



## General Description

The HT7202 use advanced SGT MOSFET technology to provide low  $R_{DS(ON)}$ , low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness.

## General Features

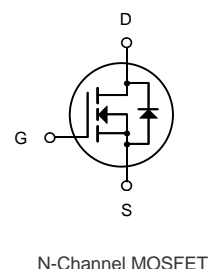
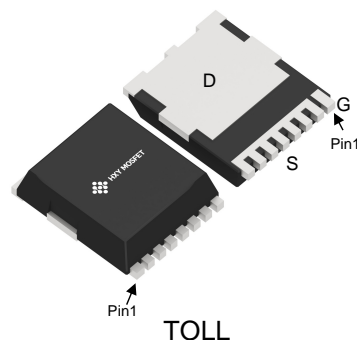
$V_{DS} = 80V$   $I_D = 400A$

$R_{DS(ON)} < 2m\Omega$  @  $V_{GS}=10V$

## Applications

Battery Protection

Power Distribution



## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HT7202	TOLL	400N08	2000

## Absolute Maximum Ratings at $T_J=25^{\circ}C$ unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	80	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_C=25^{\circ}C$	$I_D$	400	A
	$T_C=100^{\circ}C$		253	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	1600	A
Single Pulse Avalanche Energy <sup>2</sup>		$E_{AS}$	1280	mJ
Total Power Dissipation	$T_C=25^{\circ}C$	$P_D$	468.8	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 175	$^{\circ}C$
Thermal Resistance from Junction-to-Ambient <sup>3</sup>		$R_{\theta JA}$	39	$^{\circ}C/W$
Thermal Resistance from Junction-to-Case		$R_{\theta JC}$	0.32	$^{\circ}C/W$



**Electrical Characteristics ( $T_J = 25^{\circ}\text{C}$ , unless otherwise noted)**

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	80	-	-	V
Gate-body Leakage current		I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T <sub>J</sub> =25°C	I <sub>DSS</sub>	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V	-	-	1	μA
	T <sub>J</sub> =100°C			-	-	100	
Gate-Threshold Voltage		V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2	3	4	V
Drain-Source on-Resistance <sup>4</sup>		R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A	-	1.6	2	mΩ
Forward Transconductance <sup>4</sup>		g <sub>fs</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> =20A	-	70	-	S
Dynamic Characteristics <sup>5</sup>							
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 40V, V <sub>GS</sub> =0V, f =1MHz	-	8980	-	pF
Output Capacitance		C <sub>oss</sub>		-	1560	-	
Reverse Transfer Capacitance		C <sub>rss</sub>		-	90	-	
Gate Resistance		R <sub>g</sub>	f=1MHz	-	2.4	-	Ω
Switching Characteristics <sup>5</sup>							
Total Gate Charge		Q <sub>g</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 40V, I <sub>D</sub> = 20A	-	140	-	nC
Gate-Source Charge		Q <sub>gs</sub>		-	37.5	-	
Gate-Drain Charge		Q <sub>gd</sub>		-	37.5	-	
Turn-on Delay Time		t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> = 40V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = 20A	-	27.5	-	ns
Rise Time		t <sub>r</sub>		-	82	-	
Turn-off Delay Time		t <sub>d(off)</sub>		-	85	-	
Fall Time		t <sub>f</sub>		-	52	-	
Body Diode Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> =20A, di/dt = 100A/μs	-	98	-	ns
Body Diode Reverse Recovery Charge		Q <sub>rr</sub>		-	166	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage <sup>4</sup>		V <sub>SD</sub>	I <sub>S</sub> = 20A, V <sub>GS</sub> = 0V	-	-	1.2	V
Continuous Source Current	T <sub>C</sub> =25°C	I <sub>S</sub>	-	-	-	400	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)} = 150^{\circ}\text{C}$ .
2. The EAS data shows Max. rating . The test condition is  $V_{DD} = 25V, V_{GS} = 10V, L = 0.5mH, I_{AS} = 50A$ .
3. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
5. This value is guaranteed by design hence it is not included in the production test.



