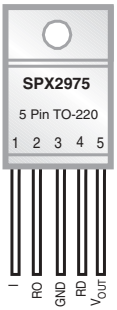
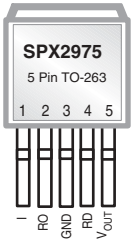
400mA Low Dropout Voltage Regulator

FEATURES

- 5V Fixed Output
- High Accuracy
- Very Low Current Consumption: 70μA
- Power-on and Under Voltage Reset
- Reset Low Down to V_{OUT} = 1V
- Extremely Low Dropout Voltage
- Short Circuit Protection
- Programmable Safety Timer
- 4kV ESD Protection





APPLICATIONS

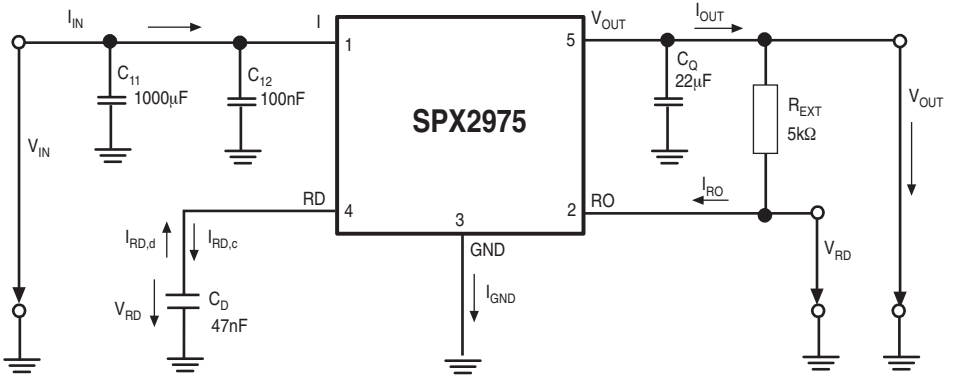
- Automotive Electronics
- Wireless Station
- Industrial Systems

Now Available in Lead Free Packaging

DESCRIPTION

Sipex's SPX2975 is a low dropout linear regulator with integrated PNP pass transistor. The part is available in a 5 pin TO-220 package or surface mount TO-263. The part used to convert an automotive battery voltage, with allowable input up to 45V, down to 5V with at least 400mA output current delivered. Internal power consumption is kept to 60uA ideal for applications where micro-power operation is important. At over-temperature the SPX2975 is turned off by the integrated temperature protection circuit. A reset signal is generated for a typical output voltage of 4.65V with a time delay that can be programmed by an external delay capacitor.

TYPICAL APLICATION CIRCUIT



ABSOLUTE MAXIMUM RATINGS

Input Voltage ..... -42V to 45V
Output Voltage ..... -1.0 to 16V
Output Current ..... Internally limited
Reset Output Voltage ..... -0.3 to 25V
Reset Output Current ..... -5mA to +5mA
Reset Delay Voltage ..... -0.3V to 7.0V
Reset Delay Current ..... -2mA to 2mA
Storage Temperature ..... -50°C to +150°C
Junction Temperature.(Note 1) ..... -40°C to +150°C

5 Pin TO-220
T_{JA}.....27.8ºC/W
T_{JC}.....79ºC/W
5 Pin T0 263
T_{JA}.....57.2ºC/W
T_{JC}.....7.6ºC/W

These are stress ratings only and functional operation of the device at these ratings or any other above those indicated in the operation sections of the specifications below is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

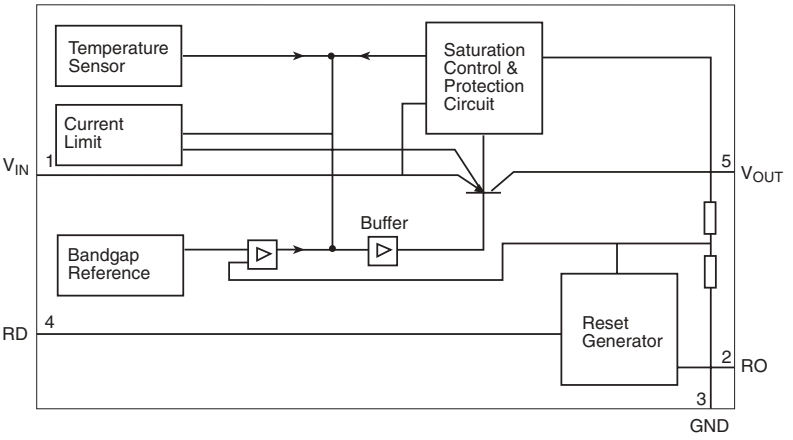
ELECTRICAL CHARACTERISTICS

V_{IN} = 13.5V; -40°C < T_j < 150°C. Unless otherwise specified.

