

International IOR Rectifier

Ultrafast Rectifier

8ETH03
8ETH03S
8ETH03-1

Features

- Ultrafast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 175°C Operating Junction Temperature

$$t_{rr} = 35\text{ns}$$

$$I_{F(AV)} = 8\text{Amp}$$

$$V_R = 300\text{V}$$

Description/ Applications

International Rectifier's 300V series are the state of the art Ultrafast recovery rectifiers designed with optimized performance of forward voltage drop and Ultrafast recovery time.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

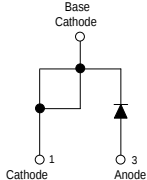
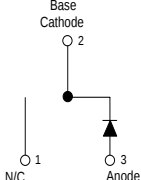
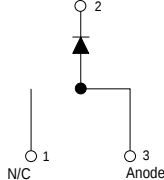
These devices are intended for use in the output rectification stage of SMPS, UPS, DC-DC converters as well as freewheeling diodes in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

Absolute Maximum Ratings

Parameters	Max	Units
V_{RRM} Repetitive Peak Reverse Voltage	300	V
$I_{F(AV)}$ Average Rectified Forward Current @ $T_C = 155^\circ\text{C}$	8	A
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$	100	
T_J, T_{STG} Operating Junction and Storage Temperatures	- 65 to 175	$^\circ\text{C}$

Case Styles

8ETH03	8ETH03S	8ETH03-1
  TO-220AC	  D²PAK	  TO-262

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
V_{BR}, V_r Breakdown Voltage, Blocking Voltage	300	-	-	V	$I_R = 100\mu\text{A}$
V_F Forward Voltage	-	1.0	1.25	V	$I_F = 8\text{A}$
	-	0.83	1.00	V	$I_F = 8\text{A}, T_J = 125^\circ\text{C}$
I_R Reverse Leakage Current	-	0.02	20	μA	$V_R = V_R \text{ Rated}$
	-	6.0	200	μA	$T_J = 125^\circ\text{C}, V_R = V_R \text{ Rated}$
C_T Junction Capacitance	-	31	-	pF	$V_R = 300\text{V}$
L_S Series Inductance	-	8	-	nH	Measured lead to lead 5mm from package body

Dynamic Recovery Characteristics @ $T_C = 25^\circ\text{C}$ (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
t_{rr} Reverse Recovery Time	-	-	35	ns	$I_F = 1\text{A}, di_F/dt = -50\text{A}/\mu\text{s}, V_R = 30\text{V}$
	-	27	-		$T_J = 25^\circ\text{C}$
	-	40	-		$T_J = 125^\circ\text{C}$
I_{RRM} Peak Recovery Current	-	2.2	-	A	$T_J = 25^\circ\text{C}$
	-	5.3	-		$T_J = 125^\circ\text{C}$
Q_{rr} Reverse Recovery Charge	-	30	-	nC	$T_J = 25^\circ\text{C}$
	-	106	-		$T_J = 125^\circ\text{C}$

$I_F = 8\text{A}$
 $di_F/dt = -200\text{A}/\mu\text{s}$
 $V_R = 200\text{V}$

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T_J Max. Junction Temperature Range	- 65	-	175	$^\circ\text{C}$
T_{Stg} Max. Storage Temperature Range	- 65	-	175	
R_{thJC} Thermal Resistance, Junction to Case Per Leg	-	1.45	2.5	$^\circ\text{C}/\text{W}$
$R_{thJA}^{①}$ Thermal Resistance, Junction to Ambient Per Leg	-	-	70	
$R_{thCS}^{②}$ Thermal Resistance, Case to Heatsink	-	0.2	-	
Weight	-	2.0	-	g
	-	0.07	-	(oz)
Mounting Torque	6.0	-	12	Kg-cm
	5.0	-	10	lbf.in

