

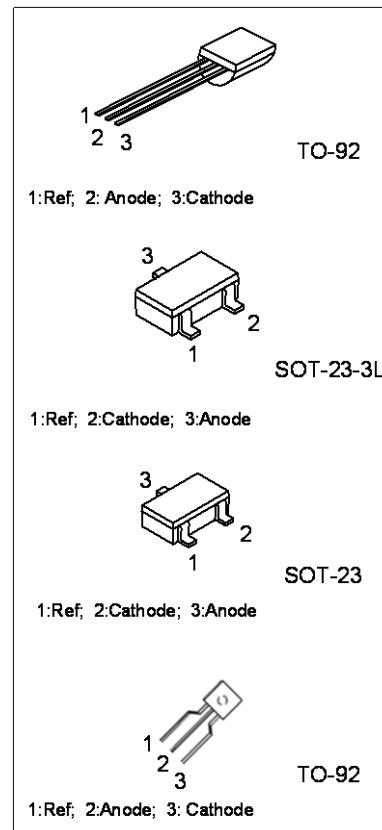
PROGRAMMABLE PRECISION REFERENCE

DESCRIPTION

The UTC431 is three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output Voltage may be set to any value between V_{ref} (approximately 2.5V) and 36 V with two external resistors. These devices have provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

FEATURE

- *Programmable output Voltage to 36V
- *Low dynamic output impedance 0.2 Ω
- *Sink current capability of 0.5 to 100mA
- *Equivalent full-range temperature coefficient of 50ppm/°C typical
- *Temperature compensated for operation over full rated operating temperature range
- *Low output noise voltage
- *Fast turn on response



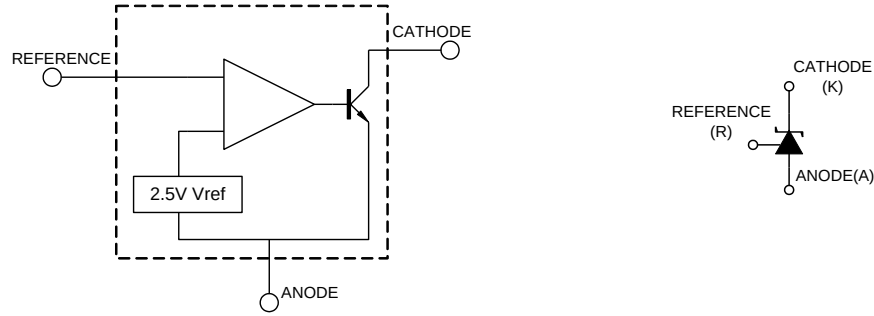
ORDERING INFORMATION

Ordering Number	Package	Print Number	Free	Packing
UTC431-T93-R-K	TO-92	431	RoHS	Bulk
UTC431-SD3-R-R	SOT-23-3L	431	RoHS	Tape Reel
UTC431-SC1-R-R	SOT-23	431	RoHS	Tape Reel
UTC431-T93-R-B	TO-92	431	RoHS	Tape Box

UTC431- T93 - R - B

Packing Type: T:Tube, R:Tape Reel, K: Bulk,
B: Tape Box
Green Package: R:RoHS
Package: T93:TO-92; SD3:SOT-23-3L;
SC1:SOT-23
Number

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS(Operating temperature range applies unless otherwise specified)

CHARACTERISTICS	SYMBOL	VALUE		UNITS
Cathode Voltage	V_{KA}	40		V
Cathode Current Range(Continuous)	I_{KA}	-100~+150		mA
Reference Input Current Range	I_{ref}	-0.05~+10		mA
Power Dissipation	P_D	TO-92	770	mW
		SOT-23-3	370	
Junction Temperature	T_j	150		°C
Operating temperature	T_{opr}	-40~+125		°C
Storage temperature Temperature	T_{stg}	-65~+150		°C
Thermal resistance junction to case	$R_{\theta JC}$	TO-92	80	°C/W
		SOT-23-3L	135	
		SOT-23	140	
Thermal resistance junction to ambient	$R_{\theta JA}$	TO-92	150	°C/W
		SOT-23-3L	200	
		SOT-23	250	

