



FEATURES

- Low Dropout Voltage of 250mV at 300mA
- Guaranteed 300mA Output Current
- Very Low Quiescent Current at about 30uA
- $\pm 2\%$ Output Voltage Accuracy for 1.2V~3.3V
- Needs Only 1 μ F Capacitor for Stability
- Thermal Shutdown Protection
- Current Limit Protection
- Output Voltage Fast Discharge
- Low-ESR Ceramic Capacitor for Output Stability.
- Tiny SC-70-4L、SC-70-5L、SOT-23
SOT-23-5L & TSOT-23-5L Packages
- RoHS Compliant & Halogen Free
- High PSRR

APPLICATIONS

- DVD/CD-ROMs, CD/RWs
- Wireless Devices
- LCD Modules
- Battery Power Systems
- Card Readers
- XDSL Routers

DESCRIPTION

The APE8865 series are low dropout, positive linear regulators with very low quiescent current. The APE8865 can supply 300mA output current with a low dropout voltage at about 250mV.

The APE8865 regulator is able to operate with output capacitors as small as 1 μ F for stability. Other than the current limit protection APE8865 also offers on chip thermal shutdown feature providing protection against overload or any condition when the ambient temperature exceeds the junction temperature.

The APE8865 series are offering several fixed output voltage types including 1.2V ~ 3.3V.

The APE8865 series are available in low-profile, space-saving SC-70-4L、SC-70-5L、SOT-23、TSOT-23-5L & SOT-23-5L packages.

TYPICAL APPLICATION

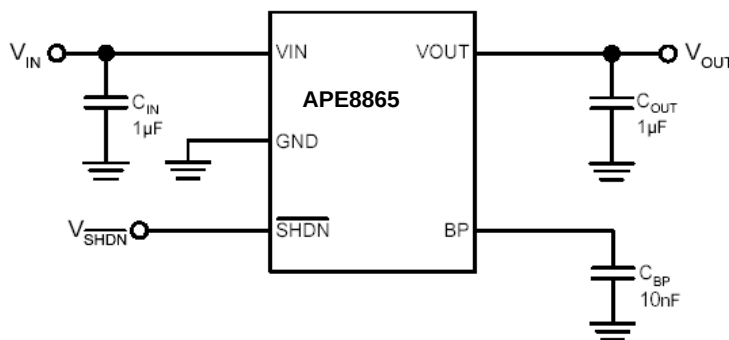


Figure 1. Typical Application Circuit of APE8865

Note : To prevent oscillation, it is recommended to use minimum 1uF X7R or X5R dielectric capacitors if ceramics are used as input / output capacitors.

ORDERING INFORMATION

APE8865X - XX	
Package Type	Output Voltage
N : SOT-23	12 : 1.2V
NR : SOT-23	19 : 1.9V
NL : SOT-23	24 : 2.4V
Y5 : SOT-23-5L	29 : 2.9V
TY5 : TSOT-23-5L	15 : 1.5V
U4 : SC-70-4L	20 : 2.0V
U5 : SC-70-5L	25 : 2.5V
	30 : 3.0V
	16 : 1.6V
	21 : 2.1V
	26 : 2.6V
	31 : 3.1V
	17 : 1.7V
	22 : 2.2V
	27 : 2.7V
	32 : 3.2V
	18 : 1.8V
	23 : 2.3V
	28 : 2.8V
	33 : 3.3V



