UPC1943T, UPC1944T

Adjustable Precision Shunt Regulators

DESCRIPTION

UPC1943T, UPC1944T are adjustable high precision shunt regulators. The output voltage can be set to any value between reference voltage (1.26V) and 24V by two external resistors.
These ICs can apply to error amplifier of switching regulators.

FEATURES

- Low voltage operation. $V_{REF} \leq V_{OUT} \leq 24V$
- High accuracy. $V_{REF} = 1.26V \pm 2.4\%$
- Adjustable output voltage by two external resistors.
- Pin compatible with UPC1093T. (UPC1944T)

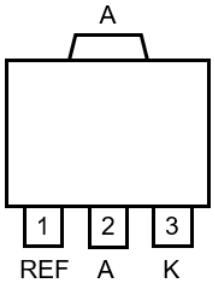
ORDERING INFORMATION

Order Name (1)	Package	Marking
UPC1943T-E1-A	POWER MINI MOLD (SOT-89) (SC-62)	9B
UPC1943T-E2-A	POWER MINI MOLD (SOT-89) (SC-62)	9B
UPC1944T-E1-A	POWER MINI MOLD (SOT-89) (SC-62)	9C
UPC1944T-E2-A	POWER MINI MOLD (SOT-89) (SC-62)	9C

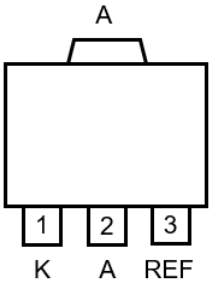
(1) Order names containing E1 or E2 indicate that the packaging format is embossed taping.
Pin 1 of E1 is on draw-out side, and pin 1 of E2 is at take-up side.

PIN CONFIGURATION (Marking Side)

UPC1943T

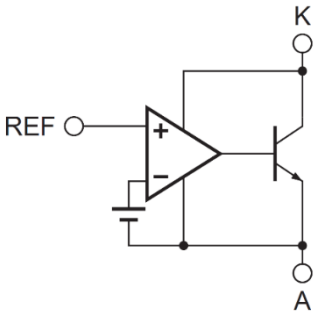


UPC1944T



REF : Reference
A : Anode
K : Cathode

BLOCK DIAGRAM



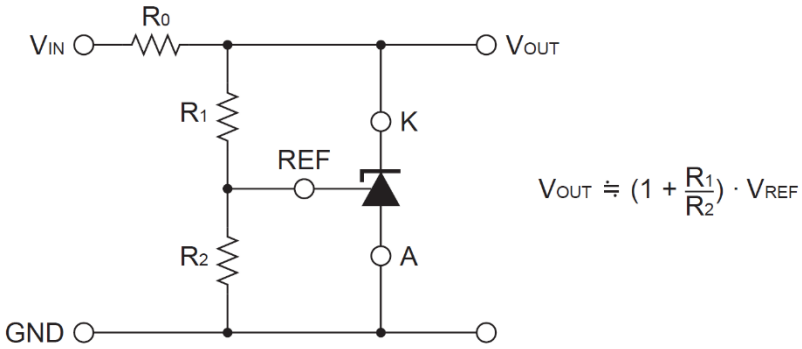
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified.)

Parameter		Symbol	Ratings	Unit
Cathode Voltage		V_{KA}	25	V
Cathode Current		I_K	50	mA
Cathode to Anode Reverse Current		$-I_K$	-30	mA
Reference Voltage		V_{REF}	7	V
Reference Input Current		I_{REF}	50	μA
Reference to Anode Reverse Current		$-I_{REF}$	-10	mA
Total Power Dissipation	UPC1943T	P_T	320 / 1600 Note1	mW
	UPC1944T		320 / 1600 Note1	mW
Operating Ambient Temperature		T_A	-30 to +85	°C
Operating Junction Temperature		T_J	-30 to +125	°C
Storage Temperature		T_{stg}	-65 to +125	°C

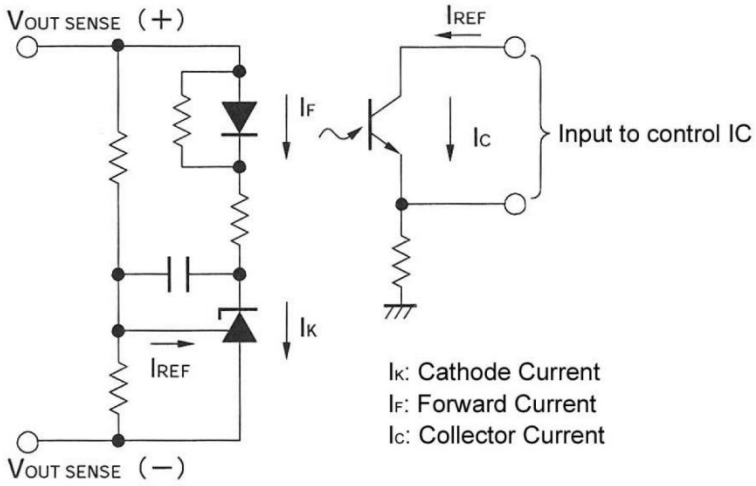
Notes 1. with 16 cm² × 0.7 mm ceramic substrate.