① Typical Socket Mount

② Mounting Surface, Flat, Smooth and Greased

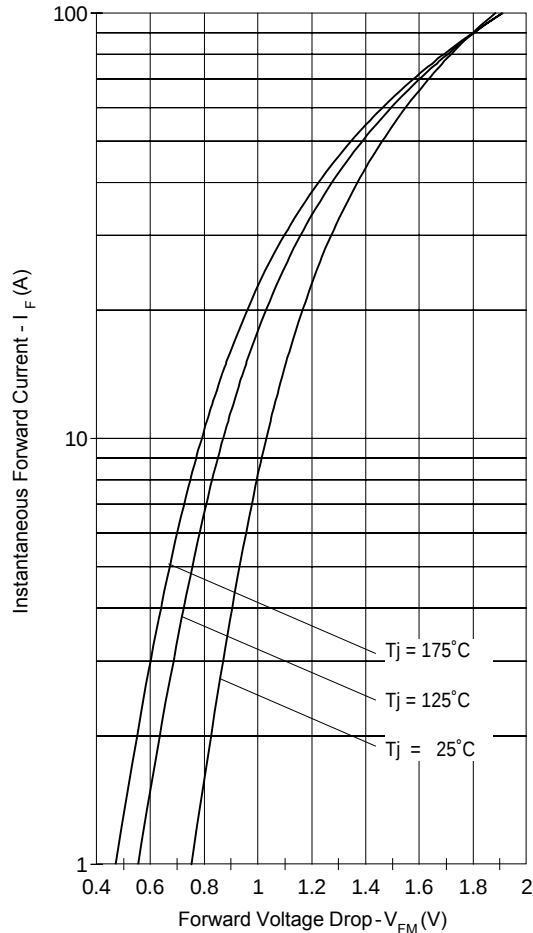


Fig. 1 - Typical Forward Voltage Drop Characteristics

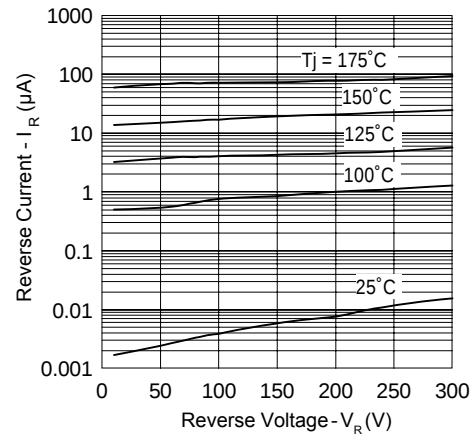


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

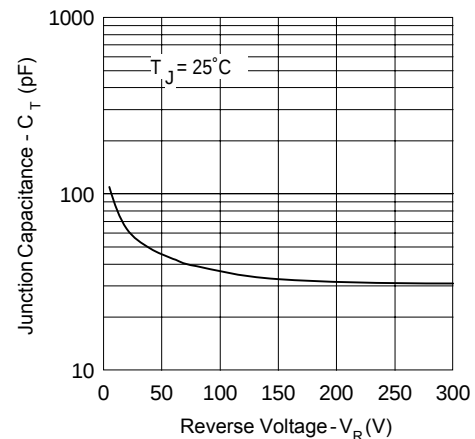


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

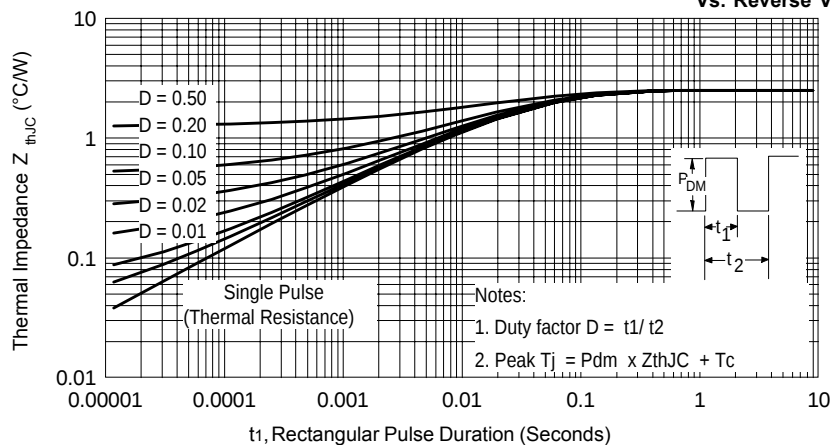


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

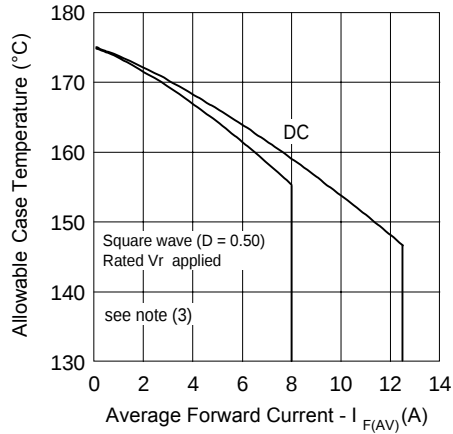