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
Input Voltage	5.5		42	V	
Junction Temperature	-40		150	C	
Output Voltage	4.9	5.0	5.1	V	5mA < I_Q < 400mA 6V < V_I < 28V
Output Voltage	4.9	5.0	5.1	V	5mA < I_Q < 200mA 6V < V_I < 40V
Output Current limitation (note 1)	450	700		V	
Output Leakage Current		0.1	100	μA	
Current Consumption		70	200	μA	I_{OUT} = 1mA
Current Consumption		7	10	mA	I_{OUT} = 250mA
Current Consumption		17	22	mA	I_{OUT} = 400mA
Dropout Voltage (note 2)		350	500	mV	I_{OUT} = 300mA V_{DO} = V_{OUT} - V_{IN}
Load Regulation		5	30	mV	I_{OUT} = 5mA to 400mA
Line Regulation	-15	2	15	mV	V_{IN} = 8V to 32V I_{OUT} = 5mA
PSRR		60		dB	fr = 100Hz; Vr = 0.5Vpp
Temperature Output Voltage Drift		0.2		mV/K	
Reset Switching Threshold	4.5	4.65	4.8	V	V_{TH}
Reset Output Low Voltage		0.2	0.4	V	Rext ≥ 5kΩ ; V_{OUT} > 1 V
Reset Output Leakage Current		0	10	μA	VROH = 5V
Reset Charging Current	3.0	5.5	9.0	μA	V_{RD} = 1V
Upper Timing Threshold	1.5	1.8	2.2	V	Vth_H
Lower Timing Threshold	0.2	0.4	0.7	V	Vth_L
Reset Delay Time	10	16	22	mS	C_O = 47nF, Td
Reset Reaction Time		0.5	2.0	μs	C_O = 47nF, Trv

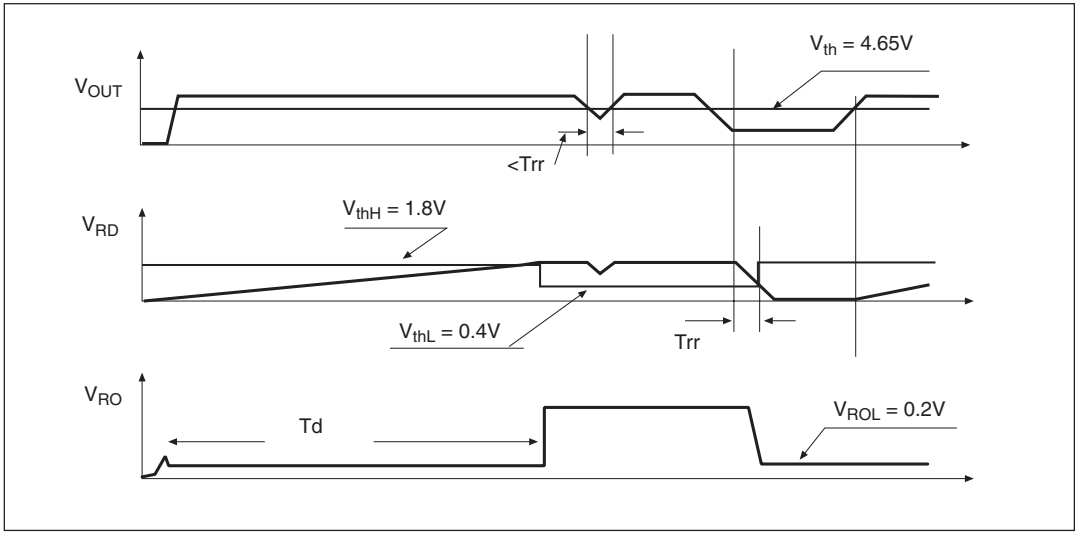
Note 1: Specifications in the -40°C to 150°C range are guaranteed by design, not production tested.
Note 2: Measured when the output voltage (Vout) has dropped 100mV form the nominal value obtained at Vin=13.5V

