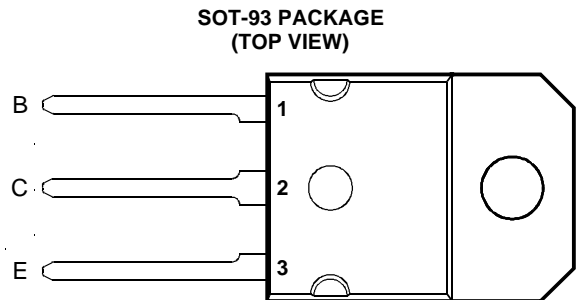


# BUV47, BUV47A NPN SILICON POWER TRANSISTORS

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- Rugged Triple-Diffused Planar Construction
- 9 A Continuous Collector Current
- 1000 Volt Blocking Capability



Pin 2 is in electrical contact with the mounting base.

MDTRAA

## absolute maximum ratings at 25°C case temperature (unless otherwise noted)

RATING		SYMBOL	VALUE	UNIT
Collector-emitter voltage ( $V_{BE} = -2.5 \text{ V}$ )	BUV47	$V_{CEX}$	850	V
	BUV47A		1000	
Collector-emitter voltage ( $R_{BE} = 10 \Omega$ )	BUV47	$V_{CER}$	850	V
	BUV47A		1000	
Collector-emitter voltage ( $I_B = 0$ )	BUV47	$V_{CEO}$	400	V
	BUV47A		450	
Continuous collector current		$I_C$	9	A
Peak collector current (see Note 1)		$I_{CM}$	15	A
Continuous base current		$I_B$	3	A
Peak base current		$I_{BM}$	6	A
Continuous device dissipation at (or below) 25°C case temperature		$P_{tot}$	120	W
Operating junction temperature range		$T_j$	-65 to +150	°C
Storage temperature range		$T_{stg}$	-65 to +150	°C

NOTE 1: This value applies for  $t_p \leq 5 \text{ ms}$ , duty cycle  $\leq 2\%$ .

## PRODUCT INFORMATION

Information is current as of publication date. Products conform to specifications in accordance with the terms of Power Innovations standard warranty. Production processing does not necessarily include testing of all parameters.



# BUV47, BUV47A

## NPN SILICON POWER TRANSISTORS

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### electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{CE(sus)}$ Collector-emitter sustaining voltage	$I_C = 200 \text{ mA}$ $L = 25 \text{ mH}$ (see Note 2) BUV47 BUV47A	400 450			V
$V_{(BR)EBO}$ Base-emitter breakdown voltage	$I_E = 50 \text{ mA}$ $I_C = 0$ (see Note 3)	7		30	V
$I_{CES}$ Collector-emitter cut-off current	$V_{CE} = 850 \text{ V}$ $V_{BE} = 0$ BUV47			0.15	mA
	$V_{CE} = 1000 \text{ V}$ $V_{BE} = 0$ BUV47A			0.15	
	$V_{CE} = 850 \text{ V}$ $V_{BE} = 0$ $T_C = 125^\circ\text{C}$ BUV47			1.5	
	$V_{CE} = 1000 \text{ V}$ $V_{BE} = 0$ $T_C = 125^\circ\text{C}$ BUV47A			1.5	
$I_{CER}$ Collector-emitter cut-off current	$V_{CE} = 850 \text{ V}$ $R_{BE} = 10 \Omega$ BUV47			0.4	mA
	$V_{CE} = 1000 \text{ V}$ $R_{BE} = 10 \Omega$ BUV47A			0.4	
	$V_{CE} = 850 \text{ V}$ $R_{BE} = 10 \Omega$ $T_C = 125^\circ\text{C}$ BUV47			3.0	
	$V_{CE} = 1000 \text{ V}$ $R_{BE} = 10 \Omega$ $T_C = 125^\circ\text{C}$ BUV47A			3.0	
$I_{EBO}$ Emitter cut-off current	$V_{EB} = 5 \text{ V}$ $I_C = 0$			1	mA
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 1 \text{ A}$ $I_C = 5 \text{ A}$ (see Notes 3 and 4)			1.5	V
	$I_B = 2.5 \text{ A}$ $I_C = 8 \text{ A}$			3.0	
$V_{BE(sat)}$ Base-emitter saturation voltage	$I_B = 1 \text{ A}$ $I_C = 5 \text{ A}$ (see Notes 3 and 4)			1.6	V
$f_t$ Current gain bandwidth product	$V_{CE} = 10 \text{ V}$ $I_C = 0.5 \text{ A}$ $f = 1 \text{ MHz}$		8		MHz
$C_{ob}$ Output capacitance	$V_{CB} = 20 \text{ V}$ $I_C = 0$ $f = 0.1 \text{ MHz}$		105		pF

NOTES: 2. Inductive loop switching measurement.