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

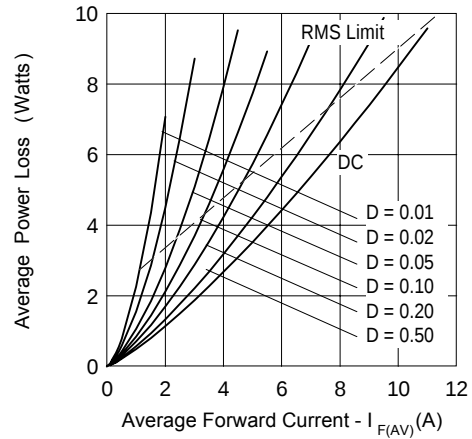


Fig. 6 - Forward Power Loss Characteristics

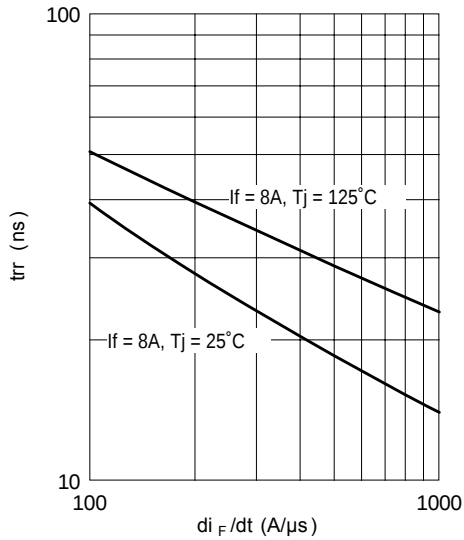


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

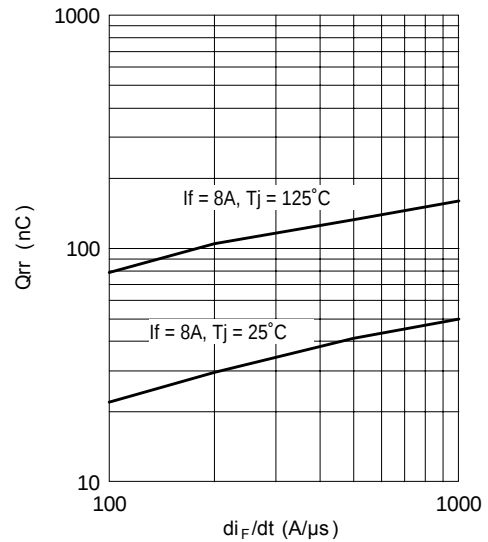


Fig. 8 - Typical Stored Charge vs. di_F/dt

(3) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)}/D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1-D)$; $I_R @ V_{R1}$ = rated V_R