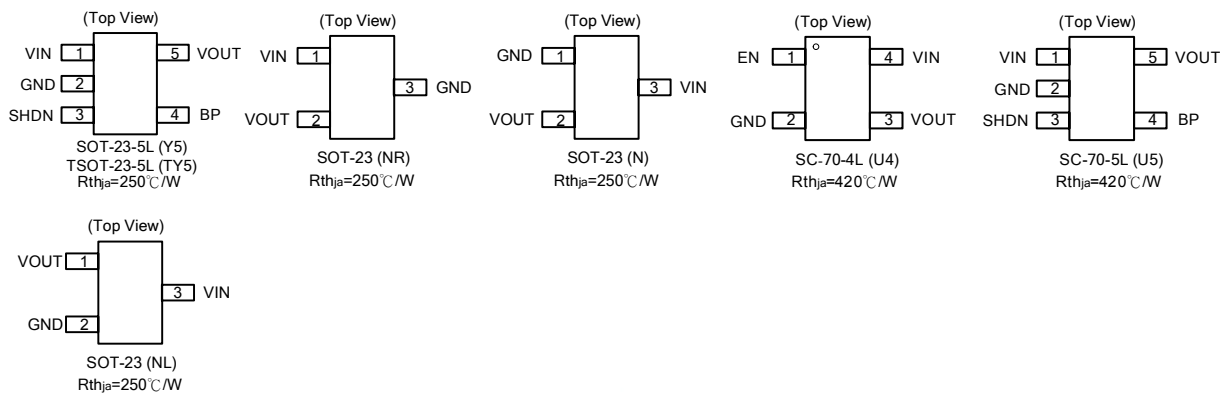
ABSOLUTE MAXIMUM RATINGS

Input Voltage (VIN)	6V
SHDN Voltage (V _{SHDN})	GND - 0.3V to VIN + 0.3V
Power Dissipation (SOT23-5L/TSOT-23-5L)	0.4W
(SOT-23)	0.4W
(SC70-4L)	0.23W
(SC70-5L)	0.23W
Storage Temperature Range	-65°C To 150°C
Maximum Junction Temperature	150°C

RECOMMENDED OPERATING CONDITIONS

Input Voltage (VIN)	2.8 to 5.5V
Operating Junction Temperature Range (T _J)	-40 to 125°C
Ambient Temperature (T _A)	-40 to 85°C

PACKAGE INFORMATION



ELECTRICAL SPECIFICATIONS

(V_{IN}=V_{OUT}+1V or V_{IN}=2.8V whichever is greater, C_{IN}=1uF, C_{OUT}=1uF, T_A=25°C, unless otherwise specified)

Parameter	SYM	TEST CONDITION	MIN	TYP	MAX	UNITS
Output Voltage Accuracy	ΔV_{OUT}	I _O = 1mA	-2	-	2	%
Current Limit	I _{LIMIT}	R _{Load} =1Ω	300	-	-	mA
Quiescent Current	I _Q	I _O = 0mA	-	30	55	μA
Dropout Voltage (Note 1)	V _{DROP}	I _O =300mA	1.2V ≤ V _{OUT} ≤ 2.0V	-	1000	mV
			2.0V < V _{OUT} ≤ 2.8V	-	350	
			2.8V < V _{OUT} ≤ 3.3V	-	250	
Line Regulation	ΔV_{LINE}	I _O =1mA, V _{IN} =V _{OUT} +1V to 5V	-	1	5	mV
Load Regulation (Note 2)	ΔV_{LOAD}	I _O =0mA to 300mA	-	6	20	mV
Ripple Rejection	PSRR	I _O =1mA, C _{OUT} =1uF, f _{RIPPLE} = 100Hz	-	-73	-	dB
		f _{RIPPLE} = 10KHz	-	-50	-	
Temperature Coefficient	TC	I _{OUT} = 1mA, V _{IN} = 5V	-	50	-	ppm/°C
Thermal Shutdown Temperature	TSD		-	160	-	°C
Thermal Shutdown Hysteresis	ΔTSD		-	25	-	°C
Shutdown Pin Current	I _{SHDN}		-	-	0.1	μA
Shutdown Pin Voltage (ON)	V _{SHDN(ON)}		1.4	-	-	V
Shutdown Pin Voltage (OFF)	V _{SHDN(OFF)}		-	-	0.4	V
Shutdown Exit Delay Time	ΔT	C _{BP} =0.1uF, C _{OUT} =1uF, I _{OUT} =30mA	-	150	-	μs

Note 1 : The dropout voltage is defined as V_{IN}-V_{OUT}, which is measured when V_{OUT} drop about 100mV.

Note 2 : Regulation is measured at a constant junction temperature by using 30ms current pulse and load regulation in the load range from 0mA to 300mA.



PIN DESCRIPTIONS

PIN SYMBOL	PIN DESCRIPTION
VIN	Power is supplied to this device from this pin which is required an input filter capacitor. In general, the input capacitor in the range of 1 μ F to 10 μ F is sufficient.
VOUT	The output supplies power to loads. The output capacitor is required to prevent output voltage unstable. The APE8865 is stable with an output capacitor 1 μ F or greater. The larger output capacitor will be required for application with large transit load to limit peak voltage transits, besides could reduce output noise, improve stability, PSRR.
GND	Common ground pin
BP	Reference Noise Bypass (the Bypass Capacitor $\geq$ 1nF)
SHDN	Chip Enable (Active High)

