

DUAL P-CHANNEL 60V ENHANCEMENT MODE MOSFET

Product Summary

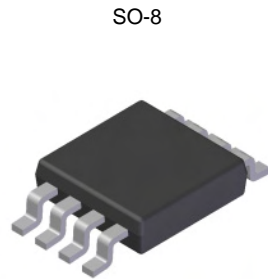
$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D $T_A = 25^\circ\text{C}$ (Notes 7 & 9)
-60V	125m Ω @ $V_{GS} = -10\text{V}$	-3.4A
	190m Ω @ $V_{GS} = -4.5\text{V}$	-2.8A

Description

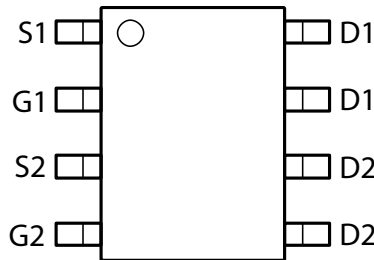
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power Management functions
- Disconnect Switches
- Motor control



Top View



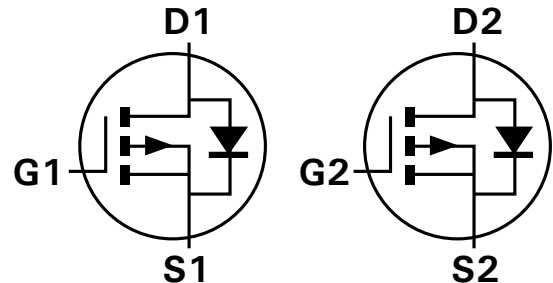
Top View

Features

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



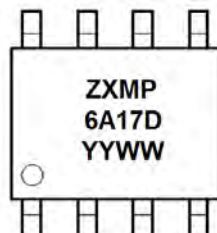
Equivalent Circuit

Ordering Information (Notes 4 & 5)

Product	Grade	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP6A17DN8TA	AEC-Q101	ZXMP6A17D	7	12	500
ZXMP6A17DN8QTA	Automotive	ZXMP6A17D	7	12	500

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen and Antimony free, "Green" and Lead-Free.
 3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com>

Marking Information



ZXMP6A17D = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 11 = 2011)
WW = Week (01 - 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