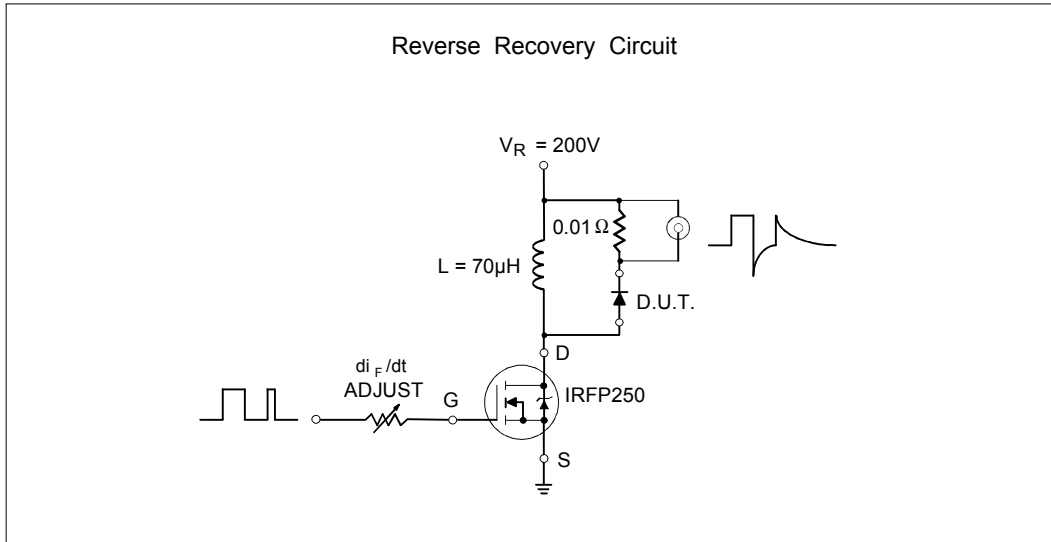


Fig. 1 - Reverse Recovery Parameter Test Circuit

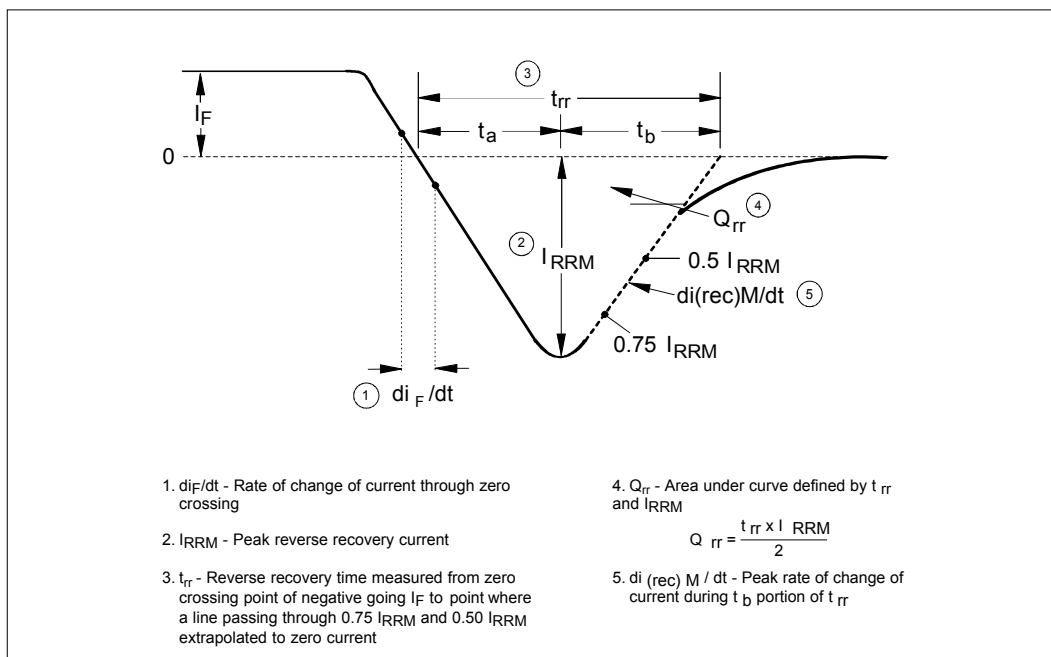


Fig. 2 - Reverse Recovery Waveform and Definitions

Bulletin PD-20023 rev. C 09/01

IOR Rectifier

The drawing includes three views of the TO-220AC package:

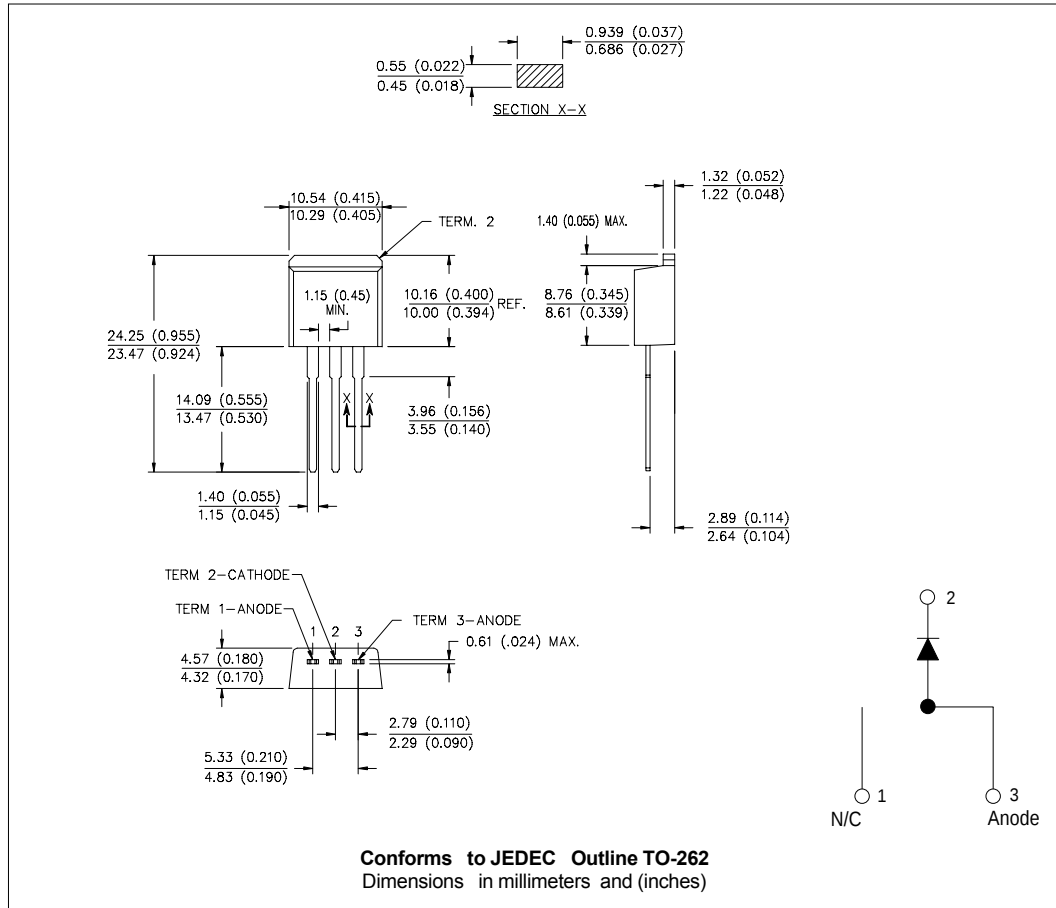
- Top View:** Shows the package footprint with dimensions: 10.54 (0.41) MAX. for the overall width, 3.78 (0.15) DIA. for the central hole, 3.54 (0.14) for the hole diameter, 2.92 (0.11) for the hole spacing, 2.54 (0.10) for the lead spacing, 15.24 (0.60) for the overall length, 14.84 (0.58) for the lead length, 14.09 (0.55) for the lead length, 13.47 (0.53) for the lead length, 1.40 (0.05) for the lead width, 1.15 (0.04) for the lead width, 0.94 (0.04) for the lead width, and 0.69 (0.03) for the lead width.
- Side View:** Shows the package profile with dimensions: 1.32 (0.05) for the lead height, 1.22 (0.05) for the lead height, 6.48 (0.25) for the lead height, 6.23 (0.24) for the lead height, 2° for the lead angle, 0.10 (0.004) for the lead width, 2.89 (0.11) for the lead height, and 2.64 (0.10) for the lead height.
- Bottom View:** Shows the package footprint with dimensions: 4.57 (0.18) for the overall width, 4.32 (0.17) for the overall width, 0.61 (0.02) MAX. for the lead width, and 5.08 (0.20) REF. for the lead length.

