TL431

Rev.G Jan.-2022

/ Descriptions

Precision adjustable shunt regulator in a TO-92 Plastic Package.

/ Features

O ref

Precise reference voltage to 2.495V;guaranteed 0.5%,1% or 2% reference voltage Tolerance; sink current capability,1.0mA ～ 100mA;quick turn-on; adjustable Output voltage, V_O=V_{ref} ～ 36V;low operational cathode current,50μA typical; 0.15Ω typical output impedance.

/ Applications

Linear regulators, adjustable power supply, switching power supply.

/ Equivalent Circuit

/ Pinning

PIN1 K PIN 2 A PIN 3 R

/ Marking

See Marking Instructions

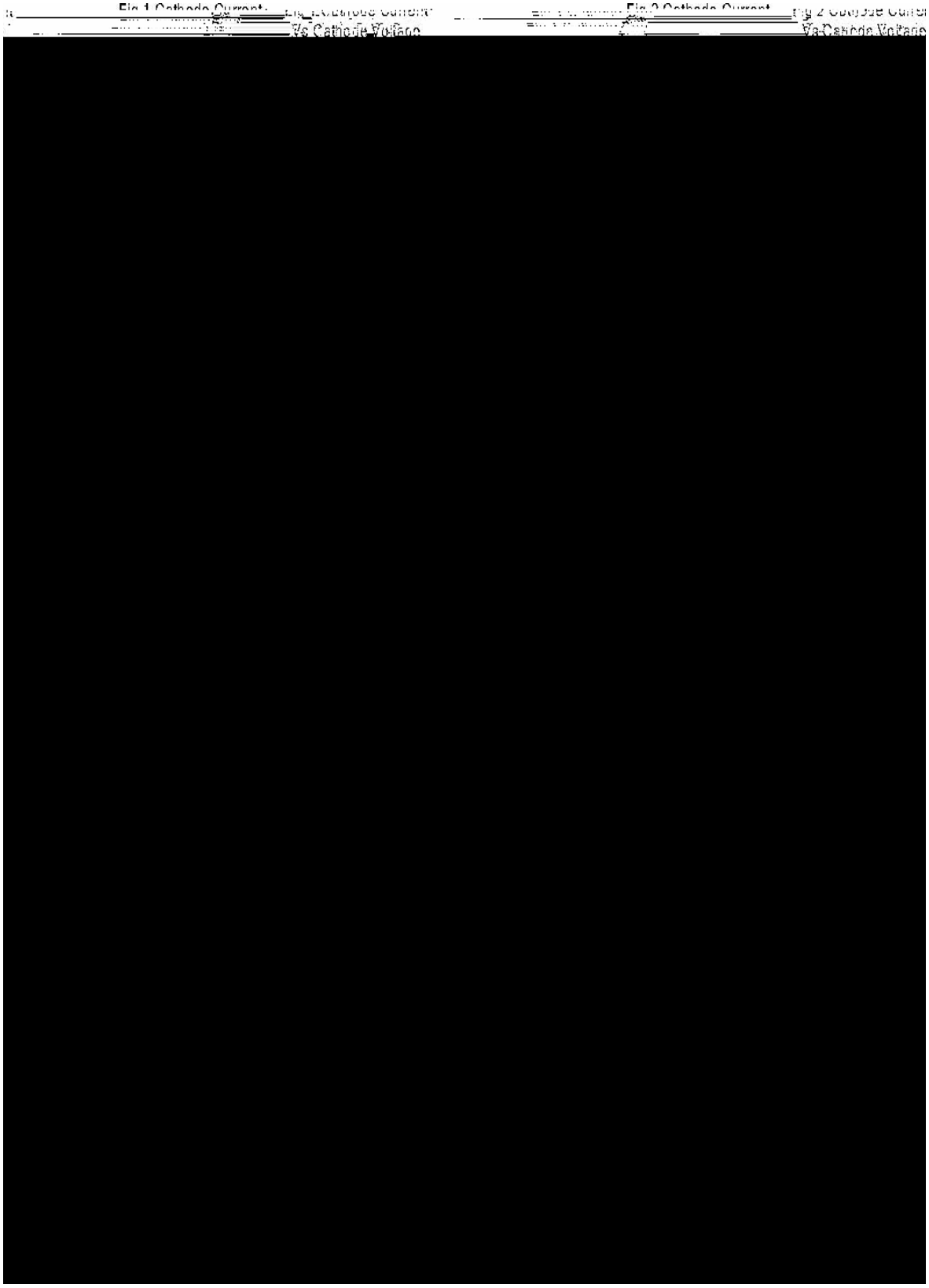
/ Absolute Maximum Ratings(Ta=25)