## Typical Characteristics

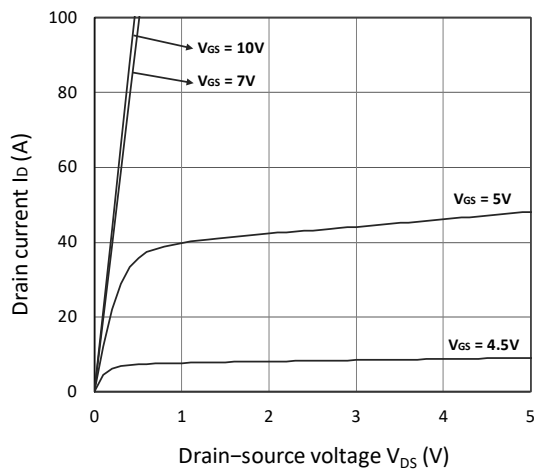


Figure 1. Output Characteristics

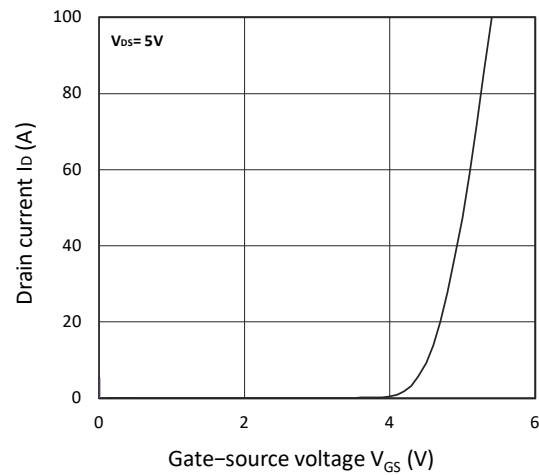


Figure 2. Transfer Characteristics

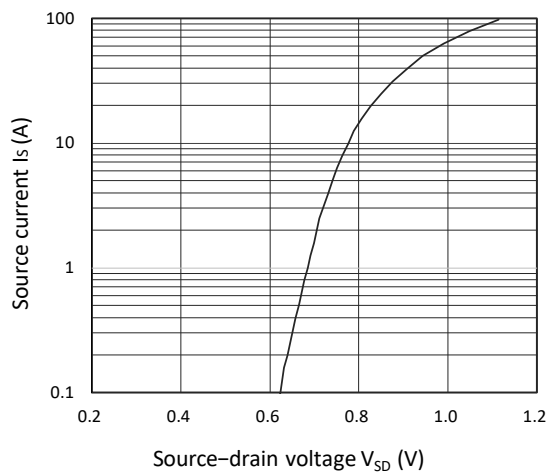


Figure 3. Forward Characteristics of Reverse

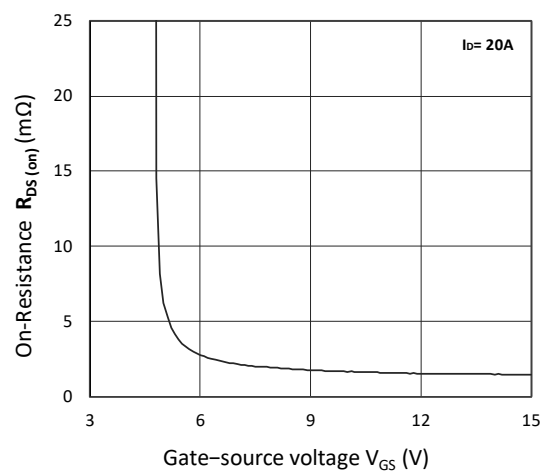


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

