

# TL431ACZ

Three terminal adjustable shunt regulator in plastic package TO-92

Attribute	Value	UOM
Configuration	Adjustable Shunt	
Package	TO-92	
$V_{KA \text{ max}}$	37	V
$I_K \text{ max}$	-100 ÷ +150	mA
$I_{\text{ref max}}$	-0.05 ÷ +10	mA
$T_A \text{ max}$	-10 ÷ +70	°C
Reference input voltage	min	2.475 V
	typ	2.500 V
	max	2.525 V
	@ $I_K$	10 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.4 mV/V
	max	-2.7 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$10 \div V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.0 mV/V
	max	-2.0 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$36 \div 10$ V
Reference input current range	$I_{\text{ref typ}}$	2 $\mu$ A
	$I_{\text{ref max}}$	4 $\mu$ A
	@ $I_K$	10 mA
	@ $R_1$	10 k $\Omega$
	@ $R_2$	$\infty$ k $\Omega$
Minimum cathode current for regulation	$I_{\text{MIN typ}}$	0.4 mA
	$I_{\text{MIN max}}$	1.0 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Off-state cathode current	$I_{\text{OFF typ}}$	0.1 $\mu$ A
	$I_{\text{OFF max}}$	1.0 $\mu$ A
	@ $V_{KA}$	36 V
	@ $V_{\text{ref}}$	0 V
Dynamic impedance	$ Z_{KA} _{\text{typ}}$	0.2 $\Omega$
	$ Z_{KA} _{\text{max}}$	0.5 $\Omega$
	@ $I_K$	1 ÷ 100 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
	@f	$\leq 1$ kHz

## TL431CZ

Three terminal adjustable shunt regulator in plastic package TO-92

Attribute	Value	UOM
Configuration	Adjustable Shunt	
Package	TO-92	
$V_{KA \text{ max}}$	37	V
$I_K \text{ max}$	-100 ÷ +150	mA
$I_{\text{ref max}}$	-0.05 ÷ +10	mA
$T_A \text{ max}$	-10 ÷ +70	°C
Reference input voltage	min	2.47 V
	typ	2.495 V
	max	2.52 V
	@ $I_K$	10 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.4 mV/V
	max	-2.7 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$10 \div V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.0 mV/V
	max	-2.0 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$36 \div 10$ V
Reference input current range	$I_{\text{ref typ}}$	2 $\mu$ A
	$I_{\text{ref max}}$	4 $\mu$ A
	@ $I_K$	10 mA
	@ $R_1$	10 k $\Omega$
	@ $R_2$	$\infty$ k $\Omega$
Minimum cathode current for regulation	$I_{\text{MIN typ}}$	0.4 mA
	$I_{\text{MIN max}}$	1.0 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Off-state cathode current	$I_{\text{OFF typ}}$	0.1 $\mu$ A
	$I_{\text{OFF max}}$	1.0 $\mu$ A
	@ $V_{KA}$	36 V
	@ $V_{\text{ref}}$	0 V
Dynamic impedance	$ Z_{KA} _{\text{typ}}$	0.2 $\Omega$
	$ Z_{KA} _{\text{max}}$	0.5 $\Omega$
	@ $I_K$	1 ÷ 100 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
	@ f	$\leq 1$ kHz

## TL431ACF

Three terminal adjustable shunt regulator in plastic package SOT89

Attribute	Value	UOM
Configuration	Adjustable Shunt	
Package	SOT89	
$V_{KA\ max}$	37	V
$I_K\ max$	-100 ÷ +150	mA
$I_{ref\ max}$	-0.05 ÷ +10	mA
$T_A\ max$	-10 ÷ +70	°C
Reference input voltage	min	2.475 V
	typ	2.500 V
	max	2.525 V
	@ $I_K$	10 mA
	@ $V_{KA}$	$V_{ref}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.4 mV/V
	max	-2.7 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$10 \div V_{ref}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.0 mV/V
	max	-2.0 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$36 \div 10$ V
Reference input current range	$I_{ref\ typ}$	2 $\mu$ A
	$I_{ref\ max}$	4 $\mu$ A
	@ $I_K$	10 mA
	@ $R_1$	10 k $\Omega$
	@ $R_2$	$\infty$ k $\Omega$
Minimum cathode current for regulation	$I_{MIN\ typ}$	0.4 mA
	$I_{MIN\ max}$	1.0 mA
	@ $V_{KA}$	$V_{ref}$ V
Off-state cathode current	$I_{OFF\ typ}$	0.1 $\mu$ A
	$I_{OFF\ max}$	1.0 $\mu$ A
	@ $V_{KA}$	36 V
	@ $V_{ref}$	0 V
Dynamic impedance	$ Z_{KA} _{typ}$	0.2 $\Omega$
	$ Z_{KA} _{max}$	0.5 $\Omega$
	@ $I_K$	1 ÷ 100 mA
	@ $V_{KA}$	$V_{ref}$ V
	@ f	$\leq 1$ kHz