3. These parameters must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

4. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

### thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$ Junction to case thermal resistance			1	$^\circ\text{C/W}$

### resistive-load-switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS <sup>†</sup>	MIN	TYP	MAX	UNIT
$t_{on}$ Turn on time	$I_C = 5 \text{ A}$ $I_{B(on)} = 1 \text{ A}$ $I_{B(off)} = -1 \text{ A}$ $V_{CC} = 150 \text{ V}$ (see Figures 1 and 2)			1.0	$\mu\text{s}$
$t_s$ Storage time				3.0	$\mu\text{s}$
$t_f$ Fall time				0.8	$\mu\text{s}$

<sup>†</sup> Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

### inductive-load-switching characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS <sup>†</sup>	MIN	TYP	MAX	UNIT
$t_{sv}$ Voltage storage time	$I_C = 5 \text{ A}$ $I_{B(on)} = 1 \text{ A}$ $V_{BE(off)} = -5 \text{ V}$ $T_C = 100^\circ\text{C}$ (see Figures 3 and 4)			4.0	$\mu\text{s}$
$t_{fi}$ Current fall time				0.4	$\mu\text{s}$

## PRODUCT INFORMATION

$t_p = 20 \mu s$   
 Duty cycle = 1%  
 $V_1 = 15 V$ , Source Impedance =  $50 \Omega$

$A - B = t_d$   
 $B - C = t_r$   
 $E - F = t_f$   
 $D - E = t_s$   
 $A - C = t_{on}$   
 $D - F = t_{off}$

$I_C$   
 C 90% 90% E  
 B 10% 10% F 0%

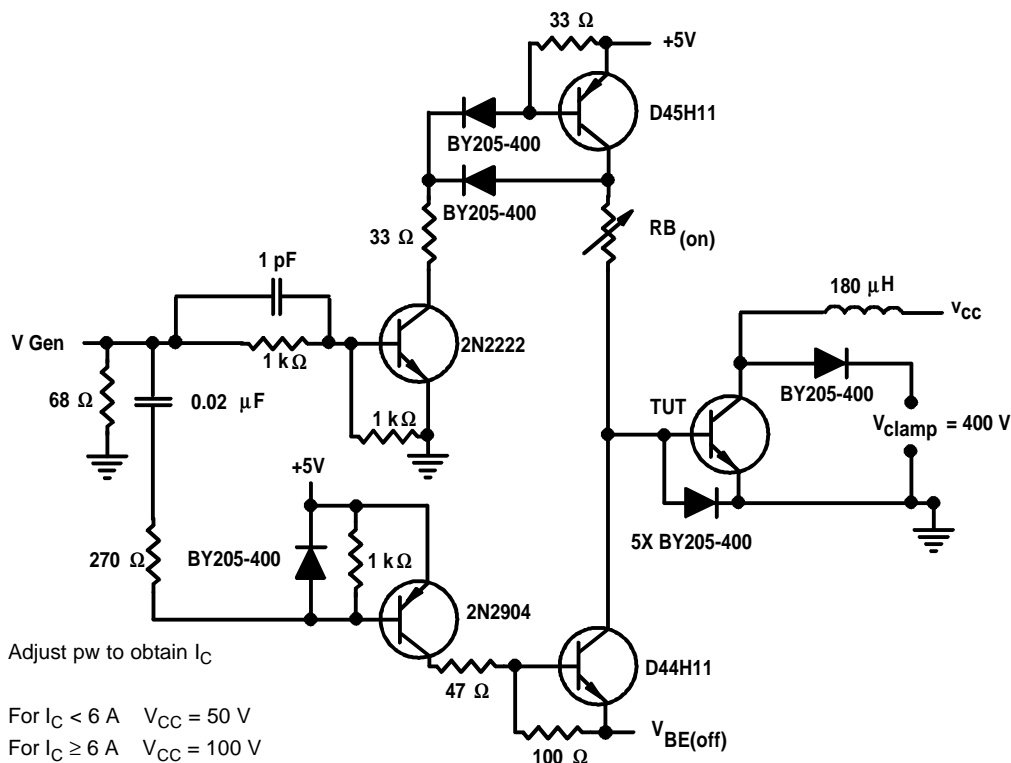
$I_B$   
 D 90%  
 A 10% 0%  
 $\frac{dI_B}{dt} \geq 2 \text{ A}/\mu\text{s}$   
 $I_{B(on)}$   
 $I_{B(off)}$