BLOCK DIAGRAM

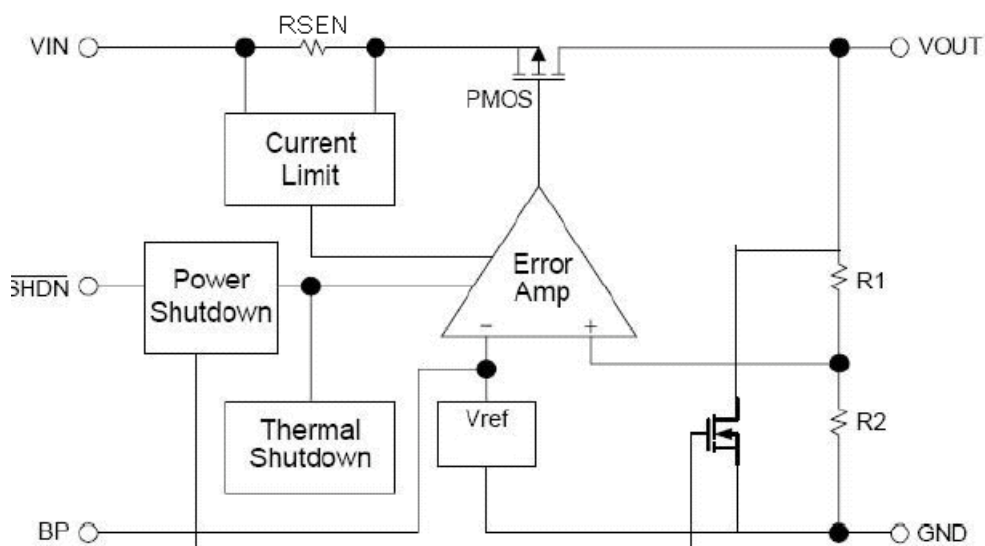
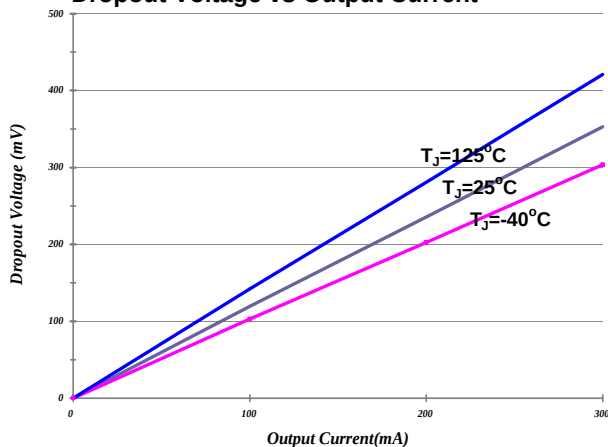


Figure 2. Block Diagram of APE8865 With Auto Discharge



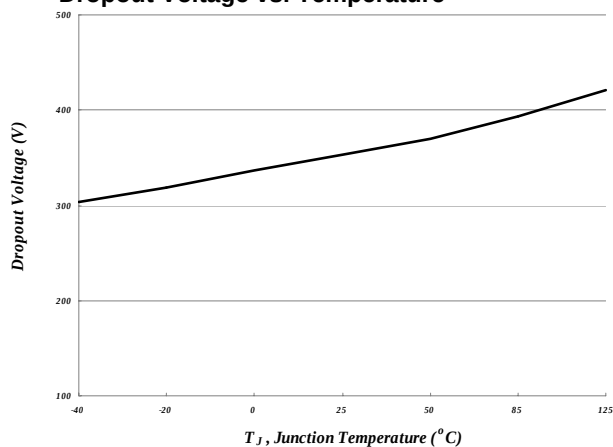
TYPICAL PERFORMANCE CHARACTERISTICS

Dropout Voltage vs Output Current



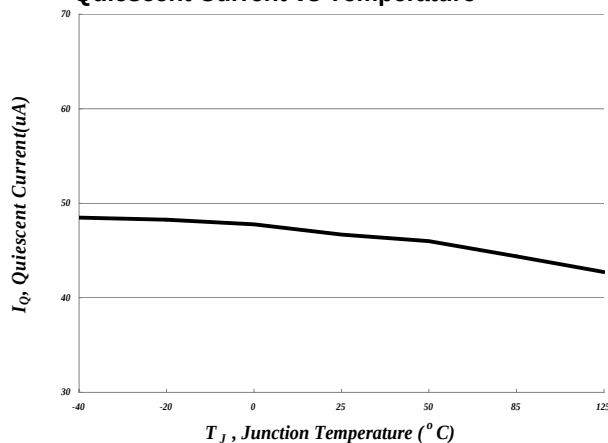
$V_{IN}=4.3\text{V}$, $V_{OUT}=3.3\text{V}$, $I_{OUT}=1 \sim 300\text{mA}$