## TL431CF

Three terminal adjustable shunt regulator in plastic package SOT89

Attribute	Value	UOM
Configuration	Adjustable Shunt	
Package	SOT89	
$V_{KA \text{ max}}$	37	V
$I_K \text{ max}$	-100 ÷ +150	mA
$I_{\text{ref max}}$	-0.05 ÷ +10	mA
$T_A \text{ max}$	-10 ÷ +70	°C
Reference input voltage	min	2.47 V
	typ	2.495 V
	max	2.52 V
	@ $I_K$	10 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.4 mV/V
	max	-2.7 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$10 \div V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.0 mV/V
	max	-2.0 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$36 \div 10$ V
Reference input current range	$I_{\text{ref typ}}$	2 $\mu$ A
	$I_{\text{ref max}}$	4 $\mu$ A
	@ $I_K$	10 mA
	@ $R_1$	10 k $\Omega$
	@ $R_2$	$\infty$ k $\Omega$
Minimum cathode current for regulation	$I_{\text{MIN typ}}$	0.4 mA
	$I_{\text{MIN max}}$	1.0 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Off-state cathode current	$I_{\text{OFF typ}}$	0.1 $\mu$ A
	$I_{\text{OFF max}}$	1.0 $\mu$ A
	@ $V_{KA}$	36 V
	@ $V_{\text{ref}}$	0 V
Dynamic impedance	$ Z_{KA} _{\text{typ}}$	0.2 $\Omega$
	$ Z_{KA} _{\text{max}}$	0.5 $\Omega$
	@ $I_K$	1 ÷ 100 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
	@ f	$\leq 1$ kHz

## TL431ACD

Three terminal adjustable shunt regulator in plastic package SO-8

Attribute	Value	UOM
Configuration	Adjustable Shunt	
Package	SO-8	
$V_{KA \text{ max}}$	37	V
$I_K \text{ max}$	-100 ÷ +150	mA
$I_{\text{ref max}}$	-0.05 ÷ +10	mA
$T_A \text{ max}$	-10 ÷ +70	°C
Reference input voltage	min	2.475 V
	typ	2.500 V
	max	2.525 V
	@ $I_K$	10 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.4 mV/V
	max	-2.7 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$10 \div V_{\text{ref}}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.0 mV/V
	max	-2.0 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	$36 \div 10$ V
Reference input current range	$I_{\text{ref typ}}$	2 $\mu$ A
	$I_{\text{ref max}}$	4 $\mu$ A
	@ $I_K$	10 mA
	@ $R_1$	10 k $\Omega$
	@ $R_2$	$\infty$ k $\Omega$
Minimum cathode current for regulation	$I_{\text{MIN typ}}$	0.4 mA
	$I_{\text{MIN max}}$	1.0 mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
Off-state cathode current	$I_{\text{OFF typ}}$	0.1 $\mu$ A
	$I_{\text{OFF max}}$	1.0 $\mu$ A
	@ $V_{KA}$	36 V
	@ $V_{\text{ref}}$	0 V
Dynamic impedance	$ Z_{KA} _{\text{typ}}$	0.2 $\Omega$
	$ Z_{KA} _{\text{max}}$	0.5 $\Omega$
	@ $I_K$	$1 \div 100$ mA
	@ $V_{KA}$	$V_{\text{ref}}$ V
	@ f	$\leq 1$ kHz

## TL431CD

Three terminal adjustable shunt regulator in plastic package SO-8

Attribute	Value	UOM
Configuration	Adjustable Shunt	
Package	SO-8	
$V_{KA\ max}$	37	V
$I_K\ max$	-100 ÷ +150	mA
$I_{ref\ max}$	-0.05 ÷ +10	mA
$T_A\ max$	-10 ÷ +70	°C
Reference input voltage	min	2.47 V
	typ	2.495 V
	max	2.52 V
	@ $I_K$	10 mA
	@ $V_{KA}$	$V_{ref}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.4 mV/V
	max	-2.7 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	10 ÷ $V_{ref}$ V
Ratio of change in reference input voltage to the change in cathode voltage	typ	-1.0 mV/V
	max	-2.0 mV/V
	@ $I_K$	10 mA
	@ $V_{KA}$	36 ÷ 10 V
Reference input current range	$I_{ref\ typ}$	2 $\mu$ A
	$I_{ref\ max}$	4 $\mu$ A
	@ $I_K$	10 mA
	@ $R_1$	10 k $\Omega$
	@ $R_2$	$\infty$ k $\Omega$
Minimum cathode current for regulation	$I_{MIN\ typ}$	0.4 mA
	$I_{MIN\ max}$	1.0 mA
	@ $V_{KA}$	$V_{ref}$ V
Off-state cathode current	$I_{OFF\ typ}$	0.1 $\mu$ A
	$I_{OFF\ max}$	1.0 $\mu$ A
	@ $V_{KA}$	36 V
	@ $V_{ref}$	0 V
Dynamic impedance	$ Z_{KA} _{typ}$	0.2 $\Omega$
	$ Z_{KA} _{max}$	0.5 $\Omega$
	@ $I_K$	1 ÷ 100 mA
	@ $V_{KA}$	$V_{ref}$ V
	@f	$\leq$ 1 kHz