RECOMMENDED OPERATING CONDITIONS

Characteristic	Symbol	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}	V_{REF}		36	V
Cathode Current	I_{KA}	0.5		100	mA

ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

Characteristic		Symbol	Test conditions	MIN	TYP	MAX	UNIT
Reference Input Voltage	TO-92	0.5%	V _{KA} =V _{REF} , I _{KA} =10mA	2.488	2.50	2.512	V
		1%		2.475	2.50	2.525	
		+0.3%		2.500	-	2.508	
		-0.3%		2.493	-	2.500	
Reference Input Voltage	SOT-23 SOT-23L	0.3%	V _{KA} =V _{REF} , I _{KA} =10mA	2.493	2.50	2.508	V
		0.8%		2.480	2.50	2.520	
Deviation of reference Input Voltage Over temperature		ΔV _{ref}	V _{KA} =V _{REF} , I _{KA} =10mA T _{MIN} ≤ T _A ≤ T _{MAX}		4.5	25	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage		ΔV _{ref} /ΔV _{KA}	I _{KA} =10mA ΔV _{KA} =10V~V _{REF}		-1.0	-2.7	mV/V
			ΔV _{KA} =36V~10V		-0.5	-2.0	
Reference Input Current		I _{ref}	I _{KA} =10mA, R1=10kΩ, R2=∞		1.5	4	μA
Deviation of Reference Input Current Over Full Temperature Range		ΔI _{ref} /ΔT	I _{KA} =10mA, R1=10kΩ, R2=∞, T _A =full Temperature		0.2	0.4	μA
Minimum cathode current for regulation		I _{KA} (min)	V _{KA} =V _{REF}		0.3	0.5	mA
Off-state cathode Current		I _{KA} (OFF)	V _{KA} =36V, V _{REF} =0		0.05	0.5	μA
Dynamic Impedance		Z _{KA}	V _{KA} =V _{REF} , I _{KA} =1 to 100mA f ≤ 1.0kHz		0.15	0.5	Ω

