

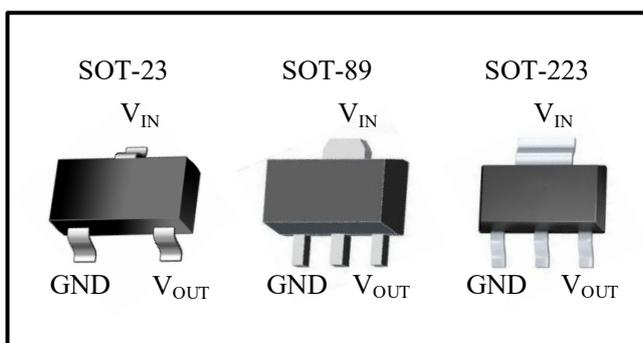
180V MOSvp[®] Voltage Regulator / Overvoltage Protector
General Features

- Typical Output Voltage: 24V @ I_{OUT}=1mA
- Wide Input Voltage Range: 0 to 180V
- High-speed Transient Response
- Excellent Temperature Characteristics
- High Reliability
- RoHS Compliant
- Halogen-free Available

V _{IN}	R _{ON(Typ.)}	V _{OUT(Typ.)}
180V	7 Ω	24V

Applications

- Industrial Control
- Automotive
- Domestic Appliances
- Photovoltaic
- Overvoltage Protection
- Overcurrent Protection
- Voltage Source
- Current Source


Ordering Information

Part Number	Package	Marking	Remark
AKZ25V15R	SOT-23	25V15R	Halogen Free
AKX25V15R	SOT-89	25V15R	Halogen Free
AKS25V15R	SOT-223	25V15R	Halogen Free

Absolute Maximum Ratings
T_A =25°C unless otherwise specified

Symbol	Parameter	AKZ25V15R	AKX25V15R	AKS25V15R	Unit
V _{IN}	Input Voltage to GND ^[1]	180			V
I _{OUT}	Continuous V _{OUT} Current ^[1]	30	50	70	mA
P _D	Power Dissipation	0.5	1.0	1.5	W
T _L	Soldering Temperature Distance of 1.6mm from case for 10s	300			°C
T _J & T _{STG}	Operating and Storage Temperature Range	-55 to 150			

Warning: Stresses exceeding the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	AKZ25V15R	AKX25V15R	AKS25V15R	Unit
R _{0JA}	Thermal Resistance, Junction-to-Ambient	250	125	83	K/W

Typical Application Circuits

The AKZ25V15R/AKX25V15R/AKS25V15R series are high-voltage integrated regulators (HVIR) developed by ARK using MOSovp® technology. This series of products integrates temperature compensation design, with excellent temperature characteristics; The internal integrated N-channel depletion MOSFET has extremely fast response speed, which can effectively suppress circuit surges and transient interference, reduce output voltage ripple, ensure stable output voltage, and only have very low static current.

AKZ25V15R/AKX25V15R/AKS25V15R series products have internal integrated depletion mode MOSFET, with fast response speed, that can effectively suppress circuit surge and transient disturbance, and provide reliable over-voltage protection for load circuit. Typical application circuit is shown in Figure 1:

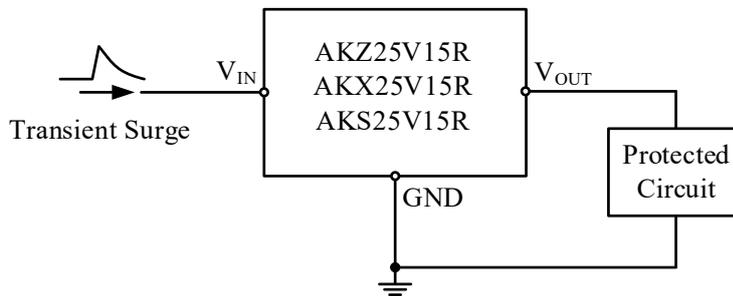


Figure 1. Typical application schemes of HVIR series products for overvoltage protection

This series of products can withstand voltage up to 180V, which is very suitable for the application of input power supply with a wide voltage range. It can be directly used as a regulator to convert high voltage into stable low voltage, and supply power to MCU and other loads. Typical application circuit schemes and circuit voltage regulation parameters are shown in fig. 2 and fig. 3:

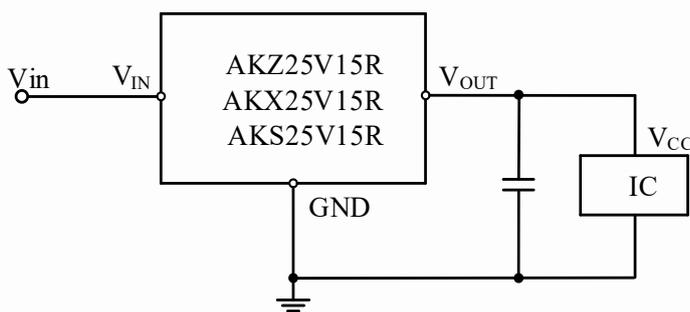


Figure 2. Typical application scheme for stabilizing power supply

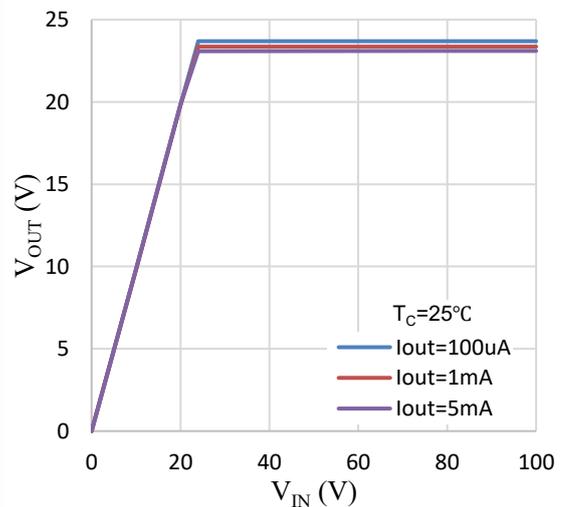


Figure 3. Circuit test results

In QC2.0/3.0 and Type-C/PD charger circuits, the AKZ25V15R/AKX25V15R/AKS25V15R is used as a high-voltage linear regulator to supply power to the PWM IC, and its allowable input voltage is up to 180V, which effectively simplifies the circuit. In addition, the typical output voltage can reach 24V@ $I_{OUT}=1mA$, which reduces its own power consumption, realizes the balanced power distribution between itself and PWM IC, and is conducive to optimizing the thermal management of the system. The typical application circuit is shown in Figure 4:

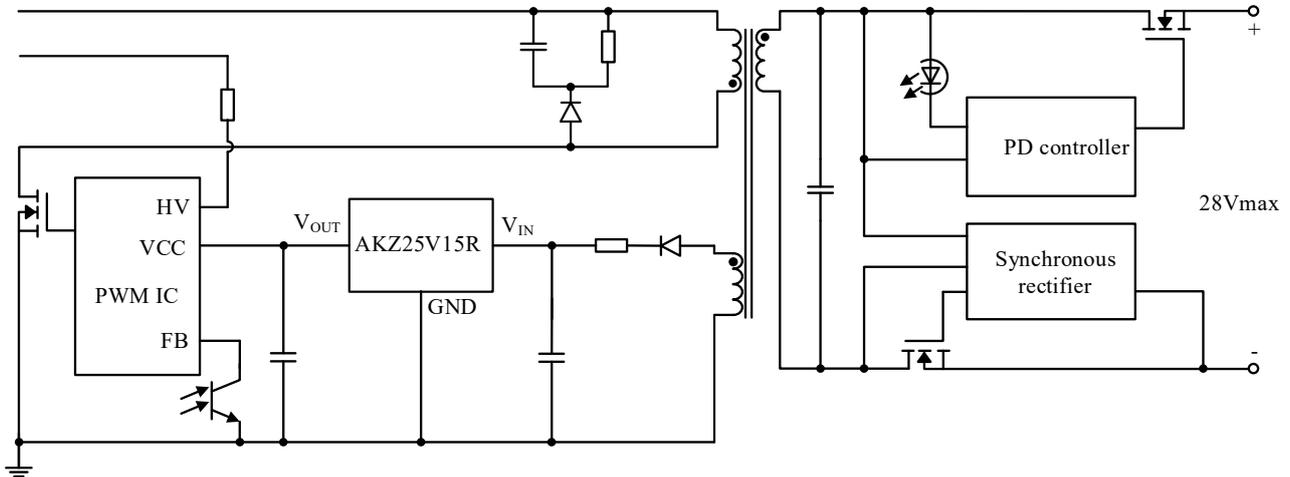


Figure 4. A typical application scheme for AKZ25V15R to supply power for PWM IC

Electrical Characteristics
 $T_A = 25^\circ\text{C}$ unless otherwise specified

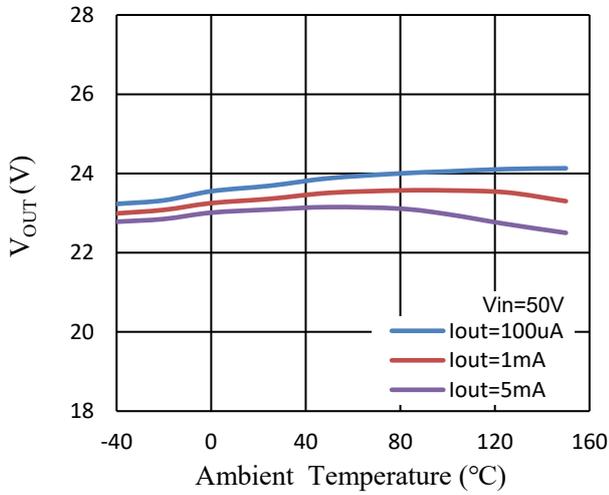
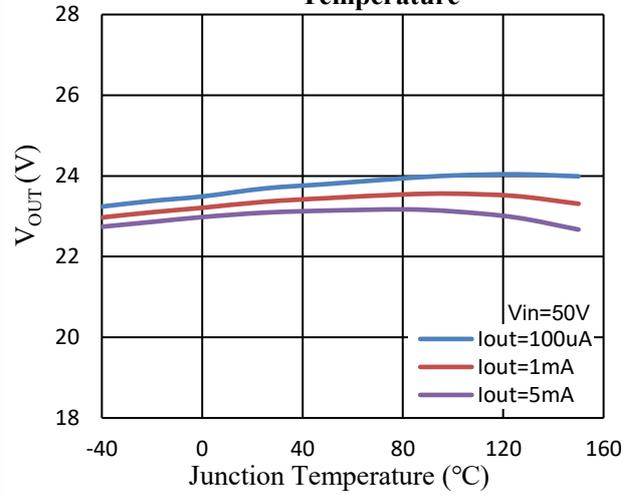
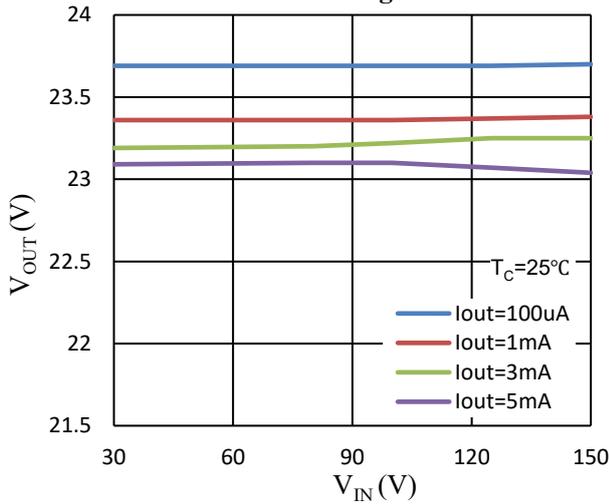
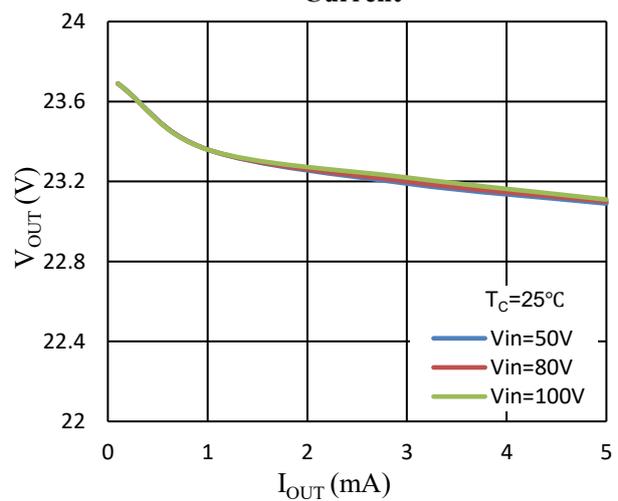
Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{IN}	Input Voltage to GND	--	--	180	V	$T_J = -40^\circ\text{C}$ to $+150^\circ\text{C}$
V_{OUT}	Output Voltage($V_{IN} < V_{CLAMP}$) ^[2]	--	V_{IN}	--	V	$T_J = -40^\circ\text{C}$ to $+150^\circ\text{C}$
	Output Voltage($V_{IN} > V_{OUT}$)	--	--	28	V	$V_{IN} = 30$ to 180 V, $I_{OUT} = 0$ μA
		--	24.5	--	V	$V_{IN} = 30$ to 180 V, $I_{OUT} = 10$ to 100 μA
		--	24	--	V	$V_{IN} = 30$ to 180 V, $I_{OUT} = 0.1$ to 1 mA
		20	23.5	--	V	$V_{IN} = 30$ to 60 V, $I_{OUT} = 3$ to 10 mA
R_{ON}	Static On-state Resistance ^[3]	--	7	25	Ω	$V_{OUT} = V_{GND}$ $I_{OUT} = 100\text{mA}$
I_{GND}	Quiescent Current	--	--	20	μA	$V_{IN} = 10$ to 180 V, $I_{OUT} = 0$ mA