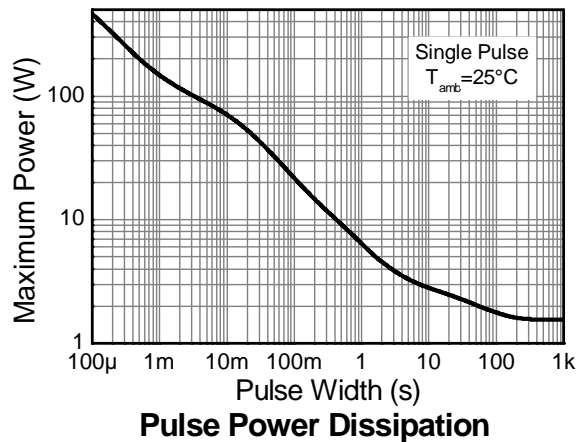
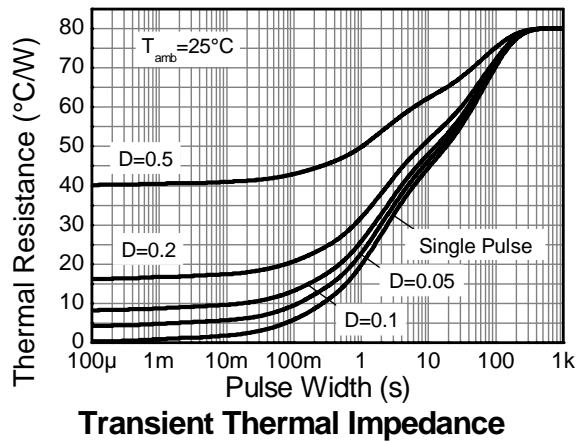
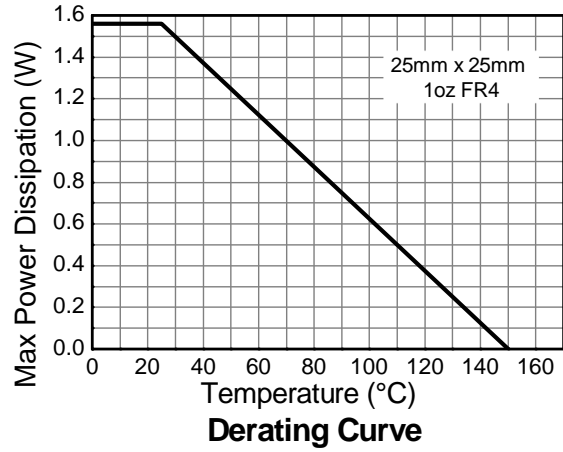
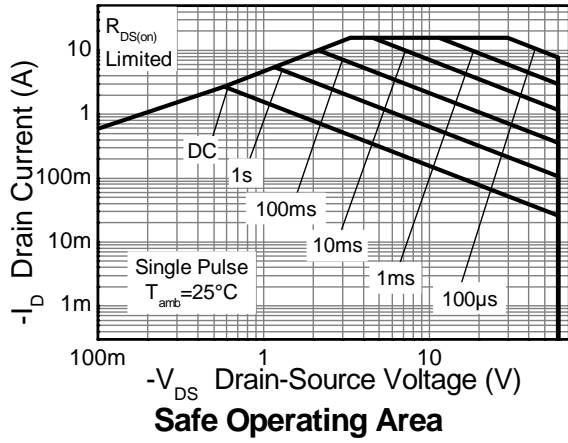
Characteristic		Symbol	Value	Unit	
Drain-Source voltage		V _{DSS}	-60	V	
Gate-Source voltage		V _{GS}	±20	V	
Continuous Drain current	V _{GS} = 10V	I _D	(Notes 7 & 9)	-3.42	A
			T _A = 70°C (Notes 7 & 9)	-2.73	
			(Notes 6 & 9)	-2.7	
Pulsed Drain current		I _{DM}	-15.6	A	
Continuous Source current (Body diode)		I _S	-3.4	A	
Pulsed Source current (Body diode)		I _{SM}	-15.6	A	

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Notes 6 & 9)	P _D	1.25	W mW/°C
	(Notes 6 & 10)		10.0	
	(Notes 7 & 9)		1.81	
			14.5	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	R _{θJA}	2.15	°C/W
	(Notes 6 & 10)		17	
	(Notes 7 & 9)		100	
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	R _{θJL}	70	°C/W
			60	
Operating and storage temperature range		T _J , T _{STG}	-55 to 150	°C

- Notes:
6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 7. Same as note (6), except the device is measured at t ≤ 10 sec.
 8. Same as note (6), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
 9. For a dual device with one active die.
 10. For a device with two active die running at equal power.
 11. Thermal resistance from junction to solder-point.

