

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

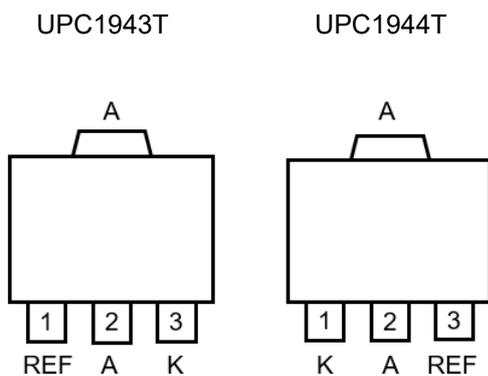
- Low voltage operation. $V_{REF} \leq V_{OUT} \leq 24V$
- High accuracy. $V_{REF} = 1.26V \pm 2.4\%$
- Adjustable output voltage by two external resistors.
- Pin compatible with UPC1093T. (UPC1944T)

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

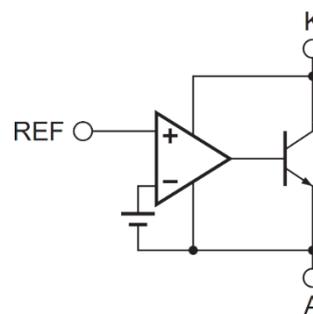
(1) The packaging format is embossed taping, and the order names include E1 (pin 1 on the tape take-up side) or E2 (pin 1 on the tape draw-out side), indicating the taping direction.

PIN CONFIGURATION (Marking Side)



REF : Reference
 A : Anode
 K : Cathode

BLOCK DIAGRAM



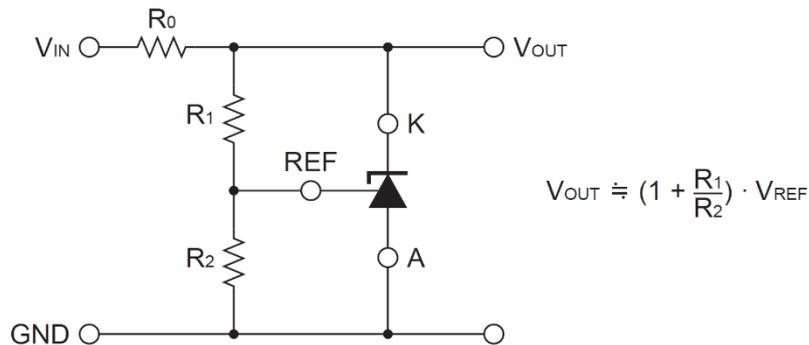
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified.)

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	

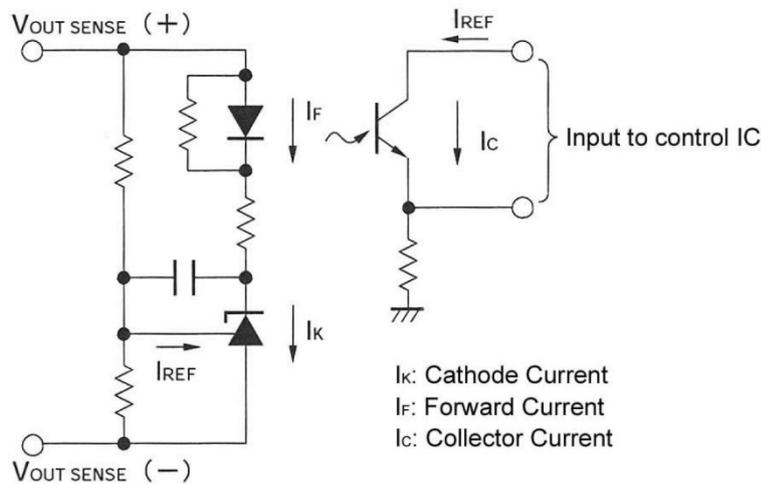
Notes 1. with 16 cm² × 0.7 mm ceramic substrate.