Dropout Voltage vs. Temperature



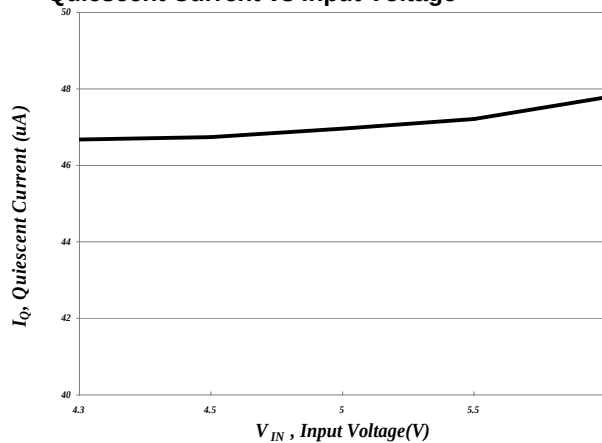
$V_{IN}=4.3\text{V}$, $V_{OUT}=3.3\text{V}$, $I_{OUT}=1 \sim 300\text{mA}$

Quiescent Current vs Temperature



$V_{IN}=4.3 \sim 6\text{V}$, $V_{OUT}=3.3\text{V}$

Quiescent Current vs Input Voltage



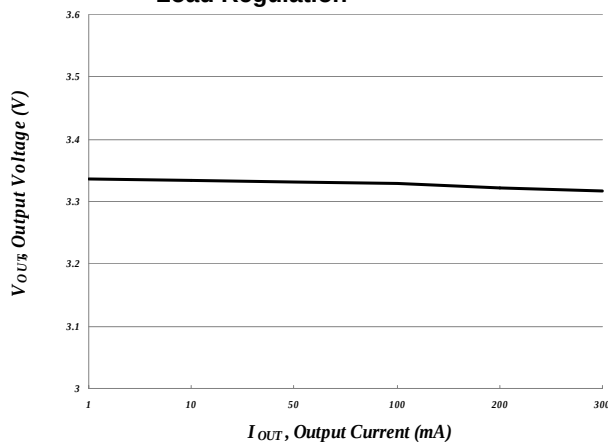
$V_{IN}=4.3 \sim 6\text{V}$, $V_{OUT}=3.3\text{V}$

Line Regulation



$V_{IN}=4.3 \sim 6\text{V}$, $V_{OUT}=3.3\text{V}$, $I_{OUT}=1\text{mA}$

Load Regulation



$V_{IN}=4.3\text{V}$, $V_{OUT}=3.3\text{V}$, $I_{OUT}=1 \sim 300\text{mA}$



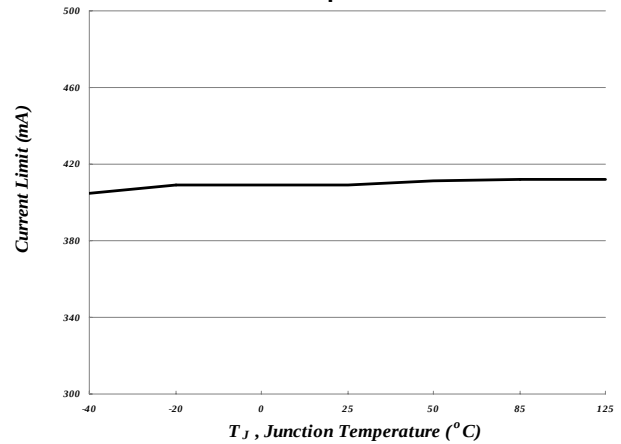
TYPICAL PERFORMANCE CHARACTERISTICS

Load Transient



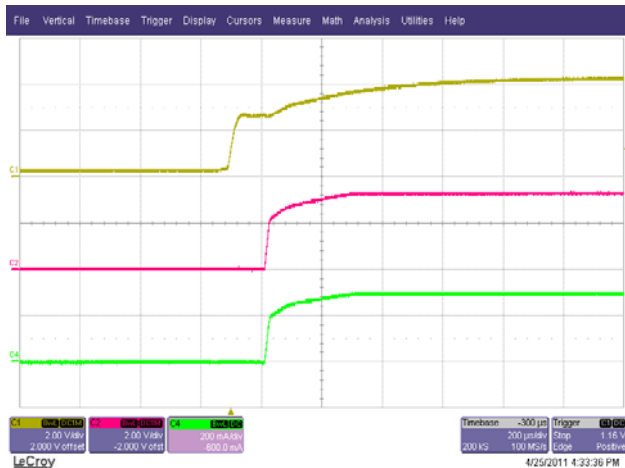
$V_{IN}=4.3V$, $V_{OUT}=1.8V$, $E_{LOAD}=10\sim300mA$