NOTE:

[1] Cannot exceed the Power Dissipation of the device.

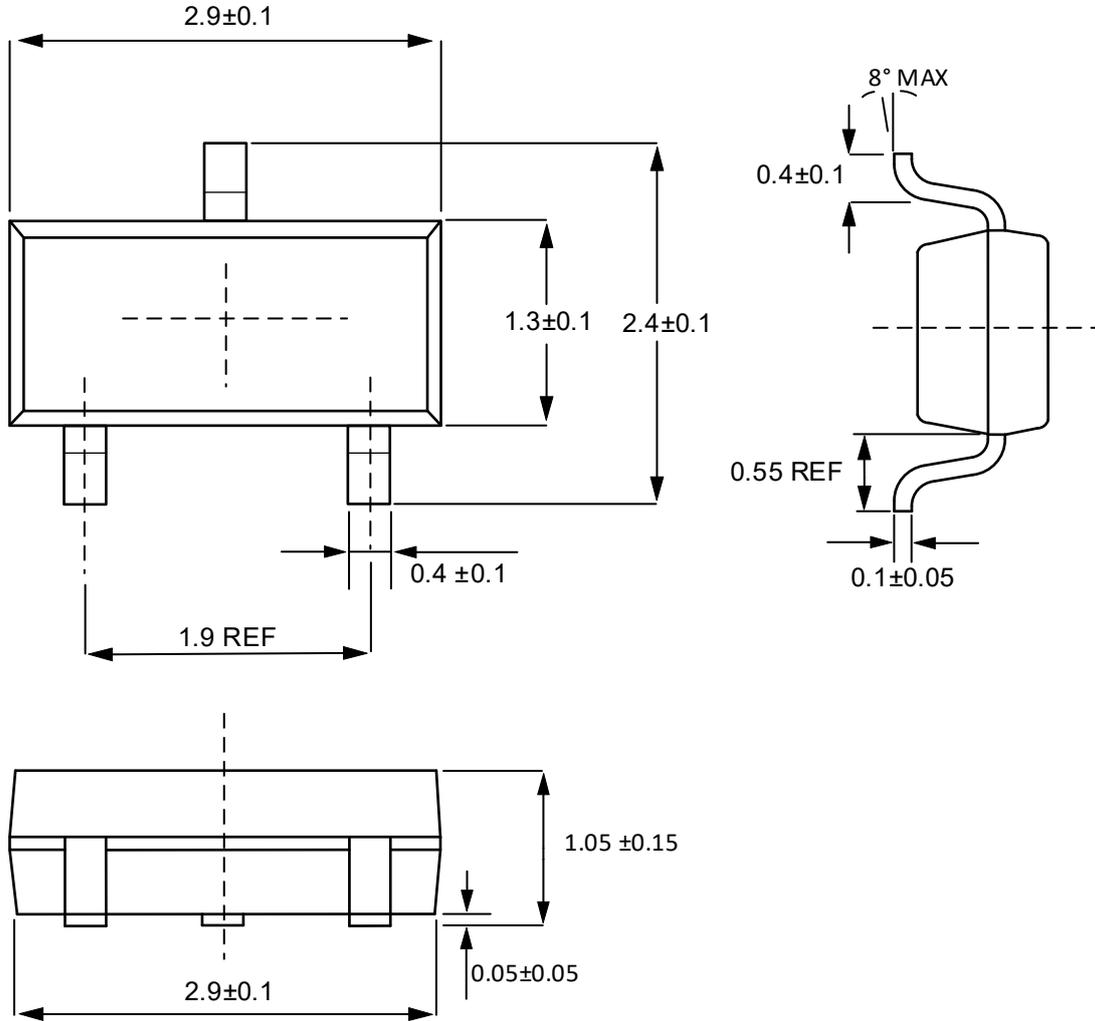
[2] The input voltage is lower than the clamp voltage value, the internal depletion MOSFET operate in a linear resistance region, and the output voltage is approximately equal to the input voltage value.