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

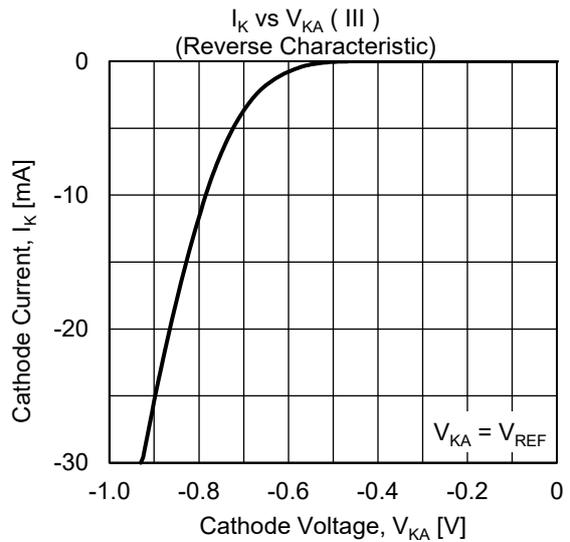
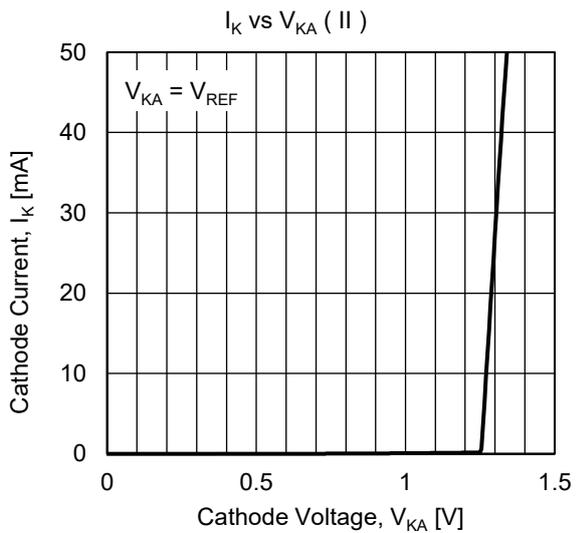
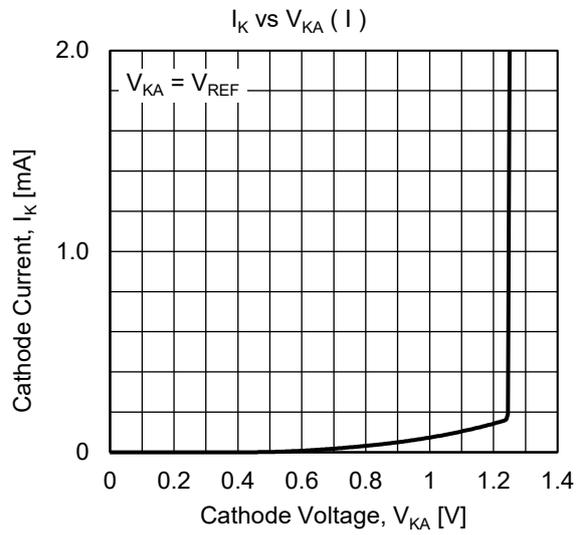
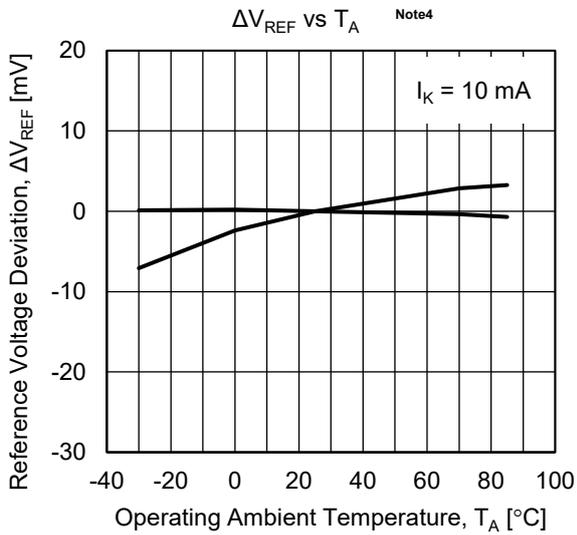
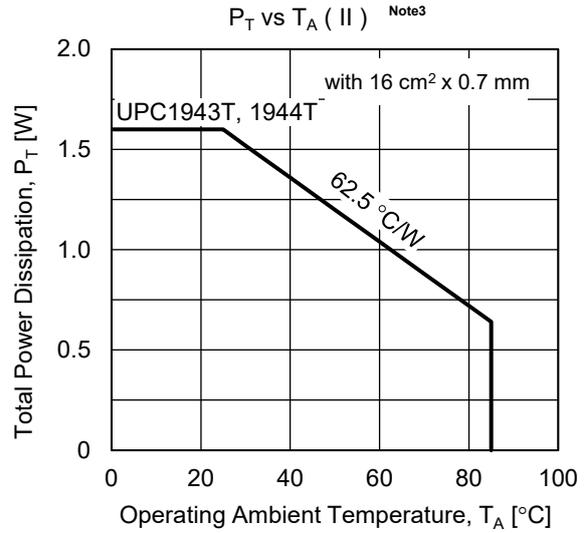
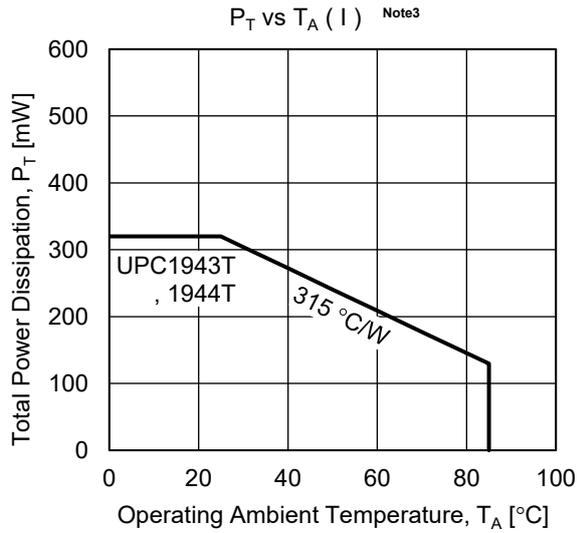
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Cathode Voltage	V_{KA}	V_{REF}		24	V
Cathode Current	I_K	1	10	30	mA
Total Power Dissipation	UPC1943T	P_T		45/240 ^{Note2}	mW
	UPC1944T				45/240 ^{Note2}
Operating Ambient Temperature	T_A	-30		+85	°C
Operating Junction Temperature	T_J	-30		+100	°C