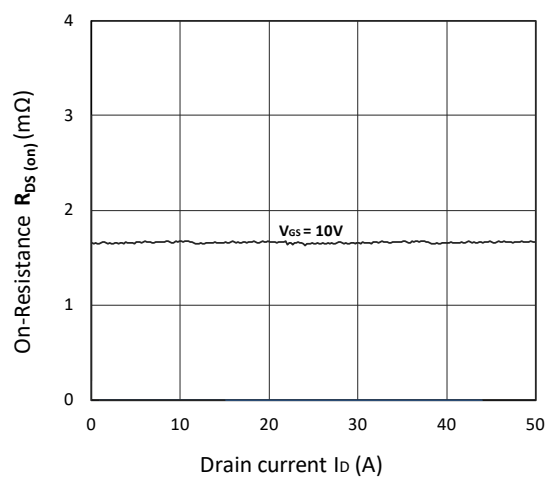


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

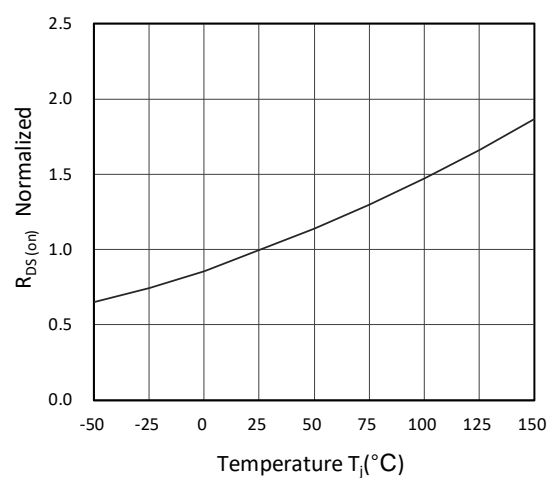


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

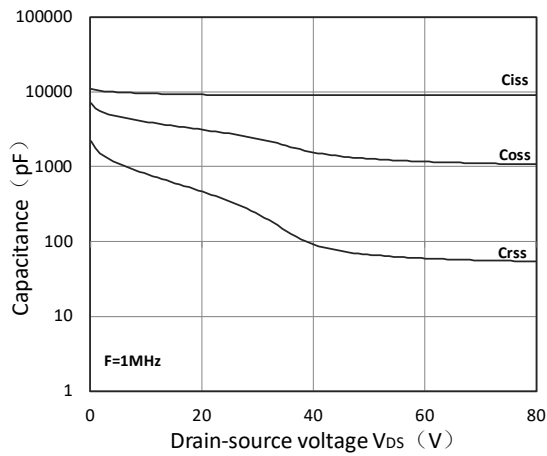


Figure 7. Capacitance Characteristics

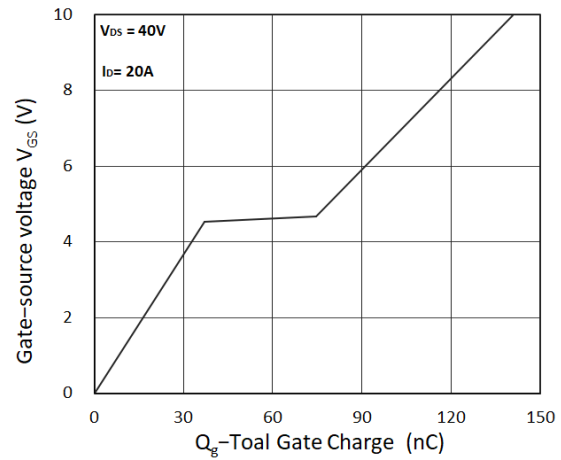


Figure 8. Gate Charge Characteristics