Current Limit vs Temperature



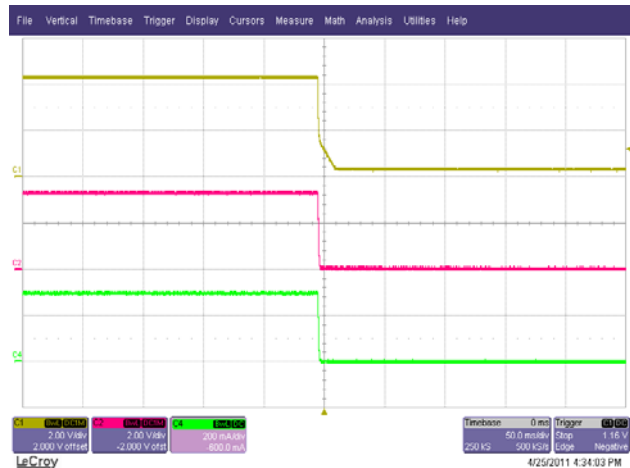
$V_{IN}=4.3V$, $V_{OUT}=3.3V$, $E_{LOAD}=Short\ GND$

Power ON



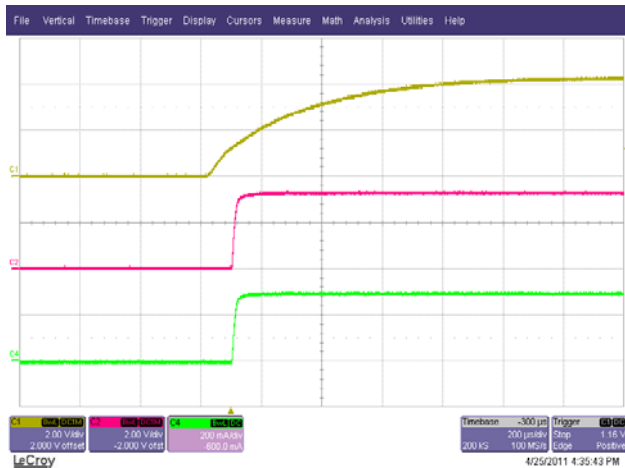
$V_{IN}=4.3V$, $V_{OUT}=3.3V$, $R_{OUT}=11\ \Omega$