Thermal Characteristics

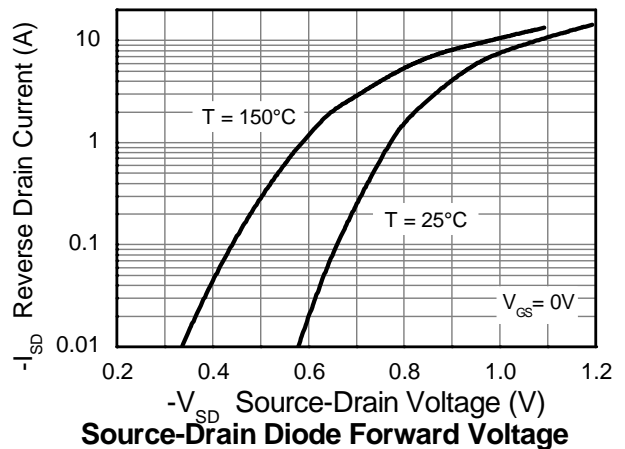
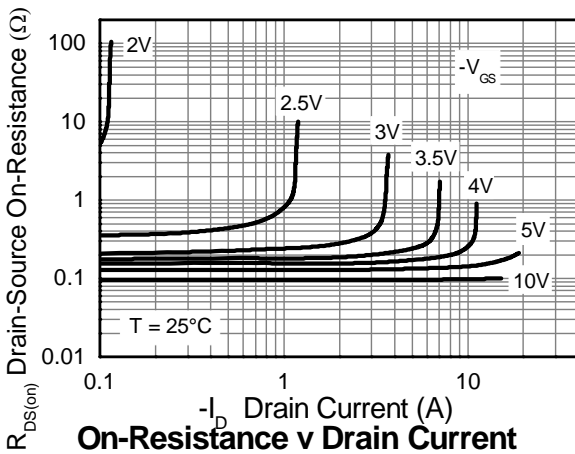
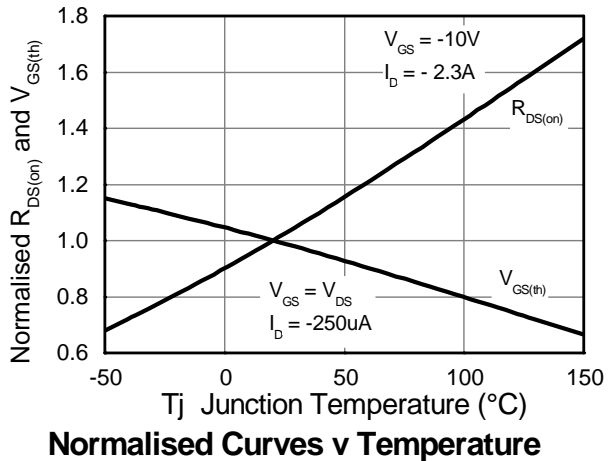
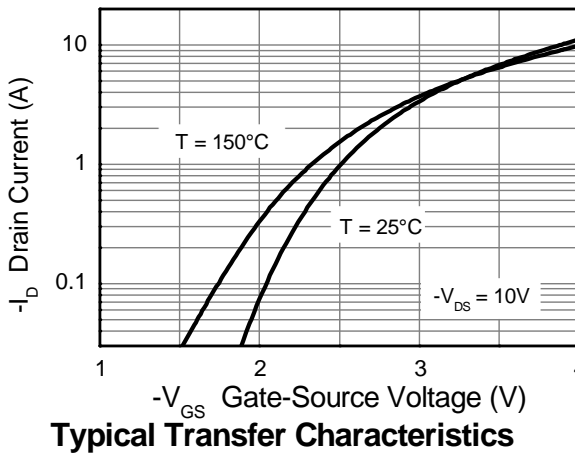
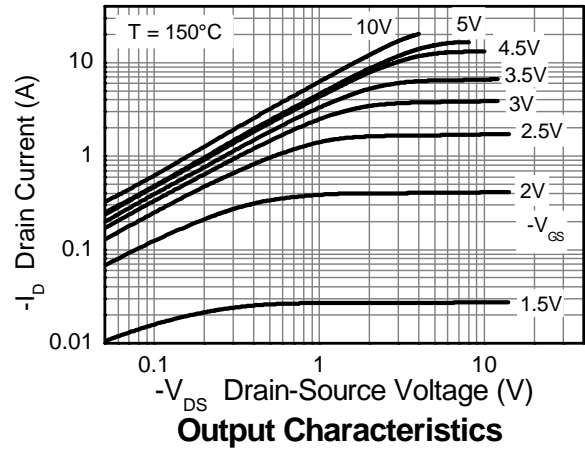
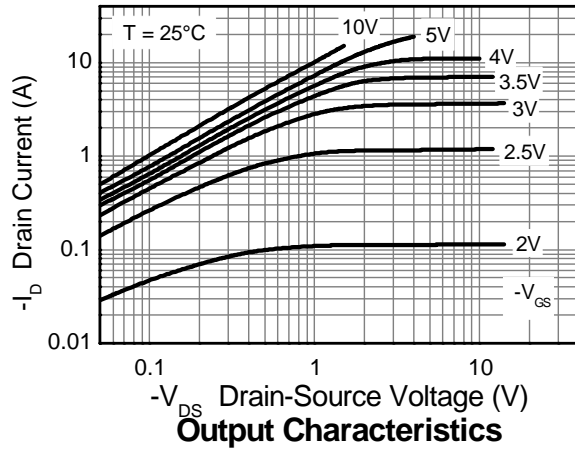


