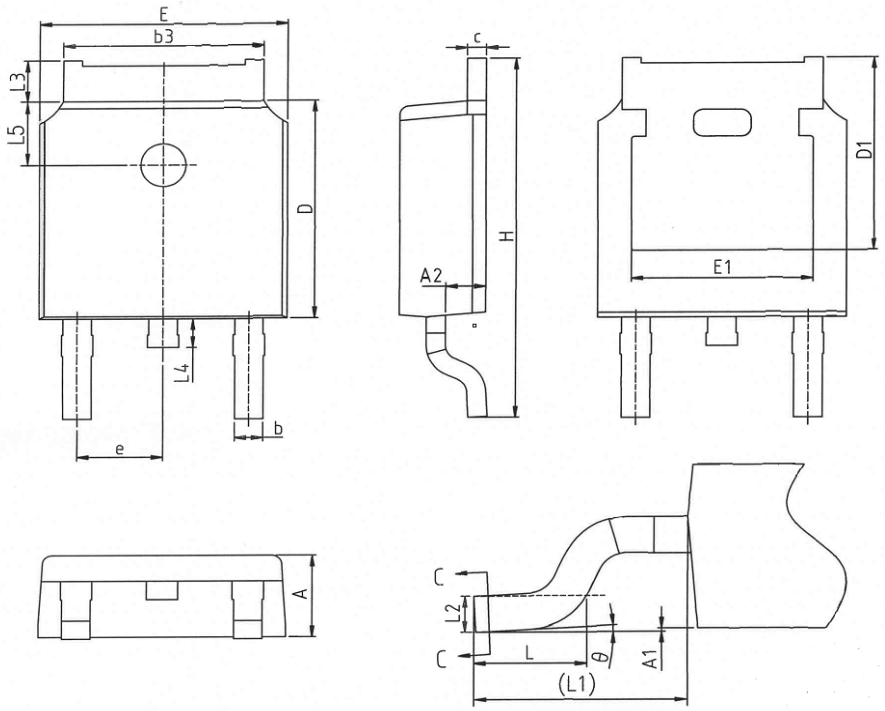
Figure 16:Unclamped Inductive Load

Unclamped inductive load test circuit and Unclamped inductive waveform



Package Outlines

D-Pak



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

* Dimensions in millimeters

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