Caution Product quality may suffer if the absolute maximum rating is exceeded even momentarily for any parameter. That is the absolute maximum ratings are rated values at which the product is on the verge of suffering physical damage, and therefore the product must be used under conditions that ensure that the absolute maximum ratings are not exceeded.

TYPICAL CONNECTION



APPLICATION CIRCUIT



RECOMMENDED OPERATING CONDITIONS

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
Cathode Voltage		V_{KA}	V_{REF}		24	V
Cathode Current		I_K	1	10	30	mA
Total Power Dissipation	UPC1943T	P_T			45/240 Note2	mW
	UPC1944T				45/240 Note2	mW
Operating Ambient Temperature		T_A	-30		+85	°C
Operating Junction Temperature		T_J	-30		+100	°C

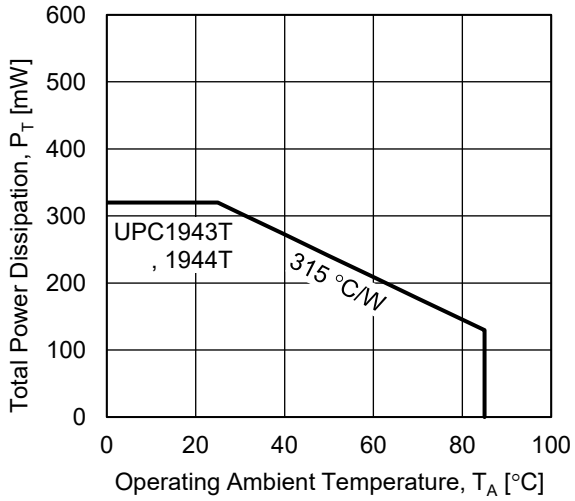
Notes 2. with 16 cm^2 × 0.7 mm ceramic substrate.

ELECTRICAL CHARACTERISTICS (I_K = 10mA, T_A = 25°C, unless otherwise specified.)

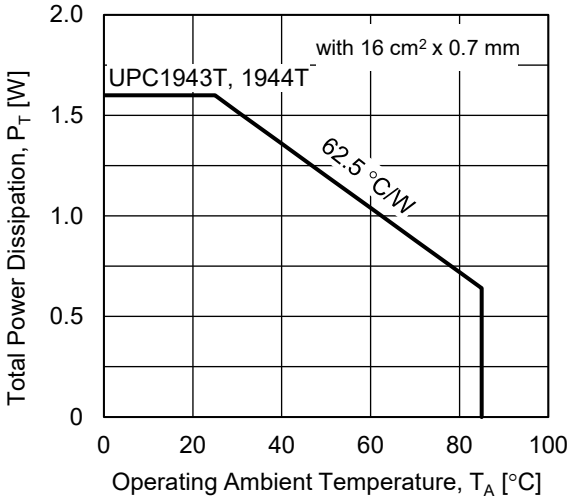
Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Reference Voltage	V_{REF}	1.23	1.26	1.29	V	$V_{KA} = V_{REF}$
Reference Voltage Change Over Temperature	ΔV_{REF}		±5	±30	mV	$V_{KA} = V_{REF}$, 0°C ≤ T_A ≤ 70°C
Reference Voltage Change Over Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$			2.7	mV/V	$\lvert V_{REF} \rvert \le V_{KA} \le 5V$
				2.0	mV/V	5V ≤ V_{KA} ≤ 24V
Reference Input Current	I_{REF}		2.0	4.0	μA	$V_{KA} = V_{REF}$, R_1 = 10kΩ, R_2 = ∞
Reference Input Current Change Over Temperature	ΔI_{REF}		0.3	1.2	μA	$V_{KA} = V_{REF}$, 0°C ≤ T_A ≤ 70°C, R_1 = 10kΩ, R_2 = ∞
Minimum Cathode Current	I_{Kmin}		0.16	1.0	mA	$V_{KA} = V_{REF}$, ΔV_{REF} = 2%
Off-state Cathode Current	I_{Koff}		0.01	1.0	μA	V_{KA} = 24V, V_{REF} = 0V
Dynamic Impedance	$\lvert Z_{KA} \rvert$		0.12	0.5	Ω	$V_{KA} = V_{REF}$, f ≤ 1kHz, 1mA ≤ I_K ≤ 30mA