Parameter	Symbol	Rating	Unit
Cathode to Anode Voltage	V_{KA}	37	V
Cathode Current Range, Continuous	I_K	-100～+100	mA
Reference Input Current Range, Continuous	I_{REF}	0.05～+10	mA
Power Dissipation	P_D	770	mW
Operating Ambient Temperature	T_{amb}	-40～125	℃
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	-65～150	℃

/ Electrical Characteristics(Ta=25)

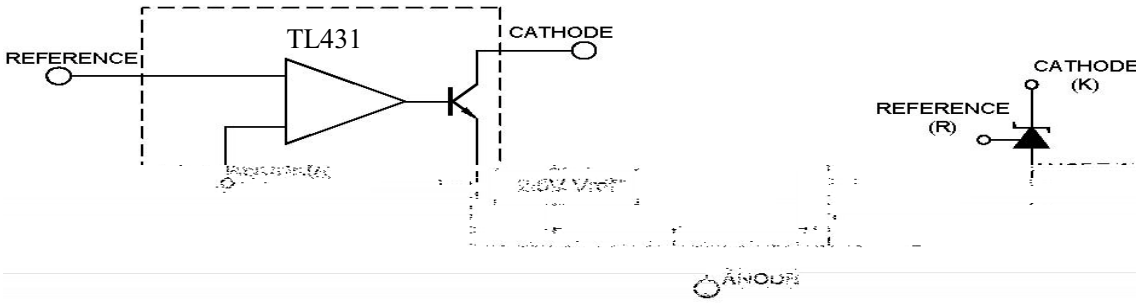
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Reference Input Voltage	V_{REF}	$V_{KA}=V_{REF}$ I_K=10mA(A=0.5%)	2.483	2.495	2.507	V
		$V_{KA}=V_{REF}$ I_K=10mA(B=1%)	2.470	2.495	2.520	V
		$V_{KA}=V_{REF}$ I_K=10mA(2%)	2.445	2.495	2.545	V
Deviation of Reference Input Voltage Over-Temperature	$\triangle V_{REF}$ /$\triangle$T	$V_{KA}=V_{REF}$ I_K=10mA T_A=-40～125℃		4.5	25	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\triangle V_{REF}$ /$\triangle V_{KA}$	I_K=10mA, $\triangle V_{KA}$ =10V to V_{REF}		-1	-2.7	mV/V
		I_K=10mA, $\triangle V_{KA}$ =36V to 10V		-0.5	-2.0	mV/V
Reference Input current	I_{REF}	I_K=10mA R_1=10KΩ R_2=open		0.8	1.0	μA
Deviation of Reference Input Current Over Full Temperature Range	$\triangle I_{REF}$/ $\triangle$T	I_K=10mA R_1=10KΩ, R_2=open T_A=-40～125℃		0.4	1.2	μA
Minimum Cathode Current for Regulation	$I_{K(min)}$	$V_{KA}=V_{REF}$		0.05	0.08	mA
Off-state cathode current	$I_{K(off)}$	V_{KA}=36V V_{REF}=0V		0.05	1.0	μA
Dynamic impedance	$\|Z_{KA}\|$	$V_{KA}=V_{REF}$ f≤1.0KHz I_K=1mA to 100mA		0.15	0.5	Ω