## PRODUCT INFORMATION

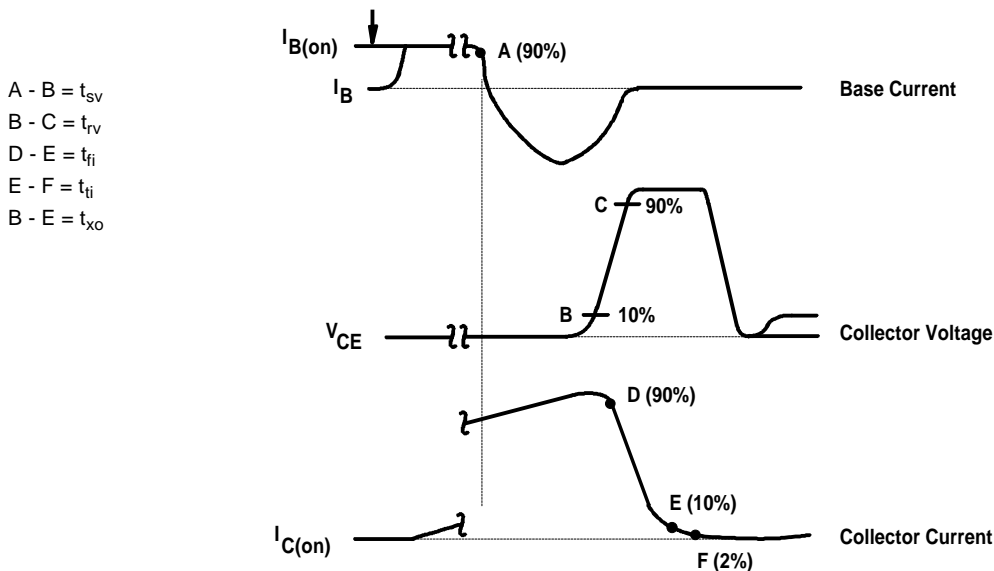
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## PARAMETER MEASUREMENT INFORMATION



### Figure 3. Inductive-Load Switching Test Circuit



NOTES: A. Waveforms are monitored on an oscilloscope with the following characteristics:  $t_r < 15 \text{ ns}$ ,  $R_{in} > 10 \text{ }\Omega$ ,  $C_{in} < 11.5 \text{ pF}$ .  
B. Resistors must be noninductive types.

### Figure 4. Inductive-Load Switching Waveforms

## PRODUCT INFORMATION

## TYPICAL CHARACTERISTICS

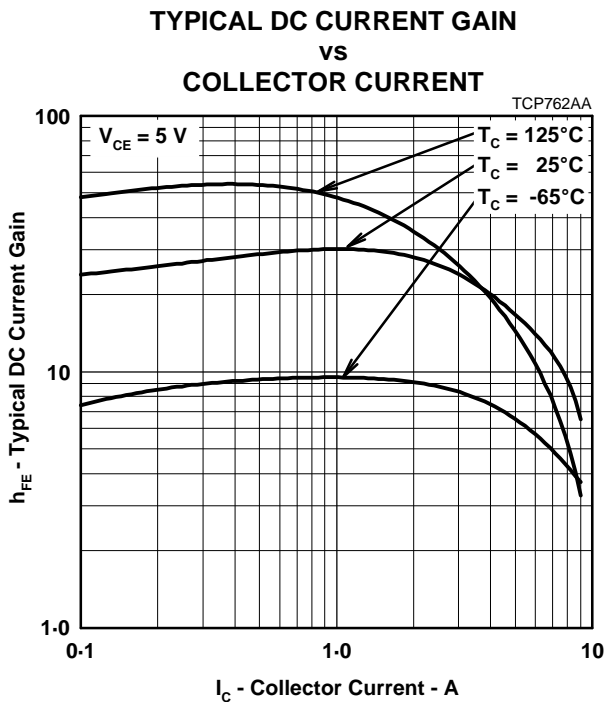


Figure 5.