TYPICAL CHARACTERISTIC (T_A = 25°C, unless otherwise specified. Nominal)

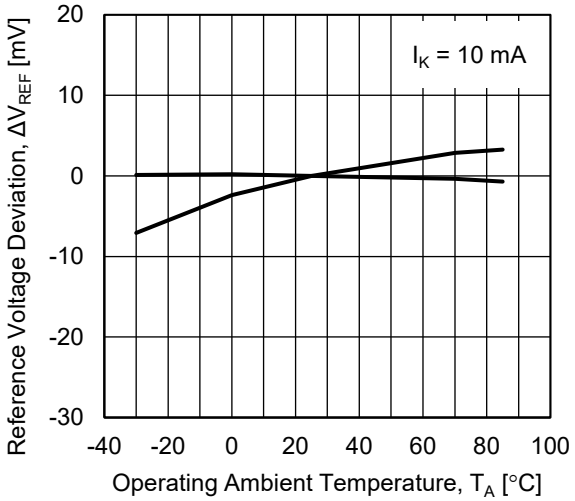
P_T vs T_A (I) Note3



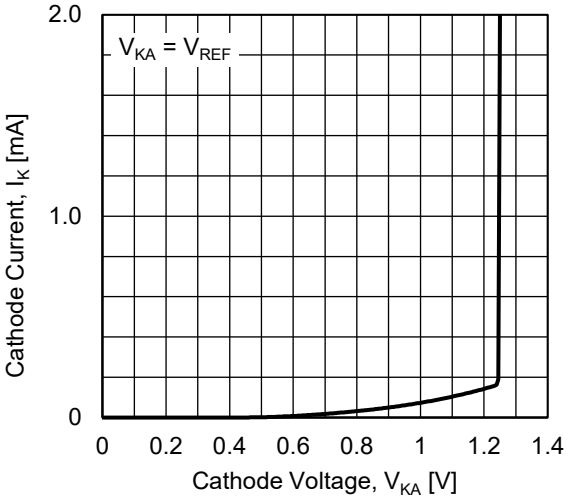
P_T vs T_A (II) Note3



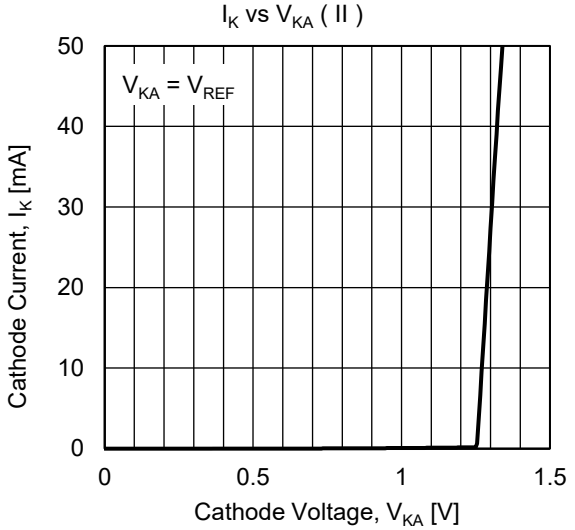
ΔV_{REF} vs T_A Note4



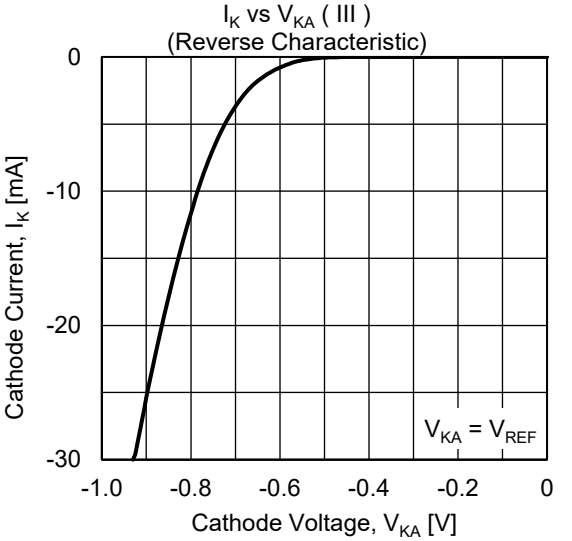
I_K vs V_{KA} (I)