TEST CIRCUITS

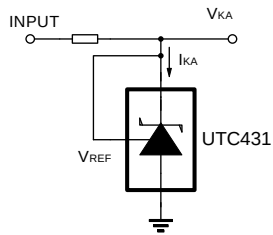


Fig 1 Test Circuit For $V_{KA}=V_{REF}$

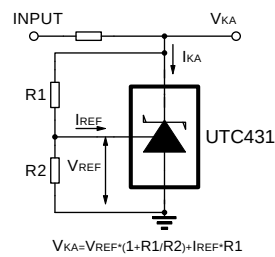


Fig 2 Test Circuit for $V_{KA} \geq V_{REF}$

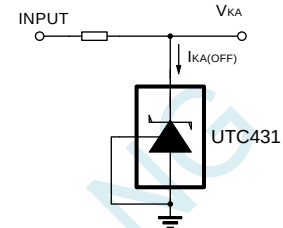


Fig 3 Test Circuit For $I_{KA(OFF)}$

TYPICAL APPLICATION

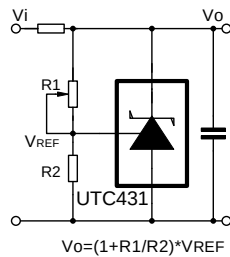


Fig 4 Shutdown Regulator

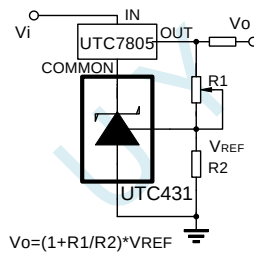


Fig 5 Output Control of a Three-Terminal Fixed Regulator

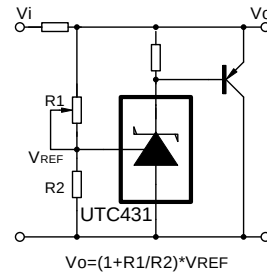


Fig 6 Higher-current Shunt Regulator

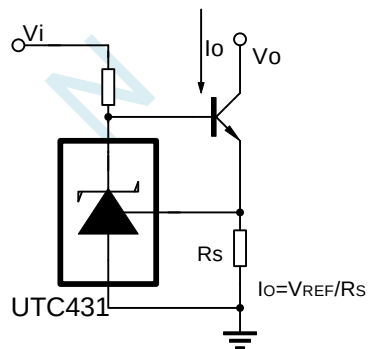


Fig 7 Constant-current Sink

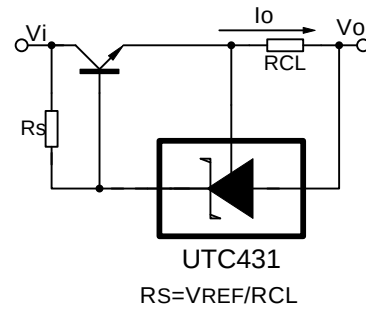


Fig 8 Current Limiting or Current Source

TYPICAL PERFORMANCE CHARACTERISTICS

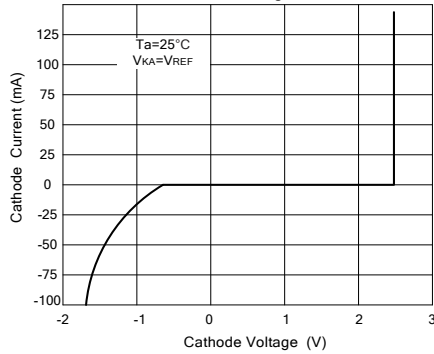
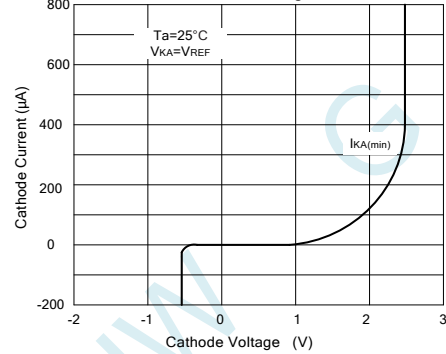
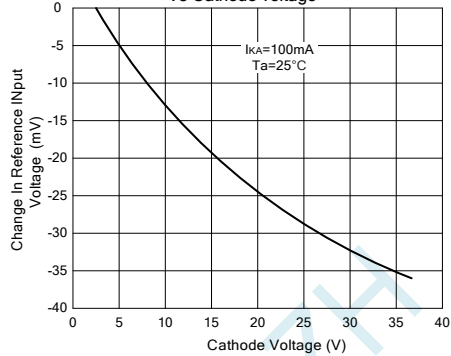
Fig 9 Cathode Current
Vs Cathode VoltageFig 10 Cathode Current
Vs Cathode VoltageFig 11 Change in Reference Input
Voltage Vs Cathode voltage