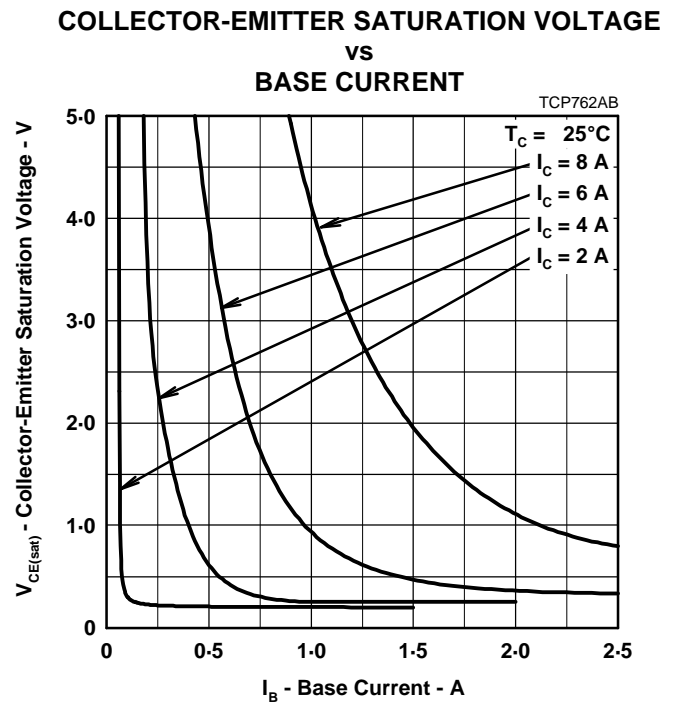


Figure 6.

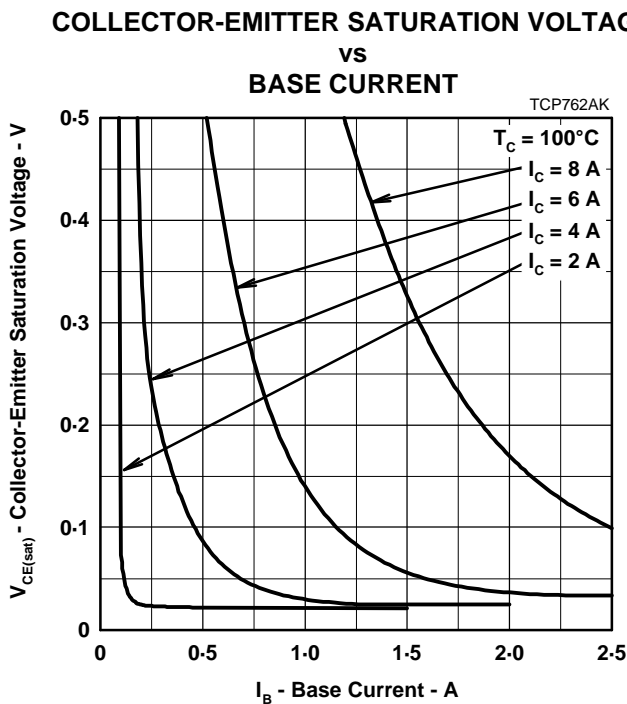


Figure 7.

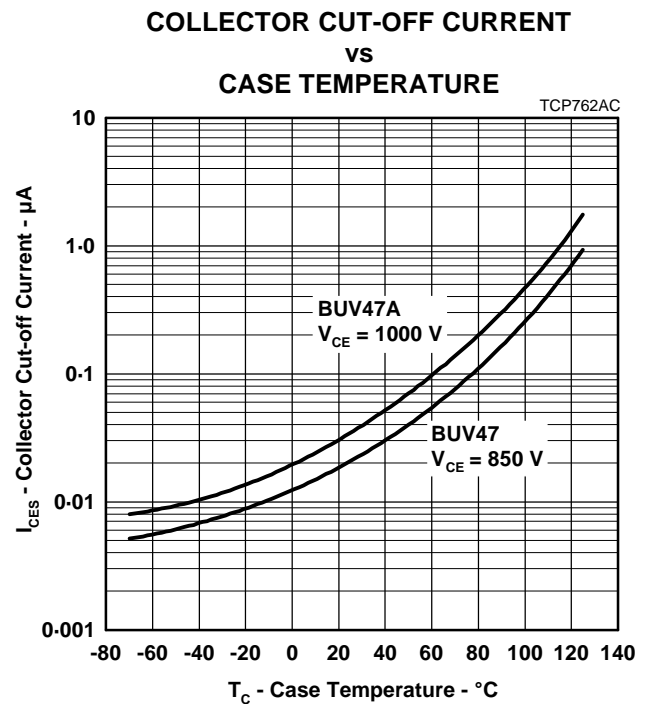


Figure 8.