/ Electrical Characteristic Curve

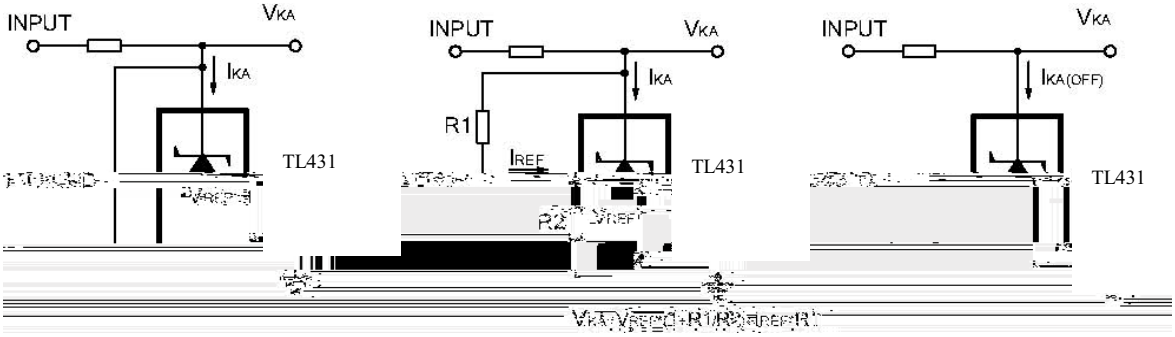


& Test circuits&Typical Application

BLOCK DIAGRAM:

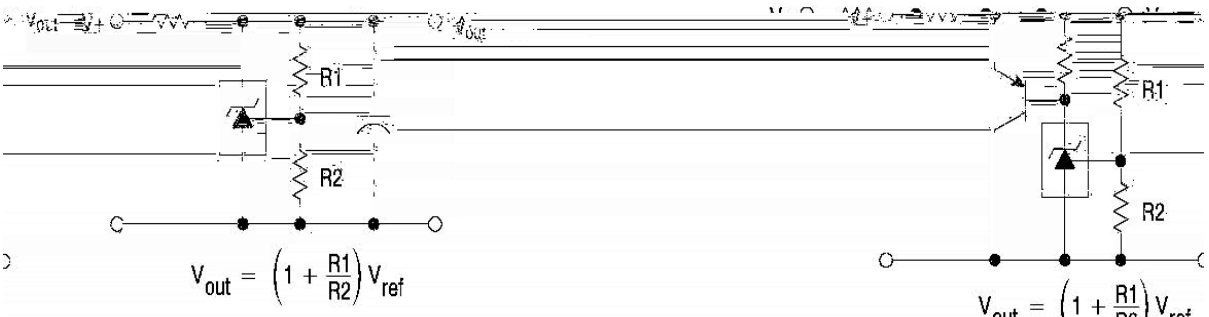


TEST CIRCUITS:

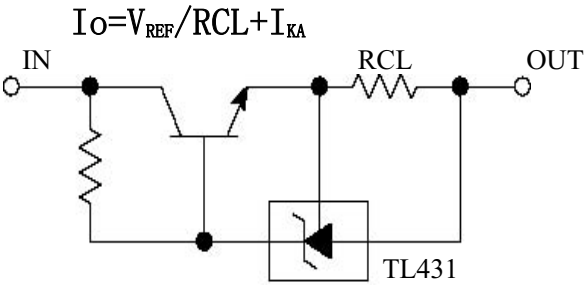


Test Circuit For VKA=VREF Test Circuit for VKA≥VREF Test Circuit For IKA(OFF)

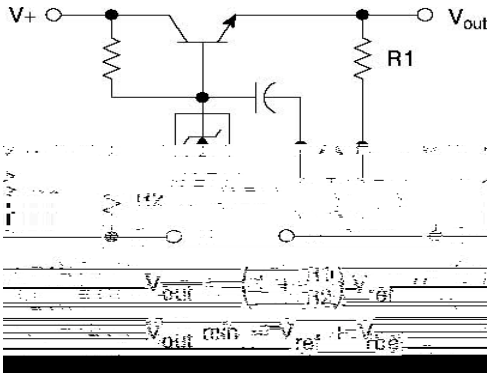
TYPICAL APPLICATION:



Shutdown Regulator Higher-current Shunt

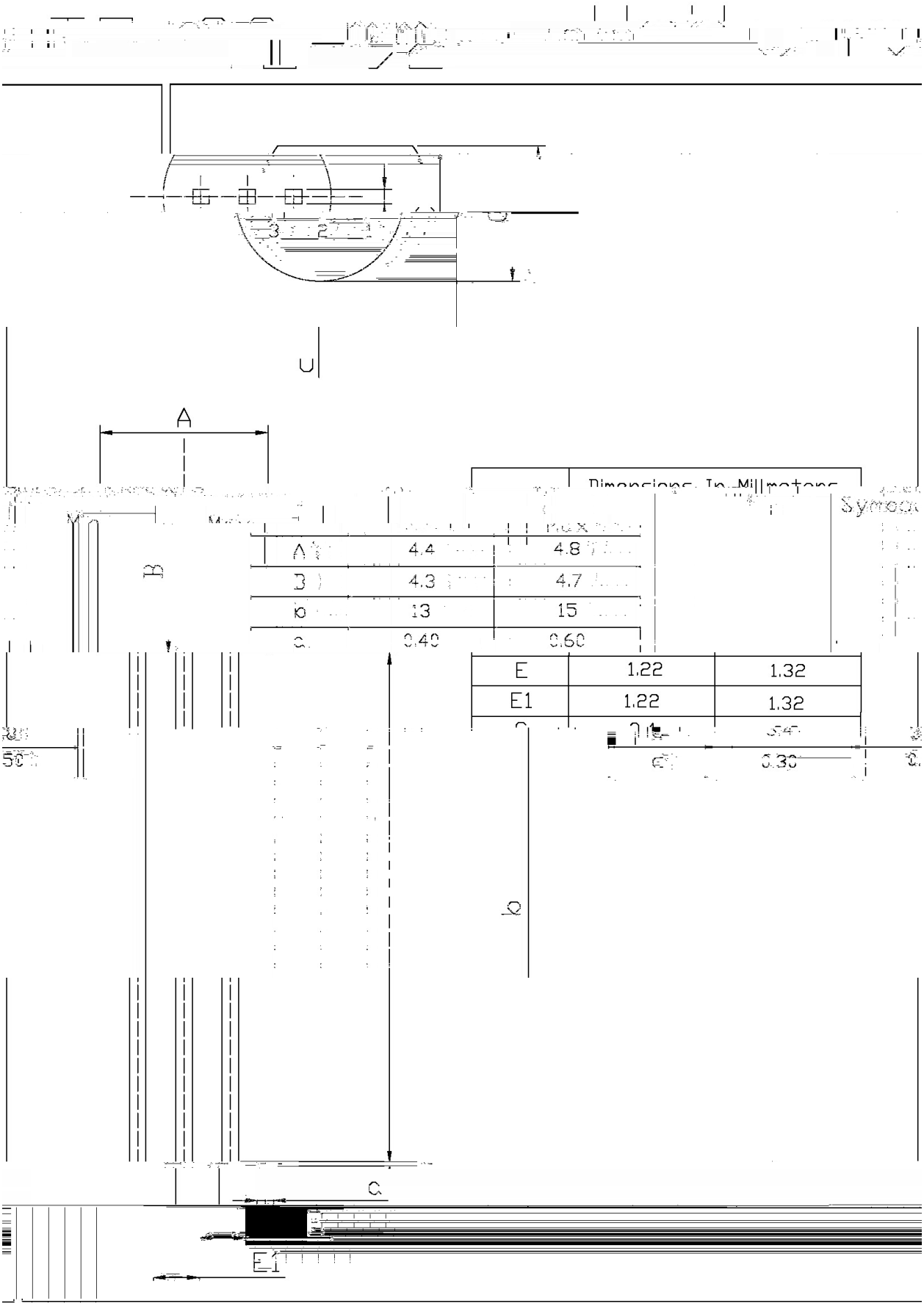


Constant Current Source

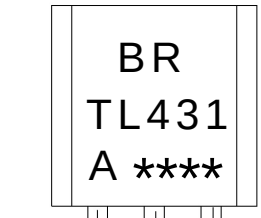


Series Pass Regulator

/ Package Dimensions



/ Marking Instructions



BR

TL431

A: V_{REF}

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Note:

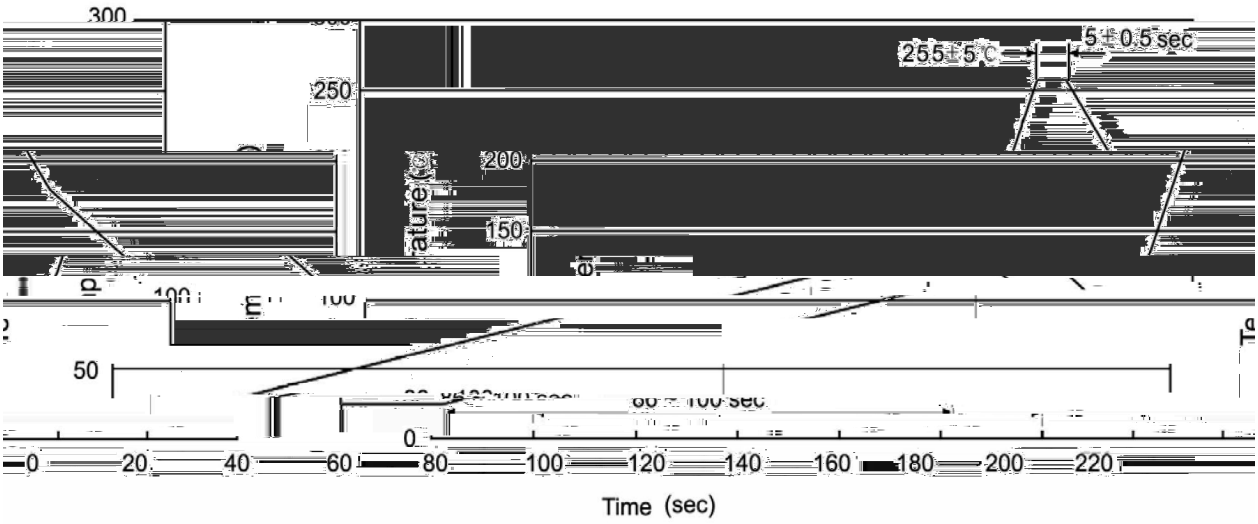
BR: Company Code.

TL431: Product Type.

A: V_{REF} Classifications Symbol

****: Lot No. Code, code change with Lot No.

( ) / Temperature Profile for Dip Soldering(Pb-Free)



		Note:
1	25 150 60 90sec;	1.Preheating:25~150℃, Time:60~90sec.
2	255±5 5±0.5sec;	2.Peak Temp.:255±5℃, Duration:5±0.5sec.
3	2 10℃/sec.	3. Cooling Speed: 2~10℃/sec.

/ Resistance to Soldering Heat Test Conditions

270±5℃	10±1 sec.	Temp:270±5℃	Time:10±1 sec

/ Packaging SPEC.

/ BULK

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm3)		
	Units/Bag 只/袋	Bags/Inner Box 袋/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Bag 袋	Inner Box 盒	Outer Box 箱
TO-92	1,000	10	10,000	5	50,000	135×190	237×172×102	560×245×195
	1,000	10	10,000	10	100,000	135×190	237×172×102	560×245×375

/ AMMO

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm3)	
	Units/tape 只/纸带	Tape/Inner Box 纸带/盒	Rows/Inner Box 纸带层/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Inner Box 盒	Outer Box 箱
TO-92	3,000	1	120	10	30,000	328×230×42	小箱 480×346×235， 大箱 547×407×268