A circuit diagram on the right shows the package connected to a Base, Cathode, and Anode. The Base is connected to the Cathode, and the Cathode is connected to the Anode.

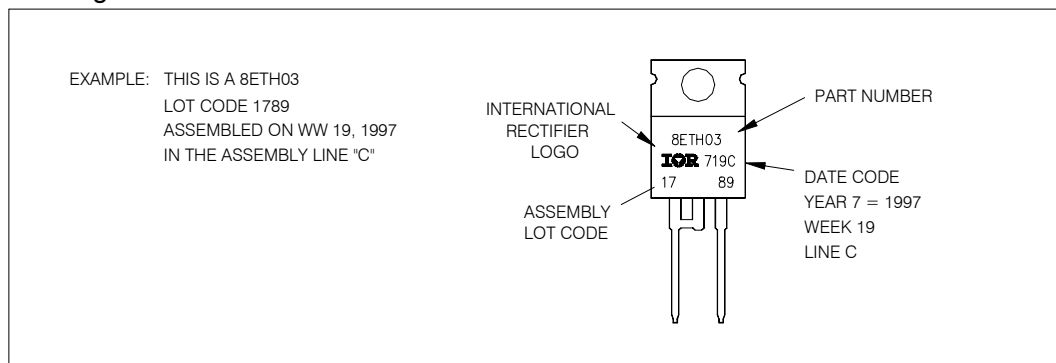
The mechanical drawing of the D2PAK package includes the following views and dimensions:

- Top View:**
 - Overall width: 10.16 (0.40) REF.
 - Left side height: 15.49 (0.61)
 - Bottom-left corner height: 14.73 (0.58)
 - Top-right corner height: 6.47 (0.25)
 - Right side height: 6.18 (0.24)
 - Internal width: 2.61 (0.10)
 - Internal height: 2.32 (0.09)
 - Bottom-right corner height: 8.89 (0.35) REF.
 - Bottom-left corner width: 1.40 (0.055)
 - Bottom-left corner height: 1.14 (0.045)
 - Bottom-right corner width: 0.93 (0.37)
 - Bottom-right corner height: 0.69 (0.27)
- Side View:**
 - Top width: 4.69 (0.18)
 - Top height: 4.20 (0.16)
 - Internal width: 1.32 (0.05)
 - Internal height: 1.22 (0.05)
 - Bottom width: 5.28 (0.21)
 - Bottom height: 4.78 (0.19)
 - Bottom-left corner width: 0.55 (0.02)
 - Bottom-left corner height: 0.46 (0.02)
- Footprint View:**
 - Overall width: 11.43 (0.45)
 - Left side height: 8.89 (0.35)
 - Right side height: 17.78 (0.70)
 - Internal width: 3.81 (0.15)
 - Internal height: 2.08 (0.08)
 - Bottom-left corner width: 2.54 (0.10)
 - Bottom-left corner height: 2X
 - Bottom-right corner width: 2.54 (0.10)
 - Bottom-right corner height: 2X
- Pin Configuration:**
 - Pin 1: N/C (Not Connected)
 - Pin 2: Base
 - Pin 3: Cathode

Outline Table



Marking Information



Ordering Information Table

Device Code					
8	E	T	H	03	-1
①	②	③	④	⑤	⑥
1	-	Current Rating (8 = 8A)			
2	-	E = Single Diode			
3	-	T = TO-220, D ² Pak			
4	-	H = HyperFast Recovery			
5	-	Voltage Rating (03 = 300V)			
6	-	"-1" = TO-262 Option			
		S = D ² Pak			
		None = TO-220AC			

Data and specifications subject to change without notice.
 This product has been designed and qualified for Industrial Level.
 Qualification Standards can be found on IR's Web site.

International
IR Rectifier

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