Fig 12 Pulse Response

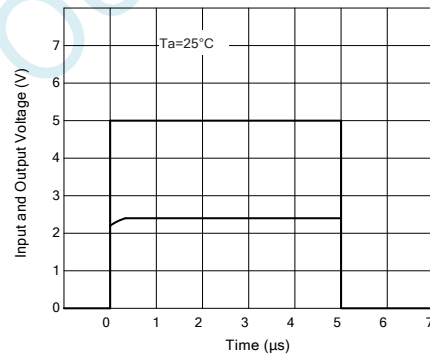
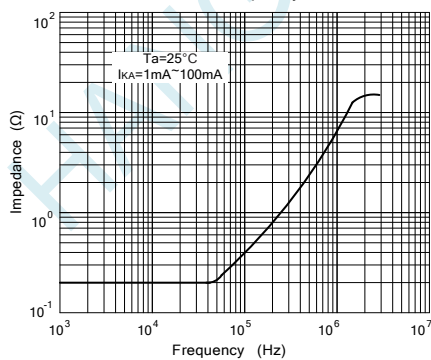
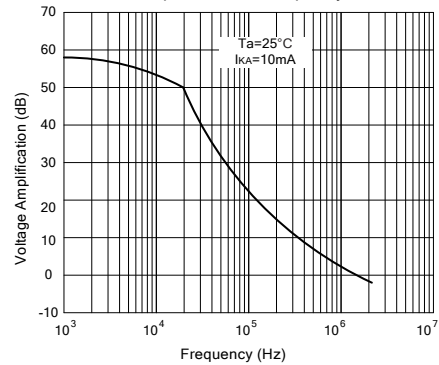
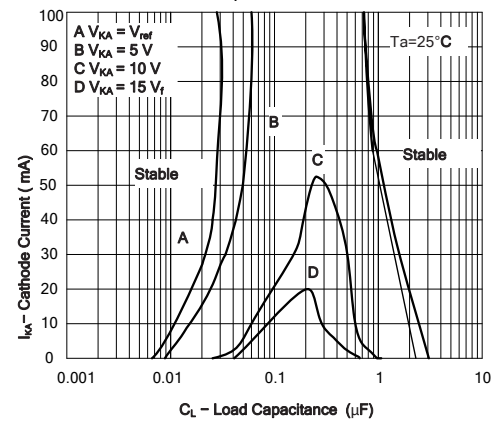