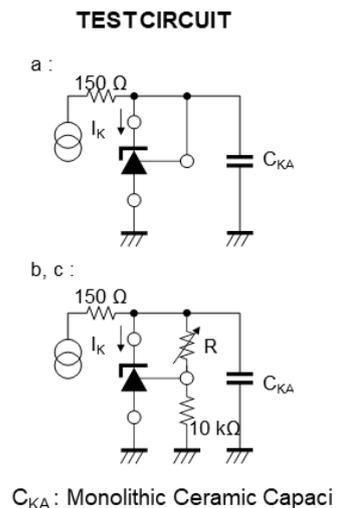
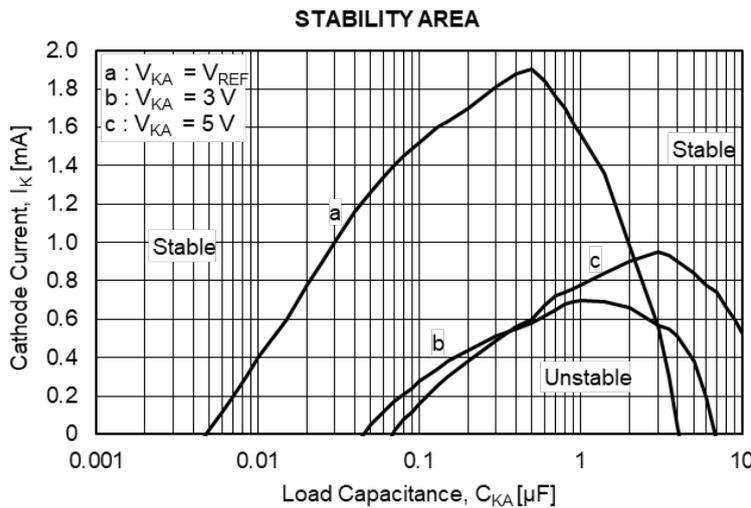
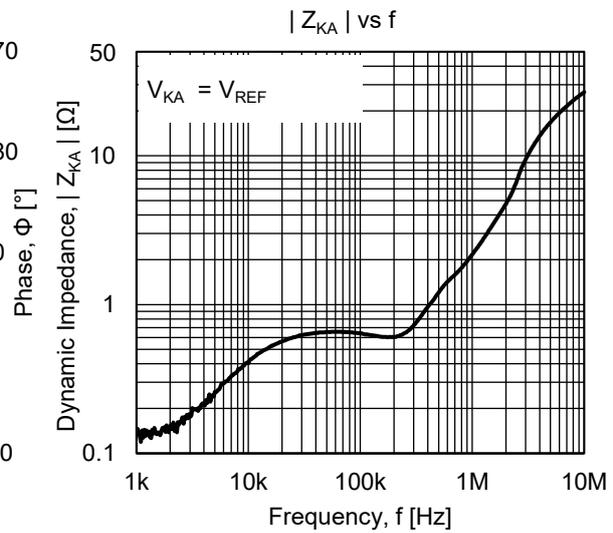
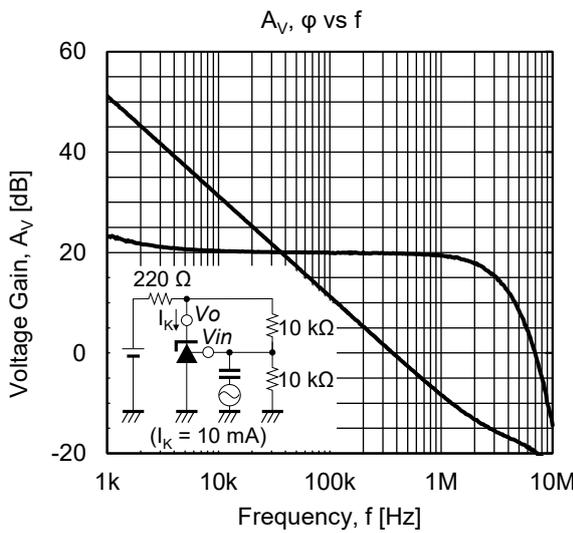
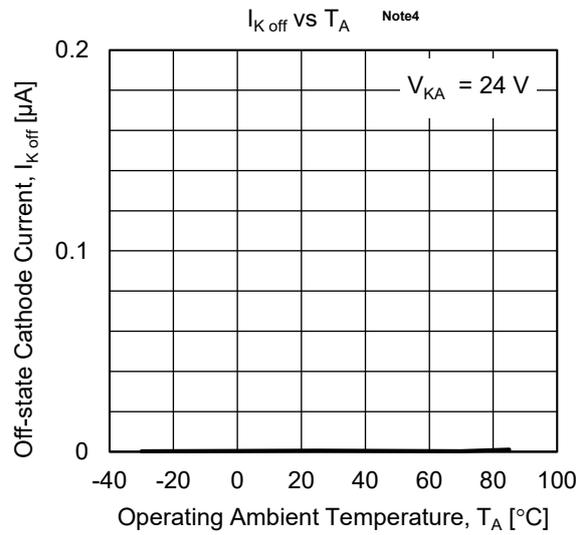
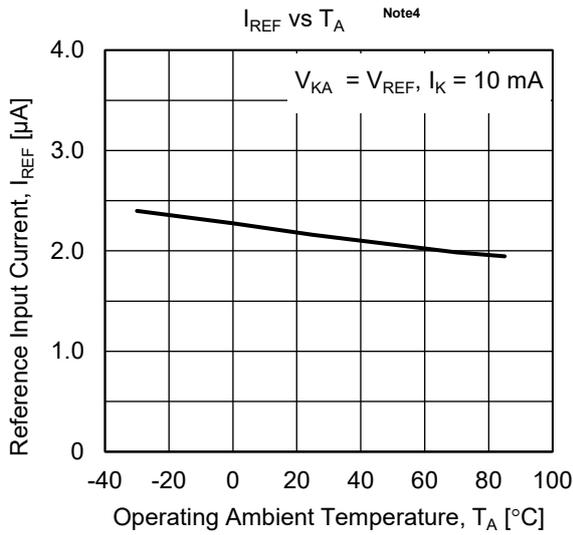
Notes 2. with 16 cm² × 0.7 mm ceramic substrate.