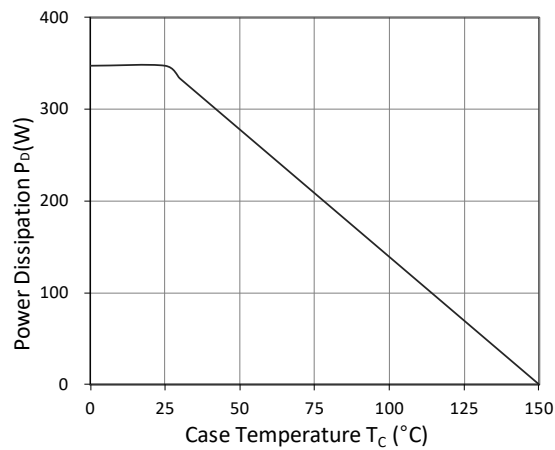


Figure 9. Power Dissipation

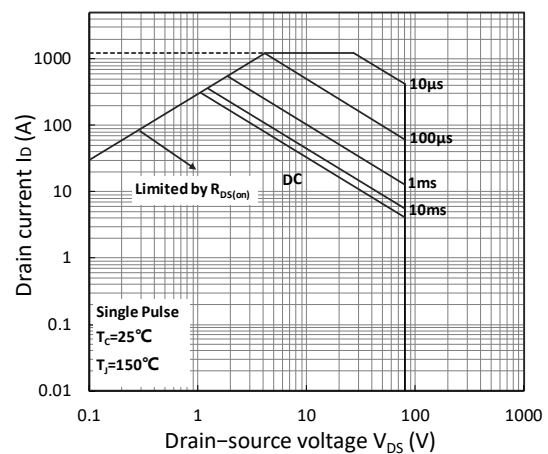


Figure10. Safe Operating Area

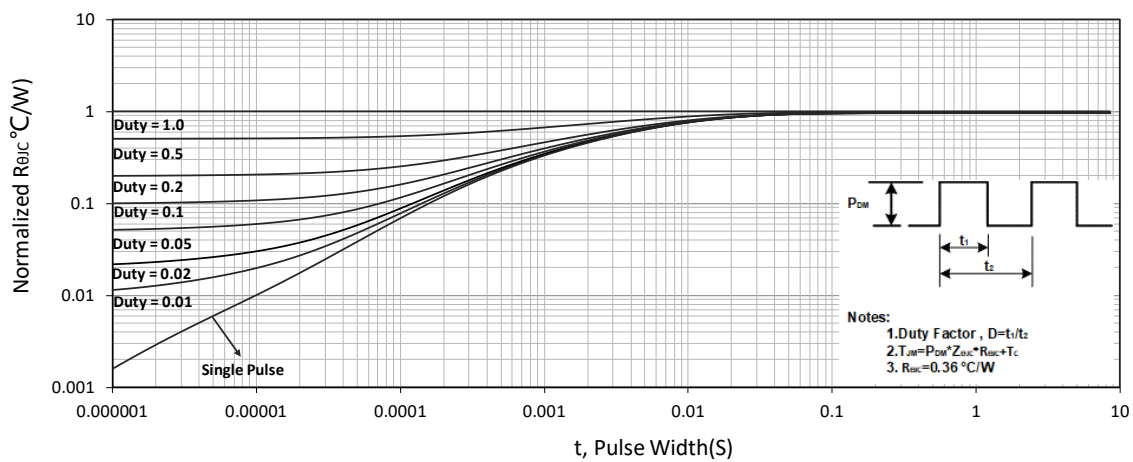


Figure 11. Normalized Maximum Transient Thermal Impedance



## Test Circuit

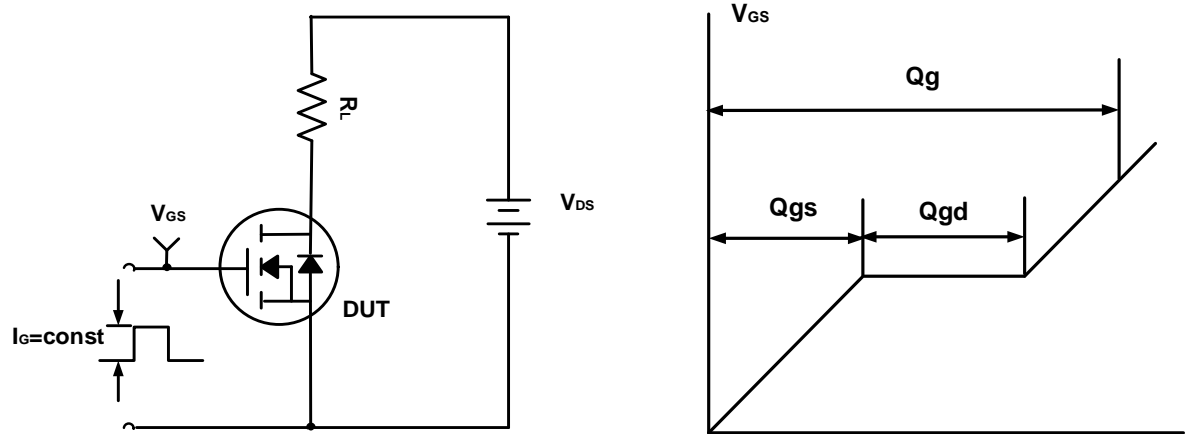


Figure A. Gate Charge Test Circuit & Waveforms