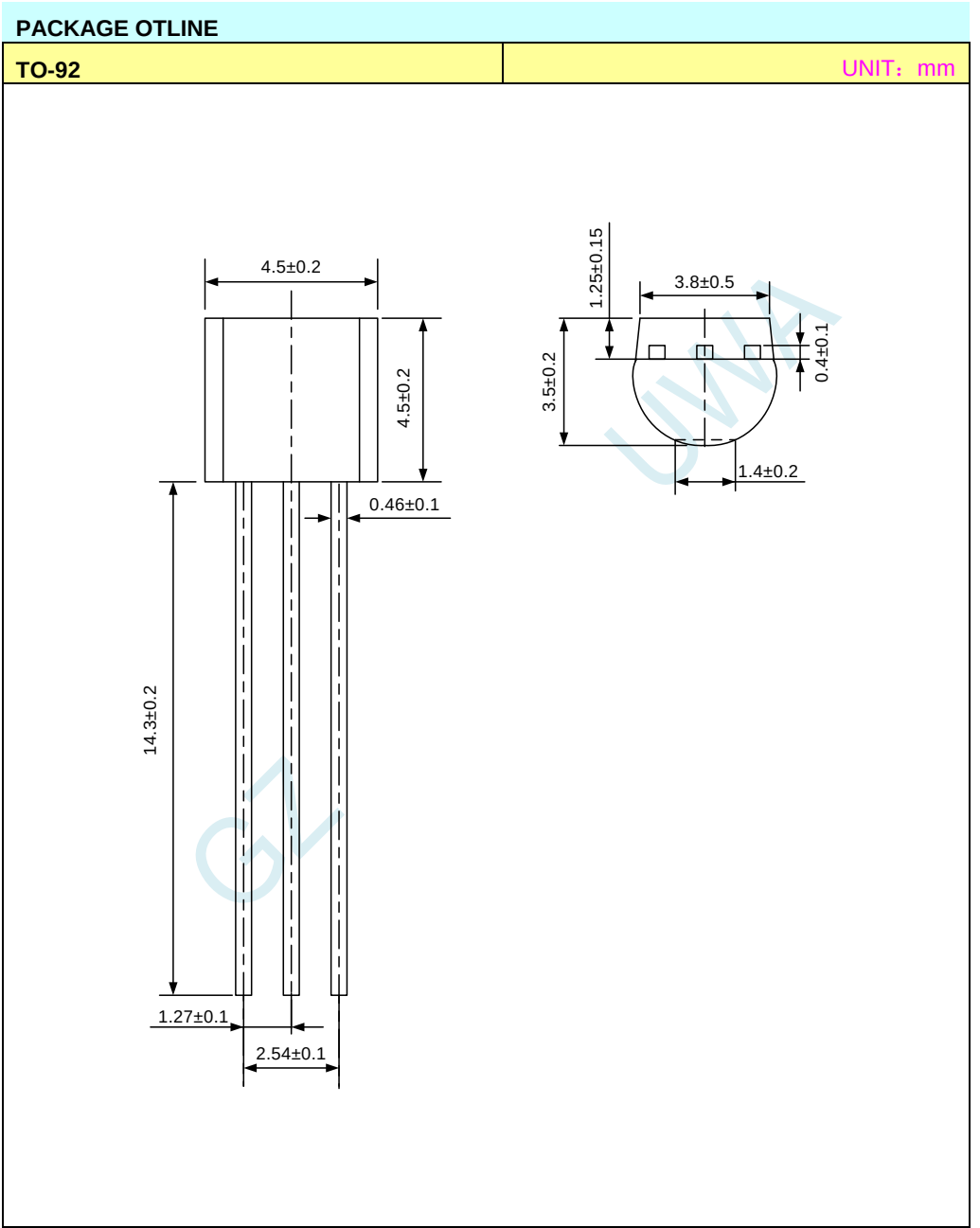
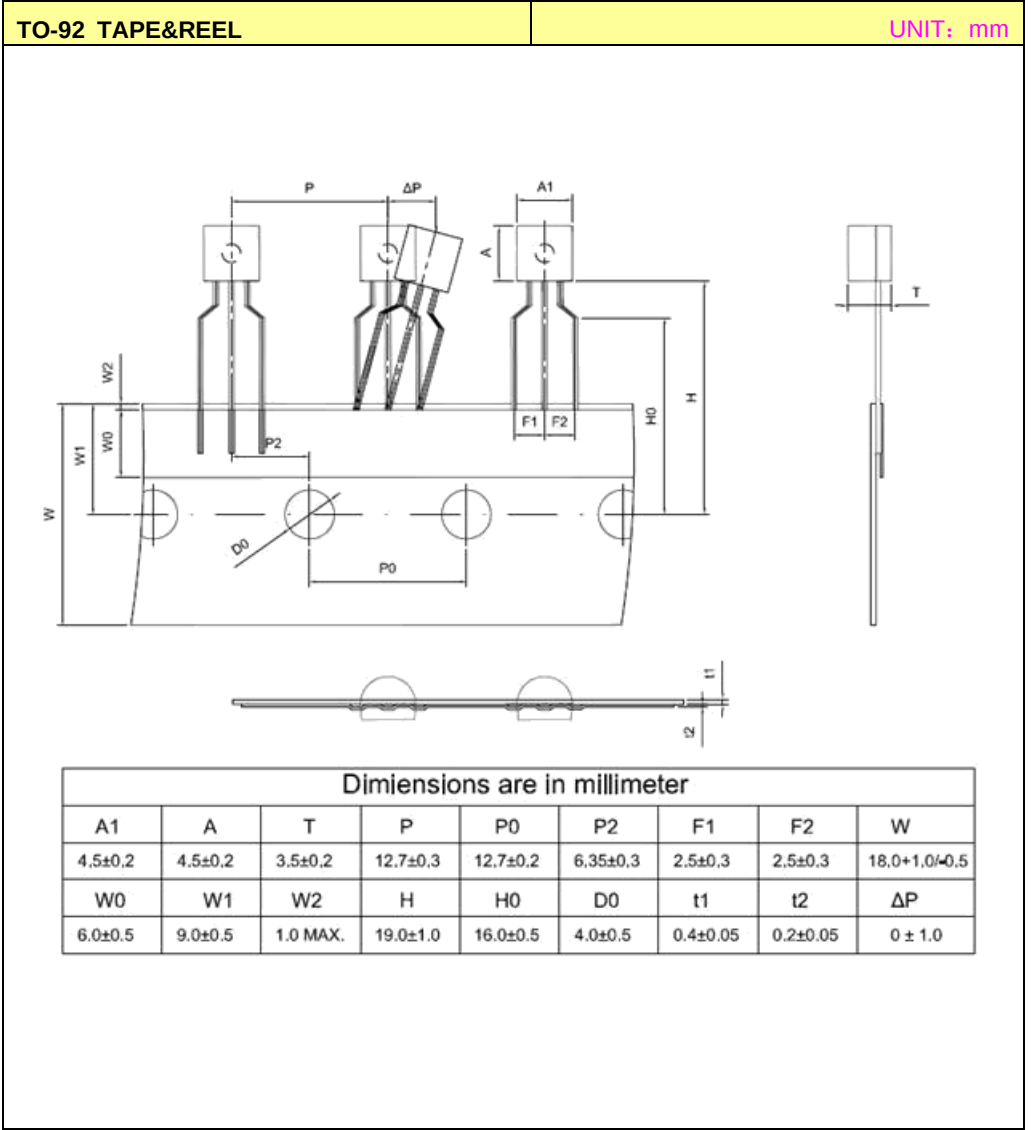
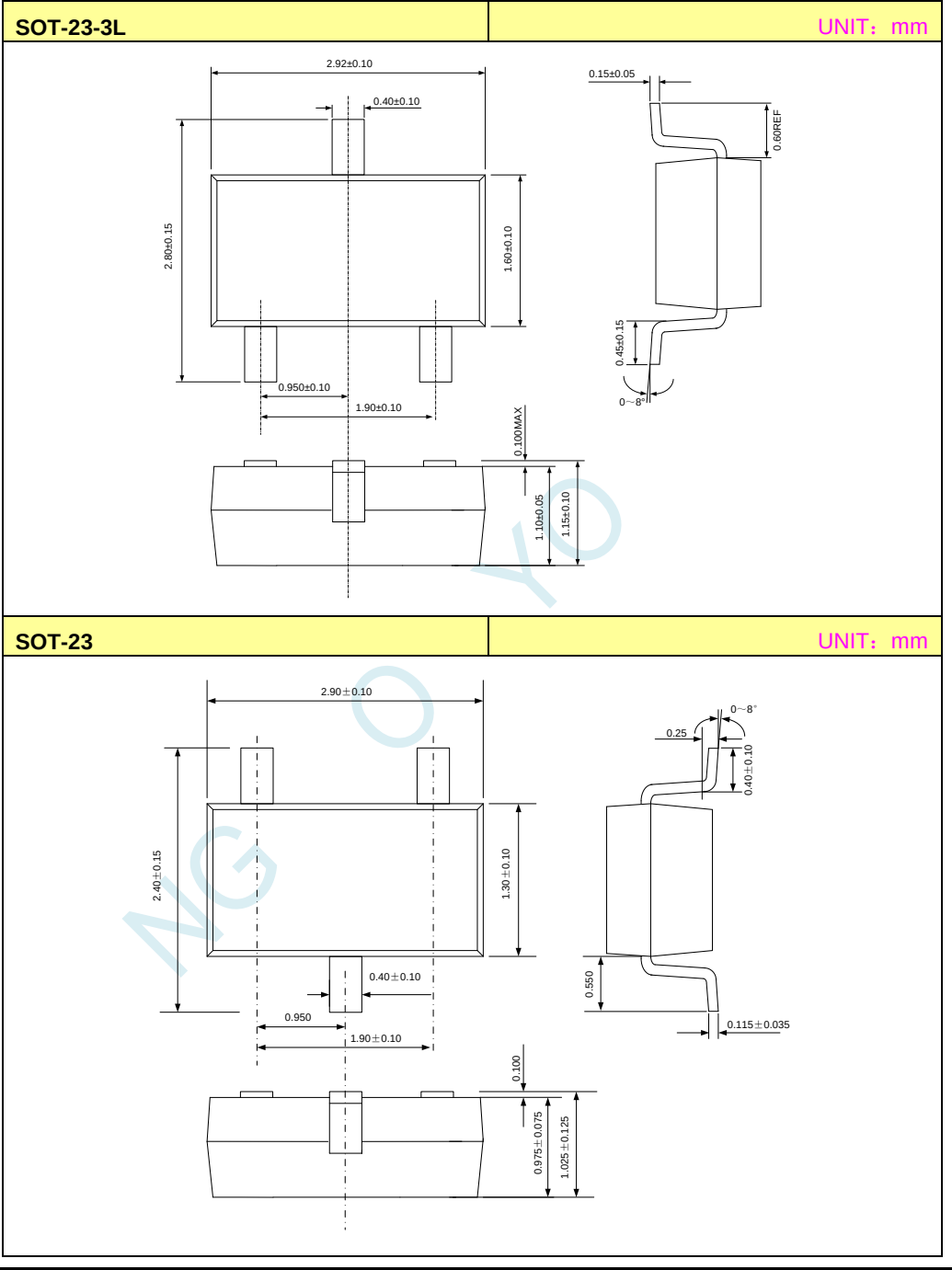
Fig 13 Dynamic Impedance
Vs FrequencyFig 14 Small Signal Voltage
Amplification Vs Frequency

Fig 15 Cathode Current Vs Load Capacitance









ELECTROSTATIC DISCHARGE CAUTION

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage handling to prevent electrostatic damage to the device.