ELECTRICAL CHARACTERISTICS ($I_K = 10\text{mA}$, $T_A = 25^\circ\text{C}$, 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	$V_{KA} = V_{REF}$, $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$
Reference Voltage Change Over Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$			2.7	mV/V	$ V_{REF} \leq V_{KA} \leq 5\text{V}$
				2.0	mV/V	$5\text{V} \leq V_{KA} \leq 24\text{V}$
Reference Input Current	I_{REF}		2.0	4.0	μA	$V_{KA} = V_{REF}$, $R_1 = 10\text{k}\Omega$, $R_2 = \infty$
Reference Input Current Change Over Temperature	ΔI_{REF}		0.3	1.2	μA	$V_{KA} = V_{REF}$, $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$, $R_1 = 10\text{k}\Omega$, $R_2 = \infty$
Minimum Cathode Current	I_{Kmin}		0.16	1.0	mA	$V_{KA} = V_{REF}$, $\Delta V_{REF} = 2\%$
Off-state Cathode Current	I_{Koff}		0.01	1.0	μA	$V_{KA} = 24\text{V}$, $V_{REF} = 0\text{V}$
Dynamic Impedance	$ Z_{KA} $		0.12	0.5	Ω	$V_{KA} = V_{REF}$, $f \leq 1\text{kHz}$, $1\text{mA} \leq I_K \leq 30\text{mA}$