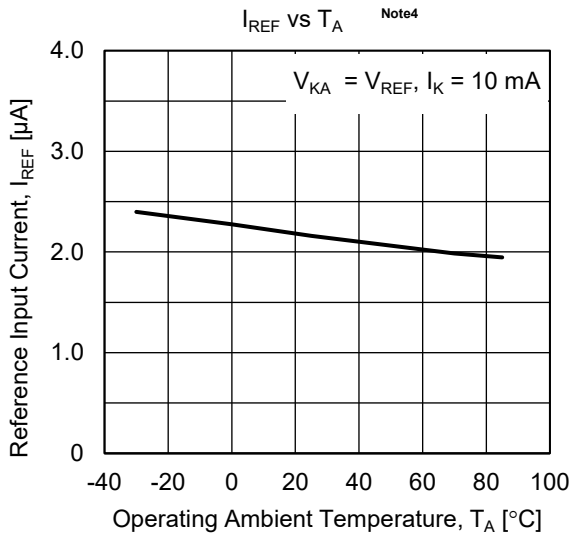


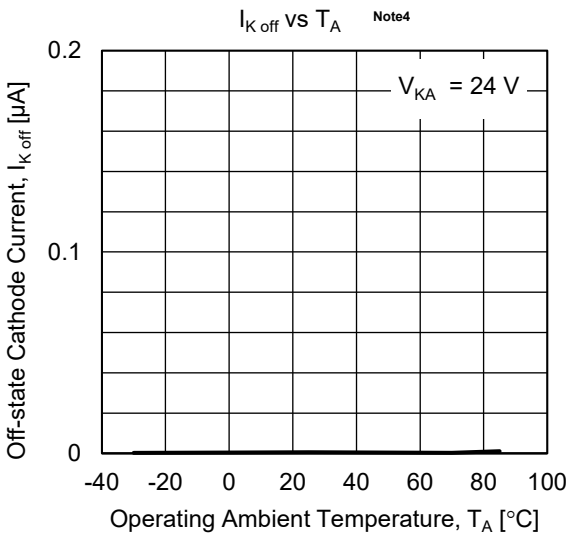
I_K vs V_{KA} (II)

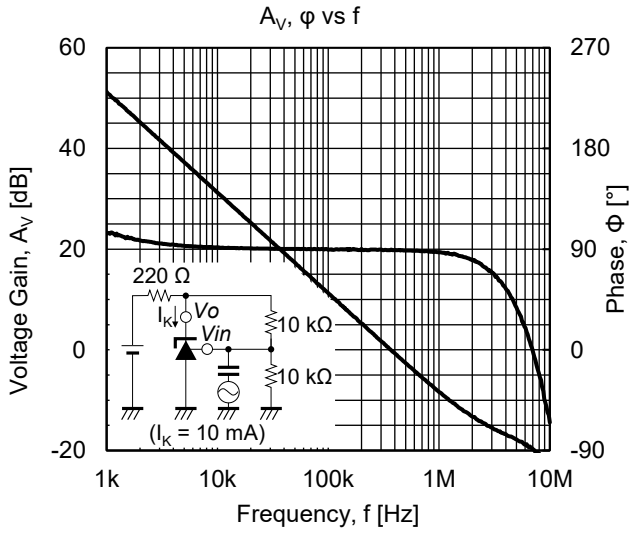


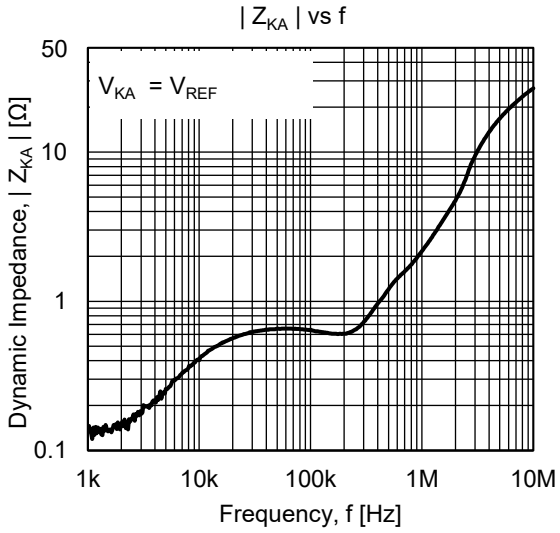
I_K vs V_{KA} (III)
(Reverse Characteristic)