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## MAXIMUM FORWARD-BIAS SAFE OPERATING AREA



## THERMAL RESPONSE JUNCTION TO CASE VS POWER PULSE DURATION



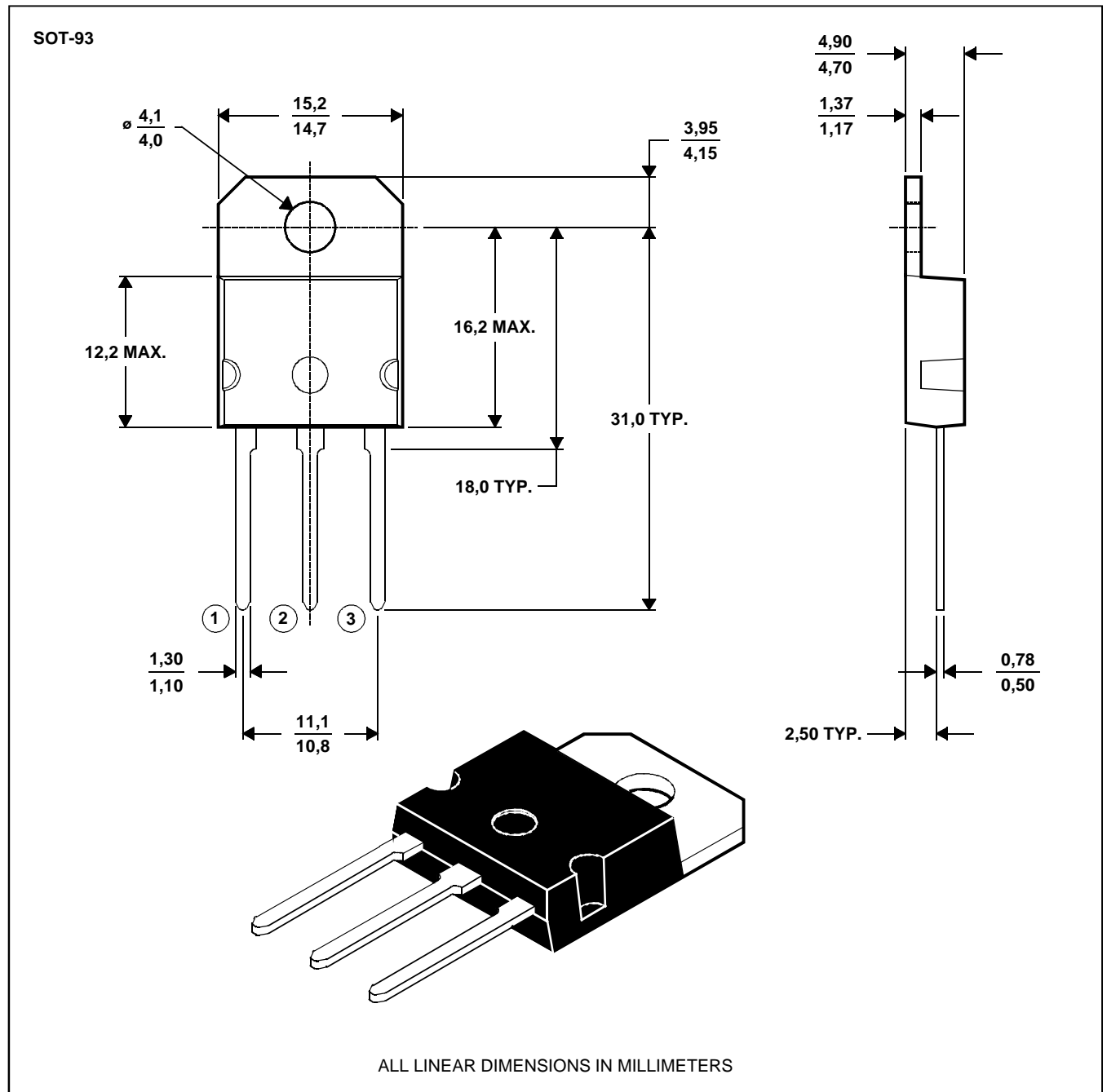
## 6

## MECHANICAL DATA

### SOT-93

#### 3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTE A: The centre pin is in electrical contact with the mounting tab.

MDXXAW

# BUV47, BUV47A

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