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

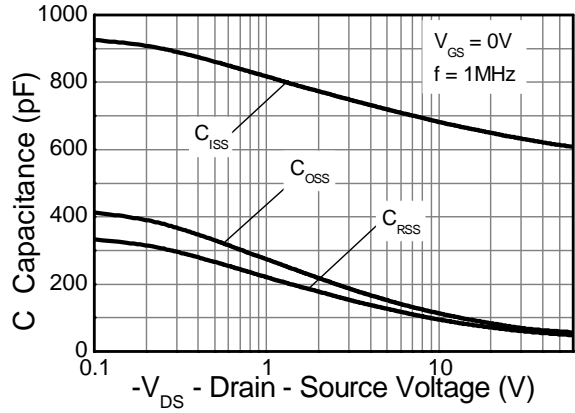
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 12)	$R_{DS(on)}$	—	—	0.125	Ω	$V_{GS} = -10\text{V}$, $I_D = -2.3\text{A}$ $V_{GS} = -4.5\text{V}$, $I_D = -1.9\text{A}$
				0.190		
Forward Transconductance (Notes 12 & 13)	g_{fs}	—	4.7	—	S	$V_{DS} = -15\text{V}$, $I_D = -2.3\text{A}$
Diode Forward Voltage (Note 12)	V_{SD}	—	-0.85	-0.95	V	$I_S = -2.0\text{A}$, $V_{GS} = 0\text{V}$
Reverse recovery time (Note 13)	t_{rr}	—	25.1	—	ns	$I_S = -1.7\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (Note 13)	Q_{rr}	—	27.2	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C_{iss}	—	637	—	pF	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	70	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	53	—	pF	
Total Gate Charge (Note 14)	Q_g	—	9.0	—	nC	$V_{GS} = -4.5\text{V}$
Total Gate Charge (Note 14)	Q_g	—	17.7	—	nC	
Gate-Source Charge (Note 14)	Q_{gs}	—	1.6	—	nC	$V_{GS} = -10\text{V}$
Gate-Drain Charge (Note 14)	Q_{gd}	—	4.4	—	nC	
Turn-On Delay Time (Note 14)	$t_{D(on)}$	—	2.6	—	ns	$V_{DD} = -30\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$, $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 14)	t_r	—	3.4	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(off)}$	—	26.2	—	ns	
Turn-Off Fall Time (Note 14)	t_f	—	11.3	—	ns	

- Notes:
12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$
 13. For design aid only, not subject to production testing.
 14. Switching characteristics are independent of operating junction temperatures.

