

## 800 V N-Channel SIC MOSFET

### Features

- ◆ Effectively lower down  $T_j$  and  $R_{th}$ , High anti-EMI ability
- ◆ High Speed Switching with Low Capacitances
- ◆ High Blocking Voltage with Low  $R_{DS(on)}$
- ◆ Easy to drive and parallel
- ◆ RoHS Compliant

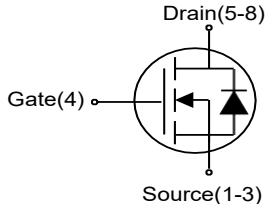
### Benefits

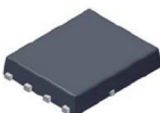
- ◆ Increased Power Density
- ◆ Higher Operating Frequency
- ◆ Reduc Heat Sink Requirements
- ◆ Higher Efficiency
- ◆ EMI Reduction

### Applications

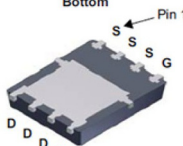
- ◆ Power Factor Correction Modules
- ◆ Switch Mode Power Supplies
- ◆ Power Inverters
- ◆ High Voltage Converters

**ORDERING INFORMATION**





Top



Bottom  
Pin 1

Power 56

**DFN-8(5x6) RD**  
**SUFFIX**  
**HT80N15ARDZ**

&HT80N15	= Specific Device Code
&A	=Version
&RD	= Packaging
&Z	= Pb-Free Package
&#	=Date Code

$T_A = -55^\circ \text{ to } 175^\circ \text{ C}$  for all packages

### Maximum ratings ( $T_j=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
$V_{DS}$	Drain-Source Voltage	$V_{GS} = 0 \text{ V}, I_D = 100 \mu\text{A}$	800	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	15 12	A
$I_{DM}$	Peak Drain Current	Pulse width $t_p$ limited by $T_{jmax}$	39	A
$V_{GSmax}$	Gate-Source Voltage		-5/ 26	V
$V_{GSop}$	Recommend Gate-Source Voltage		0/ 18	V
$P_{tot}$	Power Dissipation	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	52 25	W
$T_j$	Operating Junction Temperature		-55~175	$^\circ\text{C}$
$T_{stg}$	Storage Temperature		-55~175	$^\circ\text{C}$

**Electrical Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	800			V	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	
$I_{DSS}$	Zero Gate Voltage Drain Current		1	15	$\mu\text{A}$	$V_{GS} = 0\text{ V}, V_{DS} = 850\text{ V}$	
$I_{GSS}$	Gate-Source Leakage Current			50	nA	$V_{DS} = 0\text{ V}, V_{GS} = 18\text{ V}$	
$V_{GS(th)}$	Gate Threshold Voltage		3.5	4.0	V	$V_{GS} = V_{DS}, I_{DS} = 1\text{ mA}, T_J = 25^\circ\text{C}$	Fig. 14
			2.8			$V_{GS} = V_{DS}, I_{DS} = 1\text{ mA}, T_J = 175^\circ\text{C}$	
$R_{DS(on)}$	Static Drain-Source On-Resistance		260	300	m $\Omega$	$V_{GS} = 15\text{ V}, I_D = 4.5\text{ A}, T_J = 25^\circ\text{C}$	Fig. 15
			180	220		$V_{GS} = 18\text{ V}, I_D = 4.5\text{ A}, T_J = 25^\circ\text{C}$	
			295			$V_{GS} = 15\text{ V}, I_D = 4.5\text{ A}, T_J = 175^\circ\text{C}$	
			205			$V_{GS} = 18\text{ V}, I_D = 4.5\text{ A}, T_J = 175^\circ\text{C}$	
$C_{iss}$	Input Capacitance		180		pF	$V_{DS} = 400\text{ V}, f = 1\text{ MHz}, V_{GS} = 0\text{ V}$	Fig. 8
$C_{oss}$	Output Capacitance		20				
$C_{rss}$	Reverse Transfer Capacitance		0.9				
$Q_{gs}$	Gate-Source Charge		2.3		nC	$V_{DD} = 400\text{ V}, I_D = 5\text{ A}, R_G = 10\ \Omega,$ $V_{GS} = 0/15\text{ V}$	Fig. 7
$Q_{gd}$	Gate-Drain Charge		1.1				
$Q_g$	Total Gate Charge		11.2				
$E_{on}$	Turn-On Switching Energy		25				
$E_{off}$	Turn-Off Switching Energy		10		$\mu\text{J}$		Fig. 12
$t_{d(on)}$	Turn-On Delay Time		5				
$t_r$	Rise Time		17		ns	$V_{DD} = 400\text{ V}, I_D = 5\text{ A}, R_G = 10\ \Omega,$ $V_{GS} = -5/18\text{ V}$	
$t_{d(off)}$	Turn-Off Delay Time		8				
$t_f$	Fall Time		10				