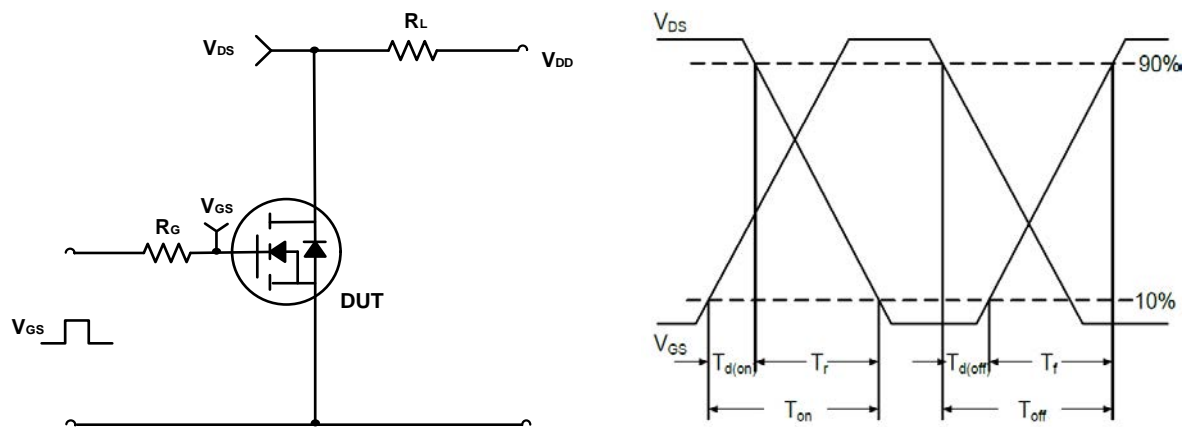


Figure B. Switching Test Circuit & Waveforms

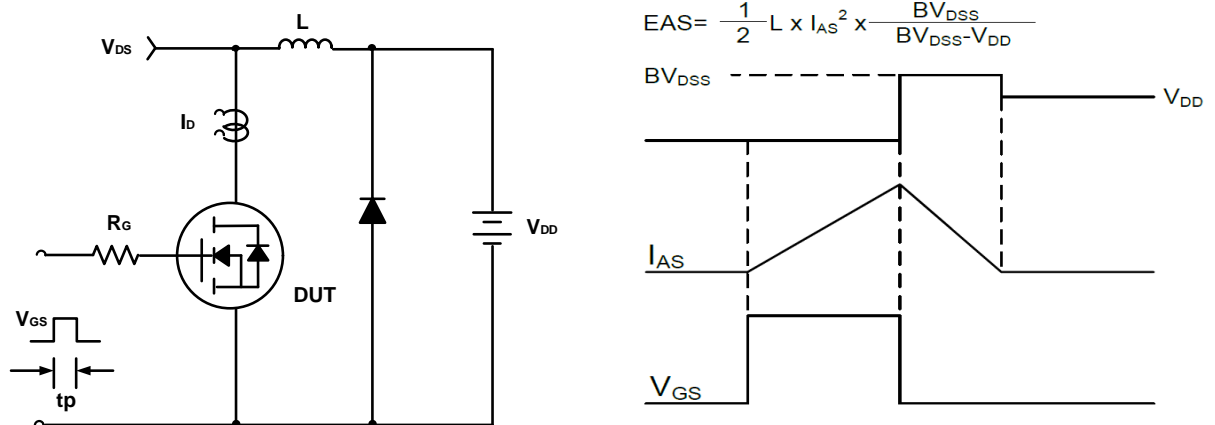
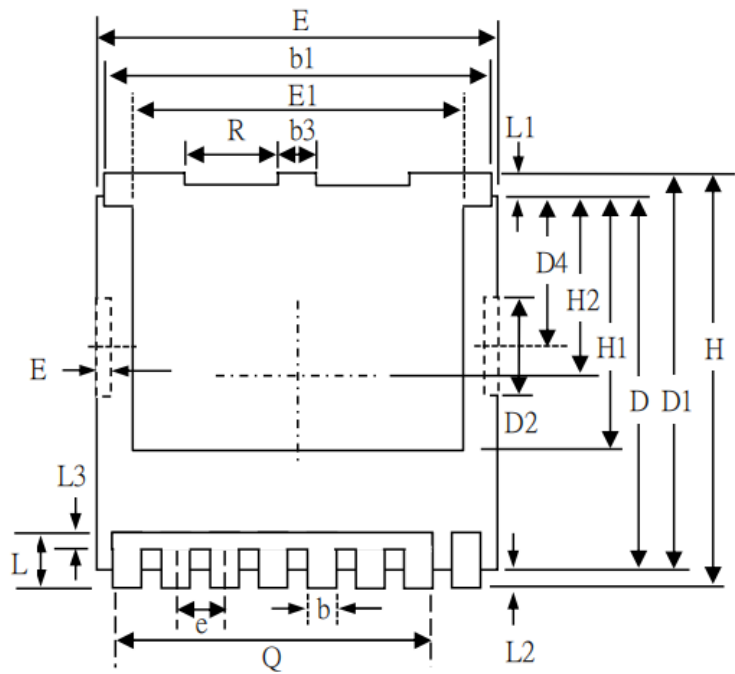


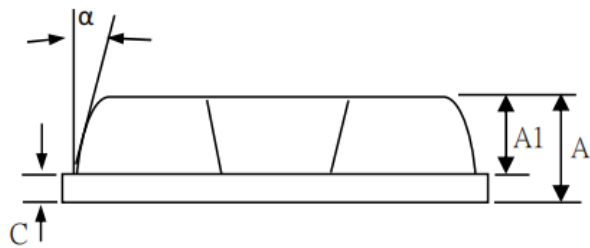
Figure C. Unclamped Inductive Switching Circuit & Waveforms



TOLL Package Information



BACKSIDE VIEW



Symbol	mm	
	Min	Max
A	2.20	2.40
b	0.60	0.90
b1	9.70	9.90
c	0.40	0.60
D	10.20	10.60
D1	3.10	3.50
D2	4.45	4.75
E	9.70	10.10
E1	7.80BSC	
E2	0.50	0.70
e	1.200 BSC	
H	11.45	11.90
H1	6.75 BSC	
K	3.10 REF	
L	1.70	2.10
L1	0.60	0.80
L2	0.50	0.70
θ	10° REF	

- 1.All Dimension Are In Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.



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