[3] Pulse width $\leq 380\mu\text{s}$, duty cycle $\leq 2\%$.

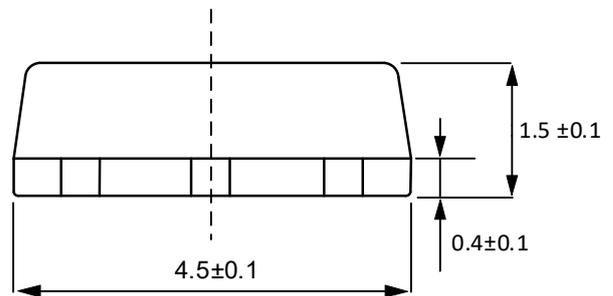
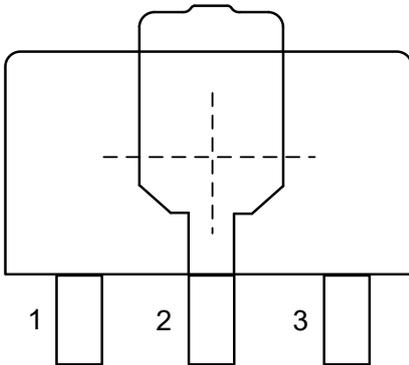
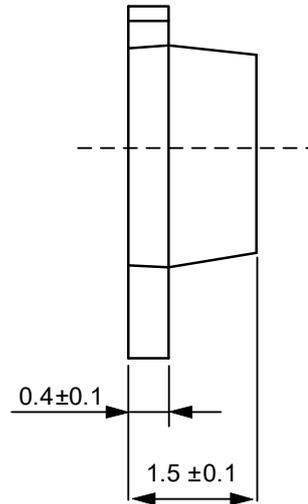
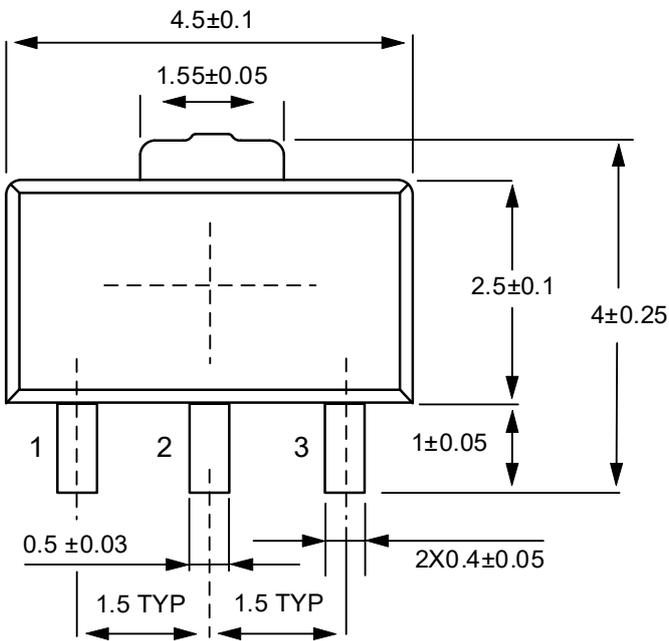
Typical Characteristics
Figure 5. Output Voltage vs. Ambient Temperature