**Reverse SiC Diode Characteristics**

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$V_{SD}$	Diode Forward Voltage	4.0		V	$V_{GS} = -4\text{ V}, I_{SD} = 2.5\text{ A}, T_J = 25^\circ\text{C}$	Fig. 16
		3.6			$V_{GS} = -4\text{ V}, I_{SD} = 2.5\text{ A}, T_J = 175^\circ\text{C}$	Fig. 17
* $I_{SD}$	Continuous Diode Forward Current		15	A	$T_C = 25^\circ\text{C}$	
			12		$T_C = 175^\circ\text{C}$	
$t_{rr}$	Reverse Recovery Time	50		ns	$I_{SD} = 5\text{ A}, di/dt = 1000\text{ A}/\mu\text{s},$ $V_{DD} = 400\text{ V}, V_{GS} = -5\text{ V}$	
$Q_{rr}$	Reverse Recovery Charge	38		nC		
$I_{RRM}$	Peak Reverse Recovery Current	2.4		A		

### Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
$R_{thJC}$	Thermal Resistance from Junction to Case	2.88	°C/W		Fig. 2
$R_{thJA}$	Thermal Resistance From Junction to Ambient	40			

### Electrical Characteristics

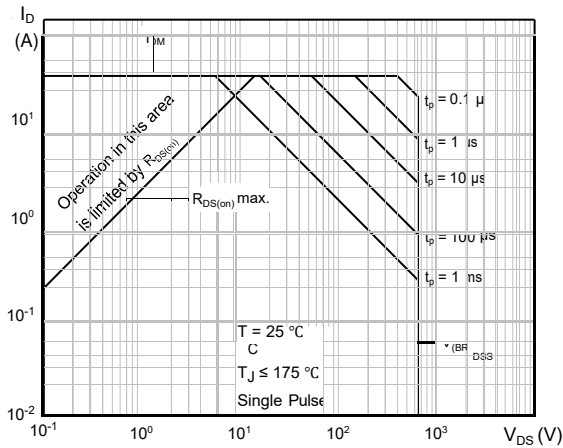


Figure 1. Safe Operating Area

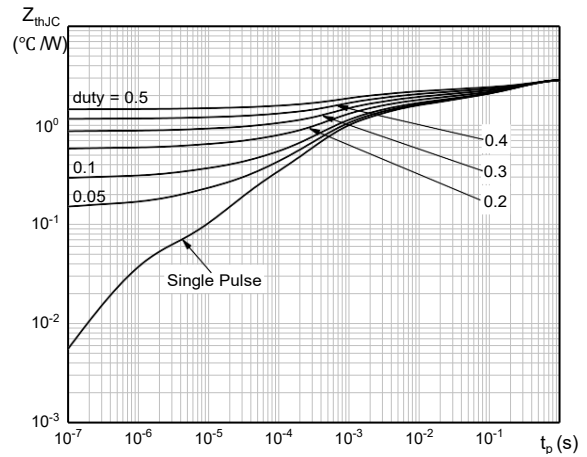


Figure 2. Maximum Transient Thermal Impedance

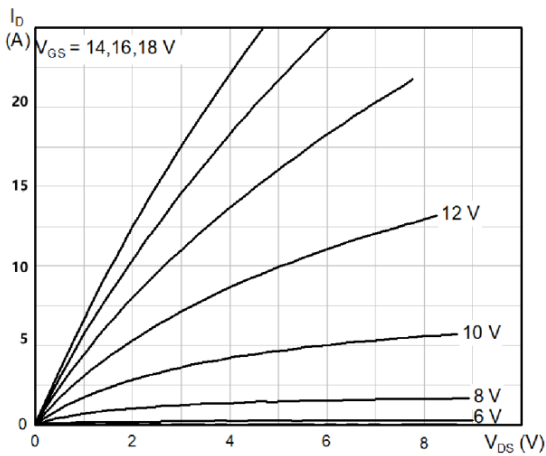
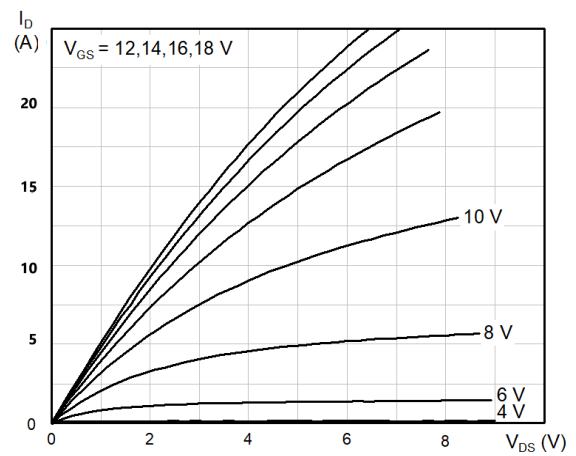
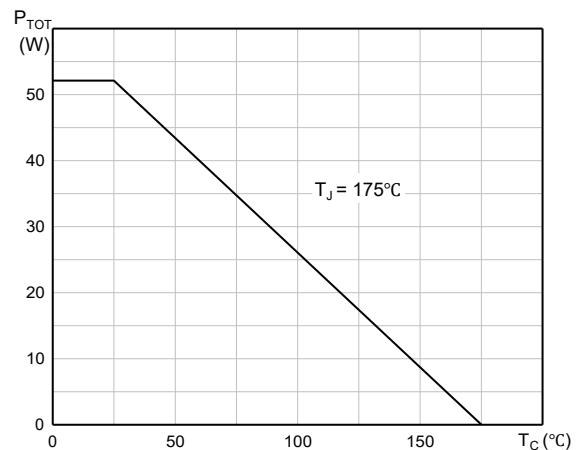
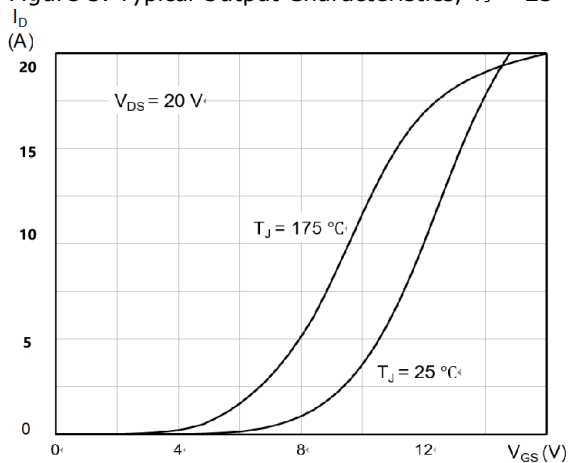