Power OFF



$V_{IN}=4.3V$, $V_{OUT}=3.3V$, $R_{OUT}=11\ \Omega$

Enable ON



$V_{IN}=4.3V$, $V_{OUT}=3.3V$, $R_{OUT}=11\ \Omega$

Enable OFF

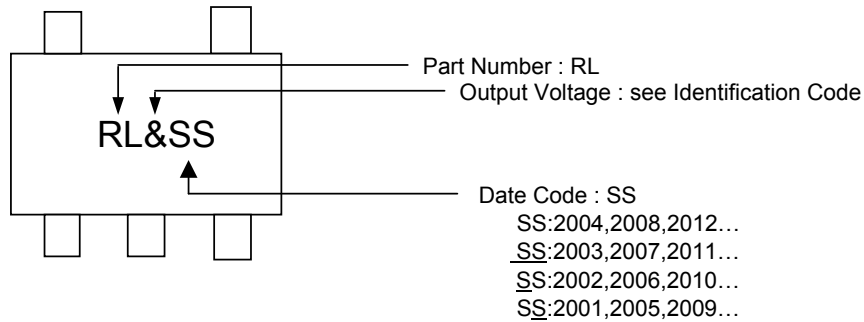


$V_{IN}=4.3V$, $V_{OUT}=3.3V$, $R_{OUT}=11\ \Omega$



MARKING INFORMATION

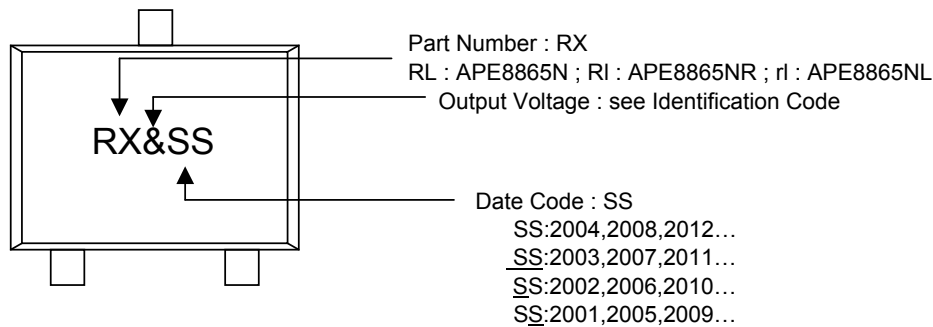
SOT-23-5L/TSOT-23-5L



SOT-23-5L

V _{OUT}	Identification Code	V _{OUT}	Identification Code
1.2V	2	2.4V	T
1.5V	5	2.5V	F
1.6V	S	2.6V	f
1.7V	X	2.7V	D
1.8V	A	2.8V	E
1.9V	a	2.9V	h
2.0V	e	3.0V	H
2.1V	B	3.1V	x
2.2V	C	3.2V	U
2.3V	v	3.3V	I

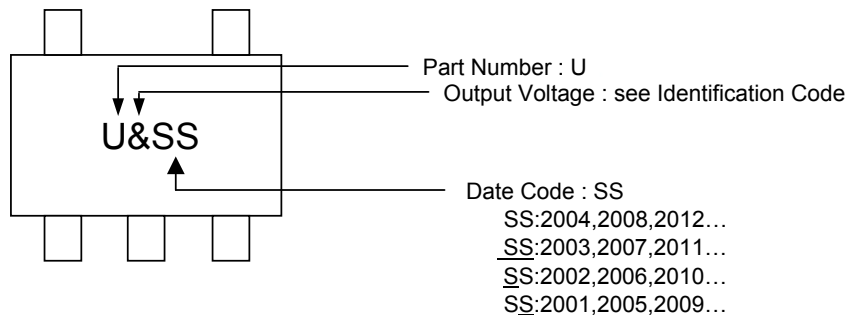
SOT-23



SOT-23

V _{OUT}	Identification Code	V _{OUT}	Identification Code
1.2V	2	2.4V	T
1.5V	5	2.5V	F
1.6V	S	2.6V	f
1.7V	X	2.7V	D
1.8V	A	2.8V	E
1.9V	a	2.9V	h
2.0V	e	3.0V	H
2.1V	B	3.1V	x
2.2V	C	3.2V	U
2.3V	v	3.3V	I

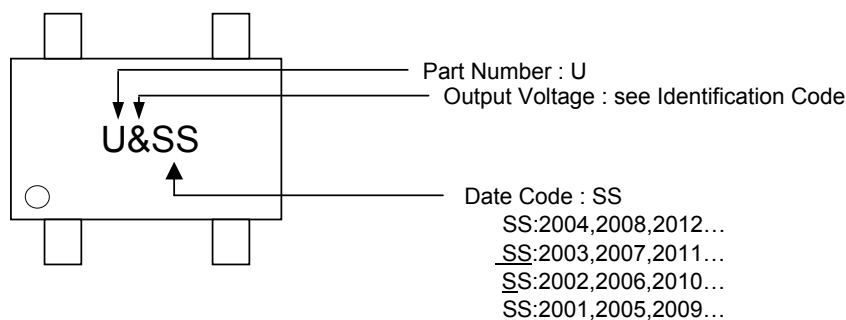
SC-70-5L



SC-70-5L

V _{OUT}	Identification Code	V _{OUT}	Identification Code
1.2V	B	2.4V	T
1.5V	C	2.5V	F
1.6V	S	2.6V	f
1.7V	X	2.7V	w
1.8V	D	2.8V	G
1.9V	a	2.9V	h
2.0V	e	3.0V	H
2.1V	b	3.1V	x
2.2V	O	3.2V	U
2.3V	v	3.3V	I

SC-70-4L



SC-70-4L

V _{OUT}	Identification Code	V _{OUT}	Identification Code
1.2V	B	2.4V	T
1.5V	C	2.5V	F
1.6V	S	2.6V	f
1.7V	X	2.7V	w
1.8V	D	2.8V	G
1.9V	a	2.9V	h
2.0V	e	3.0V	H
2.1V	b	3.1V	x
2.2V	O	3.2V	U
2.3V	v	3.3V	I