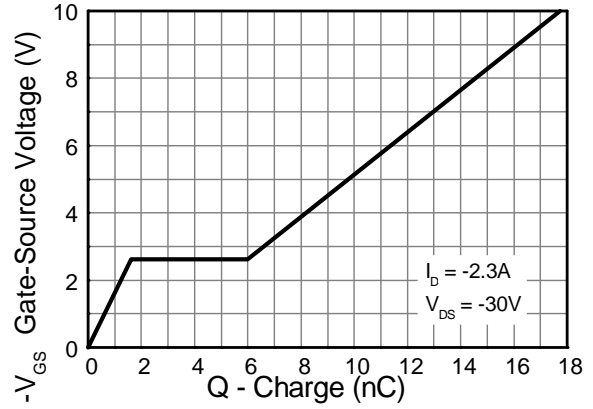
Typical Characteristics



Typical Characteristics - continued

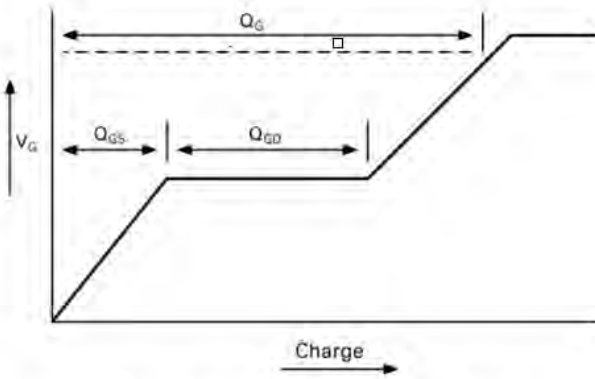


Capacitance v Drain-Source Voltage

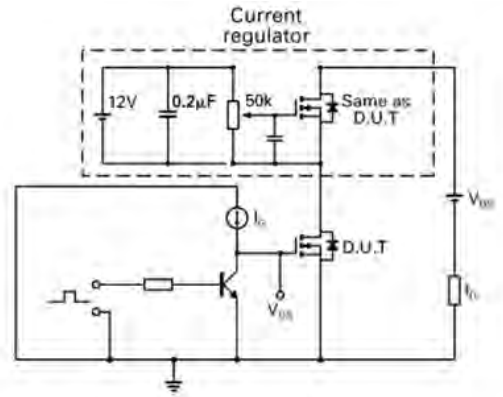


Gate-Source Voltage v Gate Charge

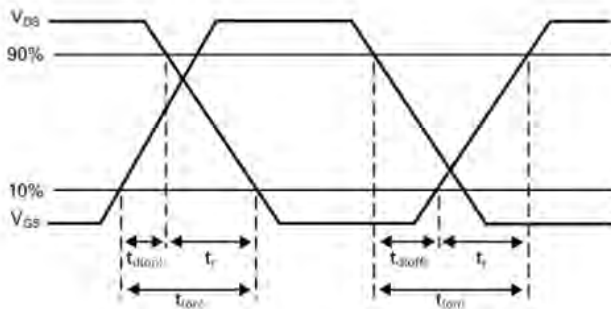
Test Circuits



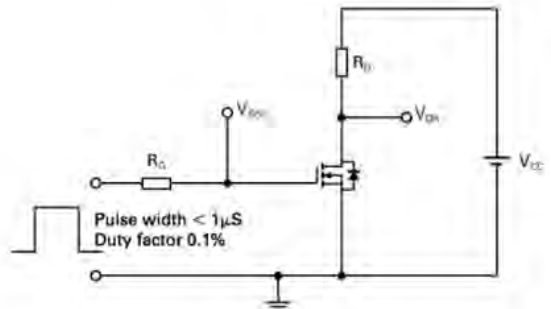
Basic gate charge waveform



Gate charge test circuit



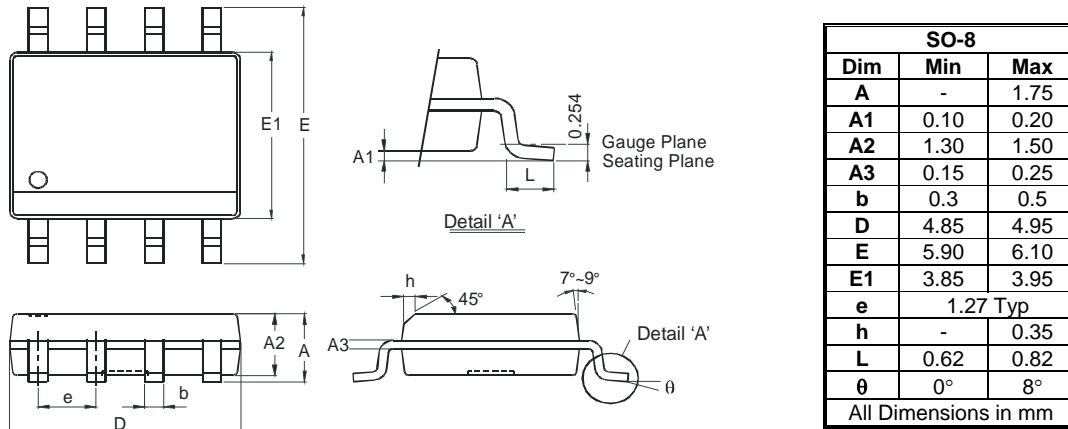
Switching time waveforms



Switching time test circuit

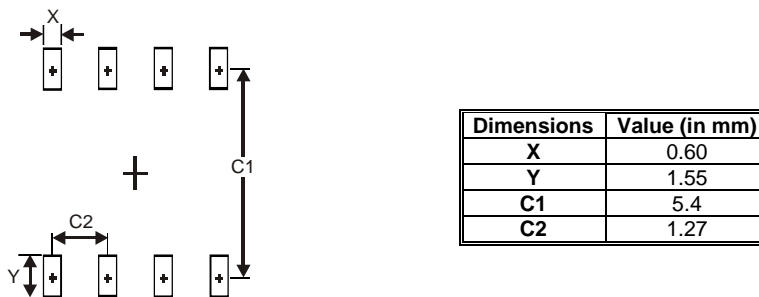
Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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