 Figure 3. Typical Output Characteristics,  $T_J = 25^\circ\text{C}$ 

 Figure 4. Typical Output Characteristics,  $T_J = 175^\circ\text{C}$ 


Figure 5. Typical Transfer Characteristics

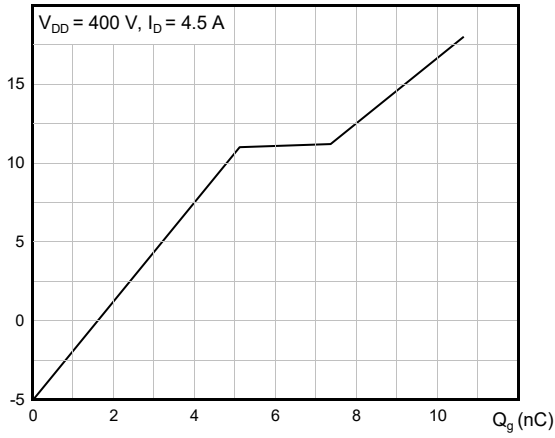


Figure 7. Typical Gate Charge Characteristics

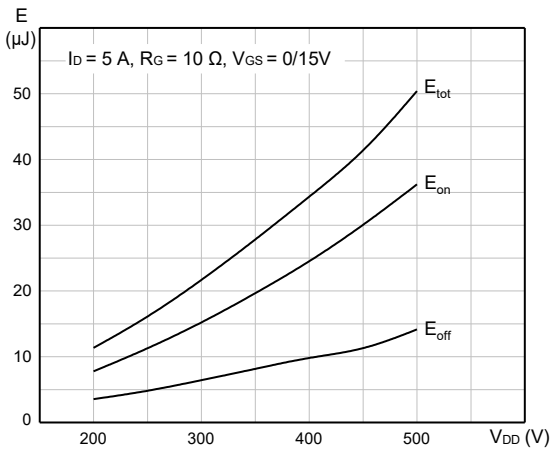


Figure 9. Typical Switching Energy vs. Supply Voltage

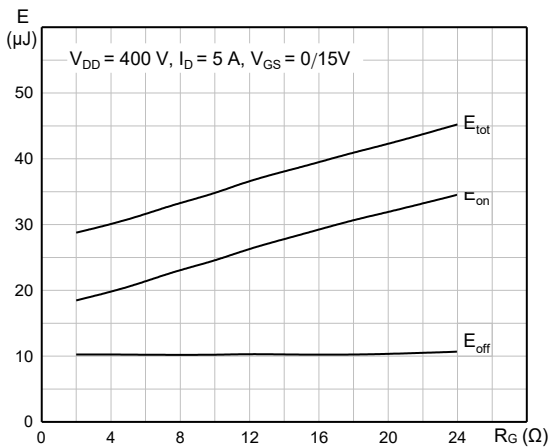


Figure 11. Switching Energy vs. Gate Resistance