Figure 6. Output Voltage vs. Junction Temperature

Figure 7. Output Voltage vs. Input Voltage

Figure 8. Output Voltage vs. Load Current


Package Dimensions

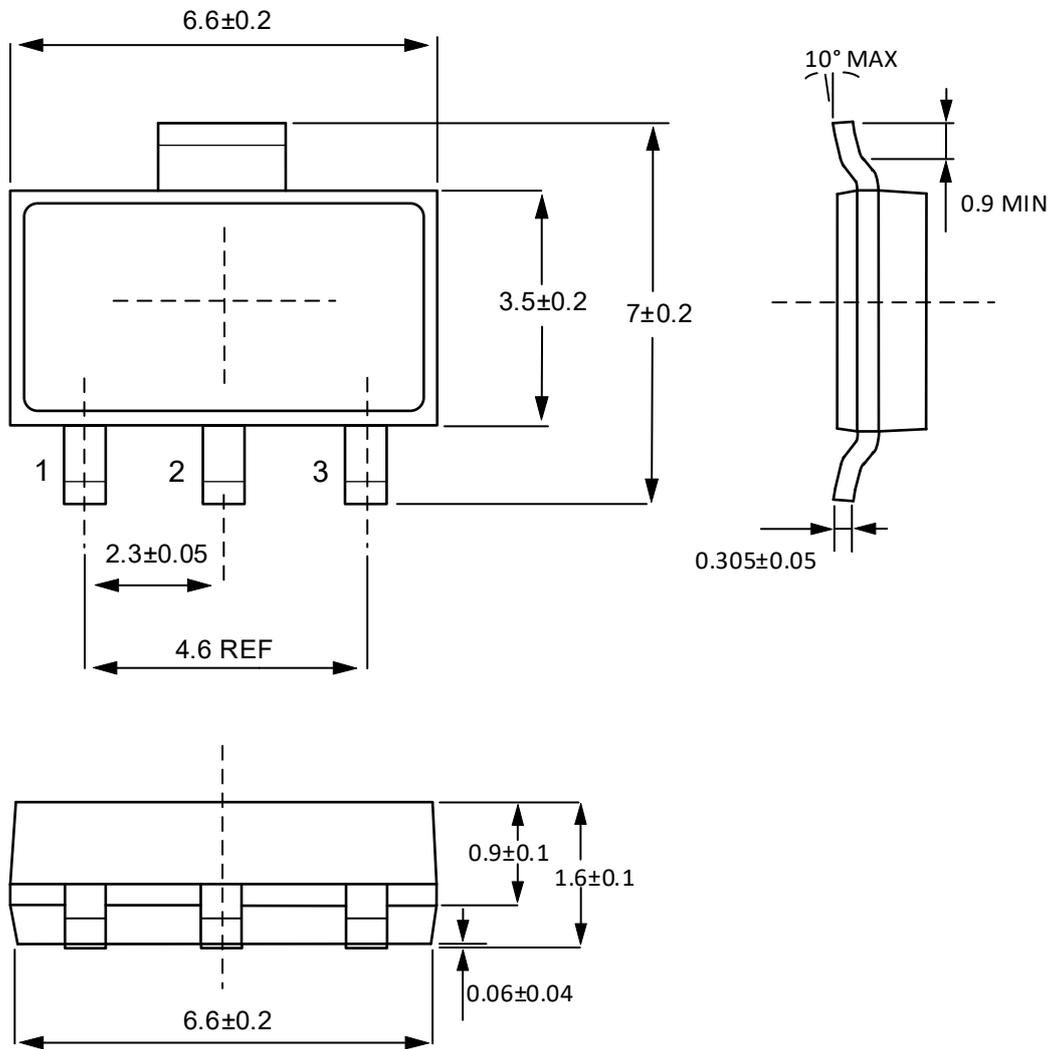
SOT-23



SOT-89



SOT-223





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 - a. Cause the failure of the life support device or system, or
 - b. Affect its safety or effectiveness.
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