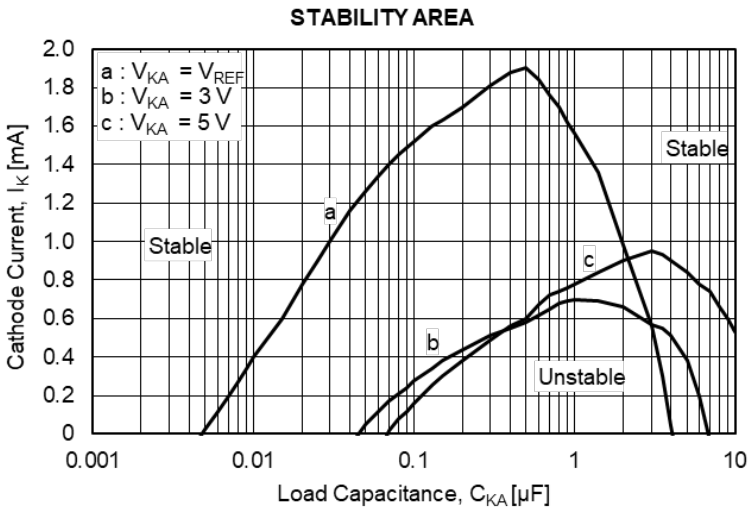


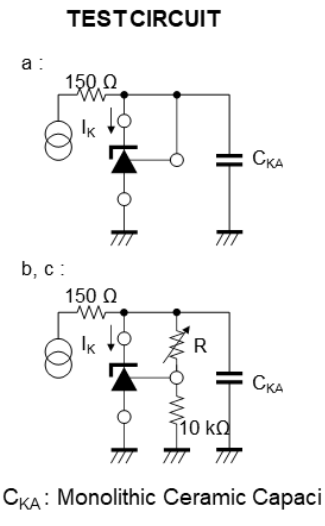












Notes 3. This graph shows the absolute maximum rating, while the other graphs show standard characteristics. Be sure to use the devices within the ranges delimited by the solid lines shown for each device.

Notes 4. In this temperature characteristics graph, the ratings for the operating ambient temperatures are indicated by a solid line, and the ratings for the operating junction temperatures are indicated by a dashed line.

Caution of Stability Area

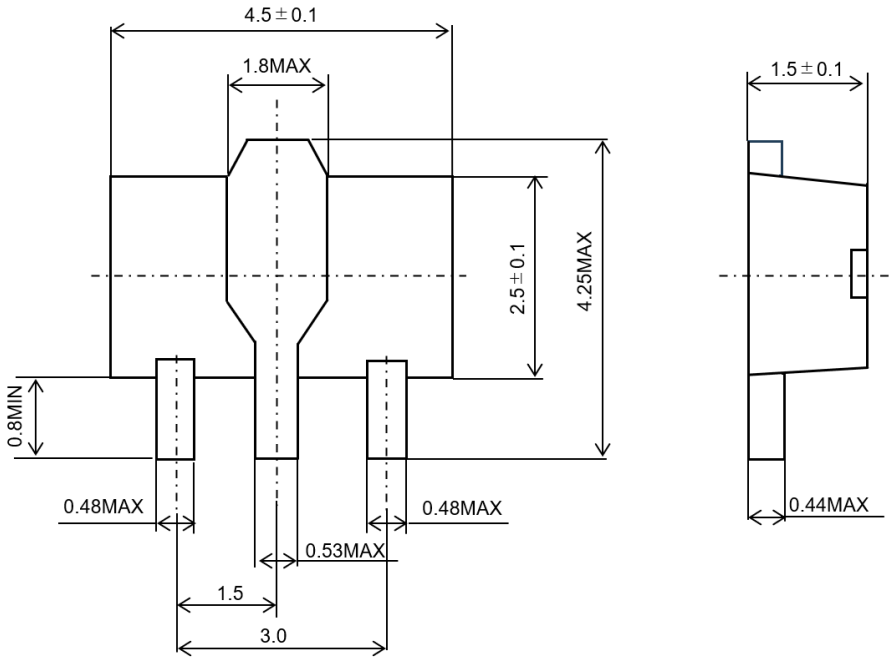
If the Aluminum electrolytic capacitor is used, it should be kept $C_{KA} \geq 6.8\mu F$. Please note Temperature characteristic and Electrical characteristic by capacitor type etc.

PACKAGE DRAWINGS

POWER MINI MOLD (SOT-89)

JEITA Package code	RENESAS code	Previous code	MASS(TYP.) [g]
SC-62	PLZZ0004CA-A	UPAK / UPAKV	0.050[g]

(UNIT : mm)



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