Figure 6. Total Power Dissipation

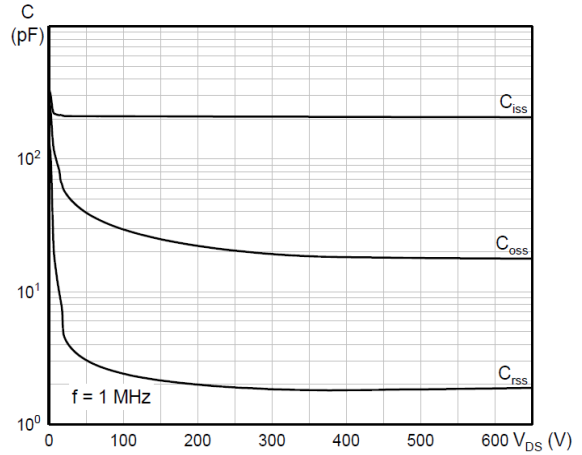


Figure 8. Typical Capacitance Characteristics

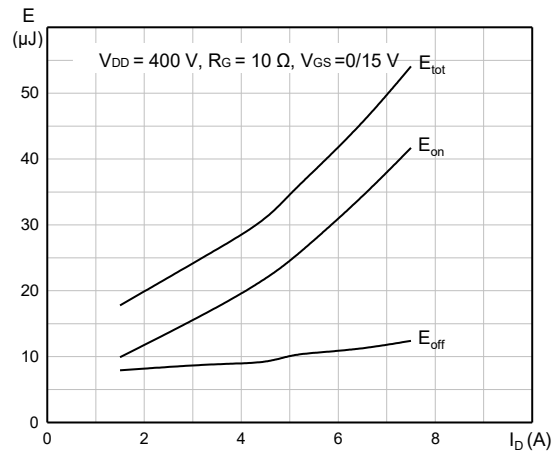


Figure 10. Typical Switching Energy vs. Drain Current

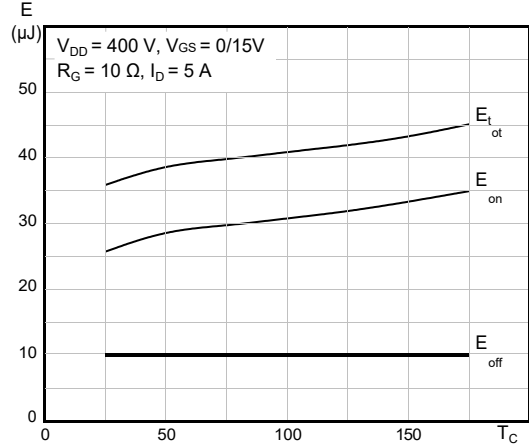


Figure 12. Typical Switching Energy vs. Temperature

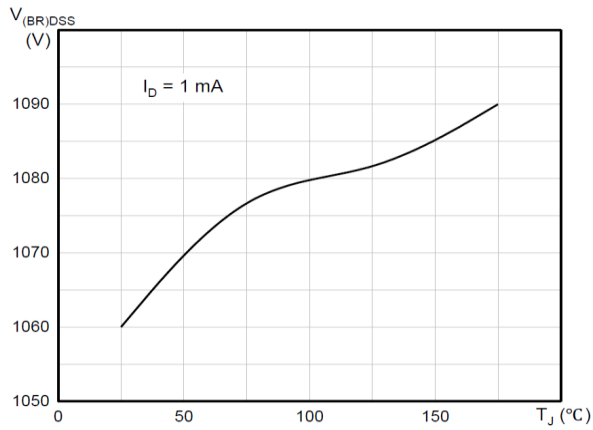


Figure 13. Breakdown Voltage vs. Temperature

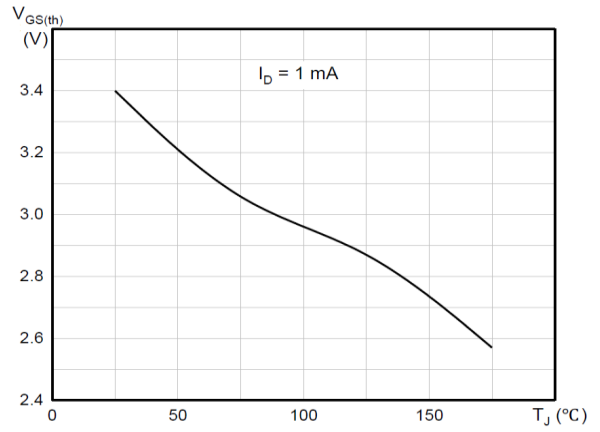