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





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

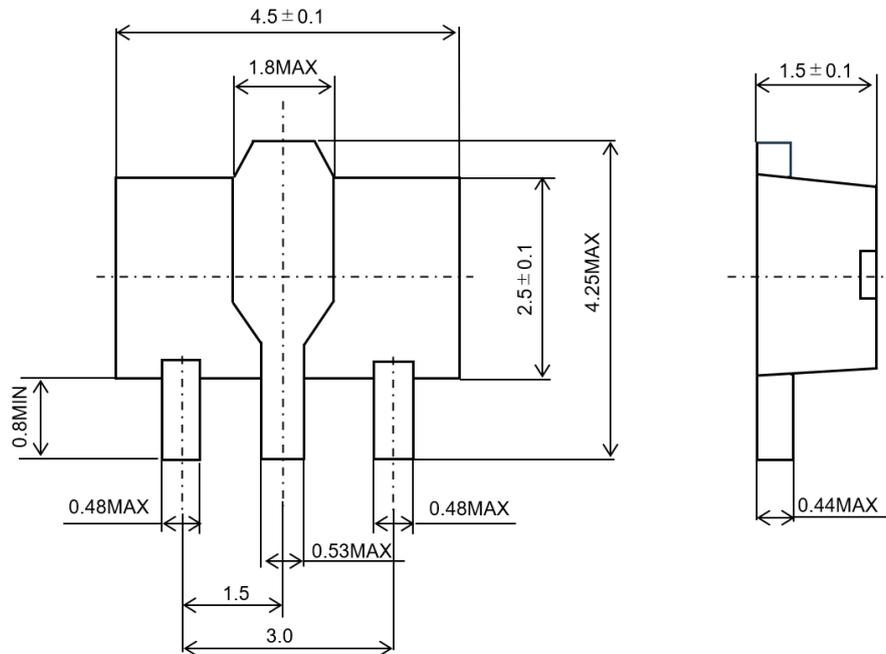
If the Aluminum electrolytic capacitor is used, it should be kept C_{KA} ≥ 6.8μF. Please note Temperature characteristic and Electrical characteristic by capacitor type etc.

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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