Figure 14. Gate Threshold vs. Temperature

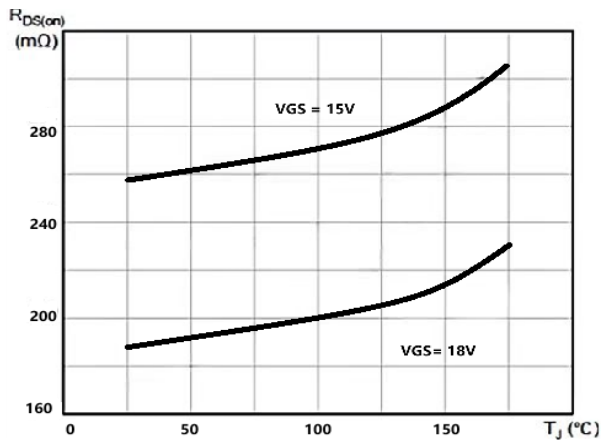


Figure 15. On-Resistance vs. Temperature

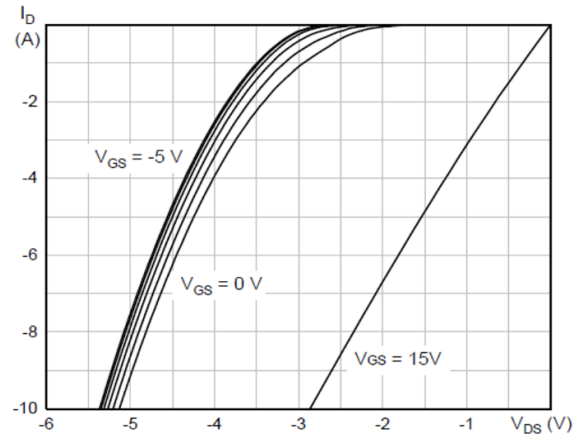


Figure 16. Body Diode Characteristics,  $T_J = 25^\circ\text{C}$

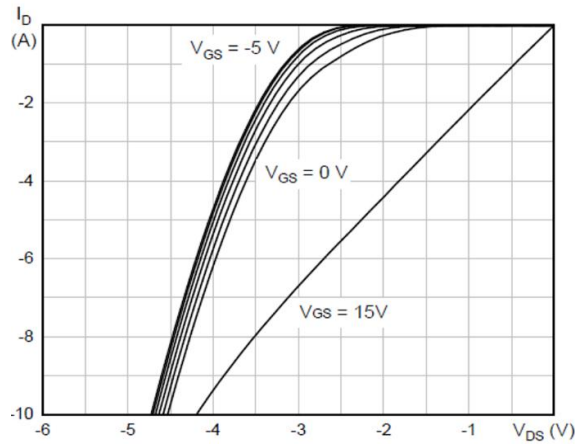
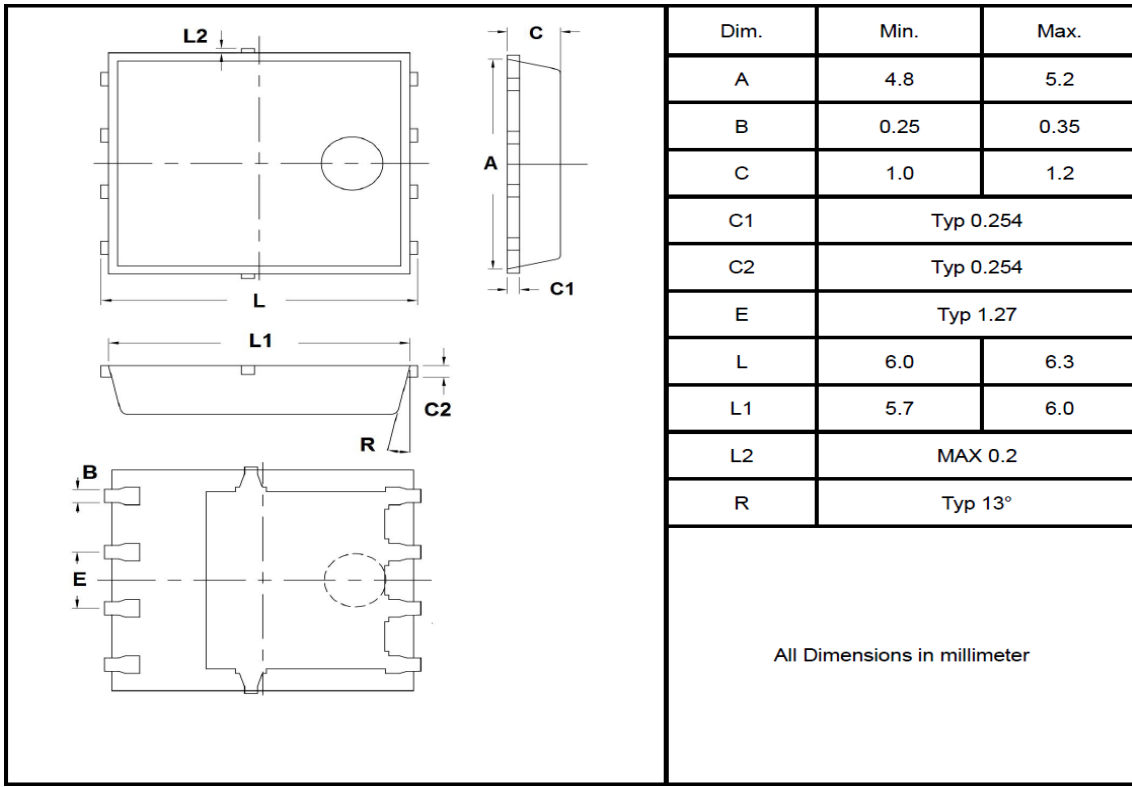


Figure 17. Body Diode Characteristics,  $T_J = 175^\circ\text{C}$

**Package Outline Dimension: PDFN 5\*6**



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