FUNCTIONAL DIAGRAM

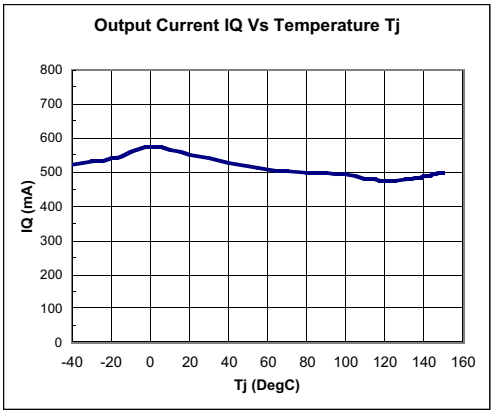


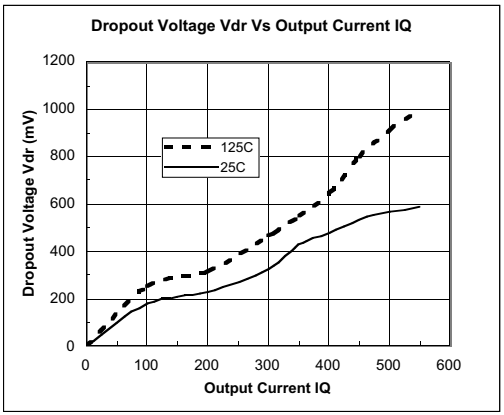
PIN DESCRIPTION

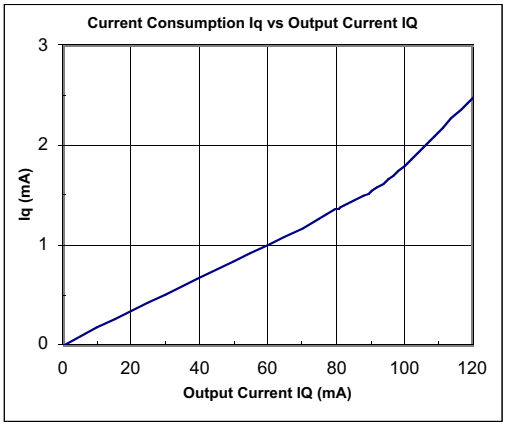
PIN NUMBER	PIN NAME	DESCRIPTION
1	V_{IN}	LDO Input. Bypass V_{IN} to GND with a Ceramic capacitor.
2	RO	Reset Output. RO remains low while V_{OUT} is below the reset switching threshold. RO is in open conector output.
3	GND	Ground. This pin also functions as a heatsink. Solder to large pads or the circuit-board ground plane to maximize thermal dissipation.
4	RD	Reset Delay. RD connects capacitor to GND for setting delay time.
5	V_{OUT}	LDO Output. Bypass V_{OUT} to GND with a minimum 22µF capacitor with ESR less than 5Ω at 10kHz.

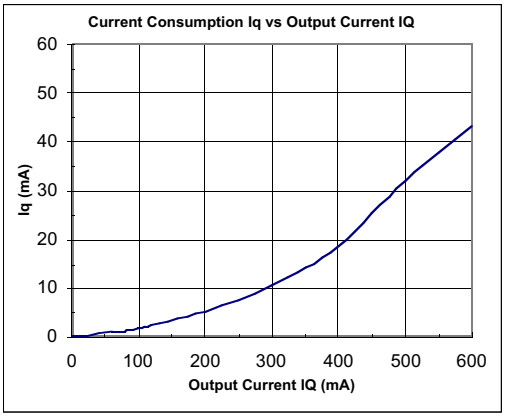


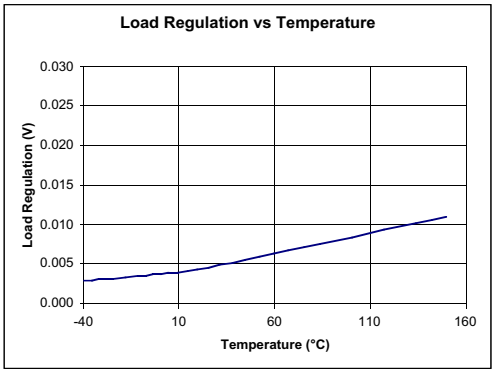
Reset Timing

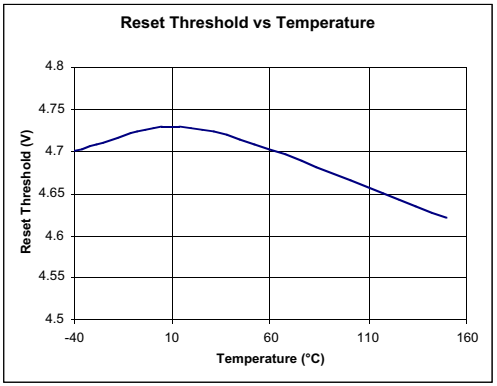


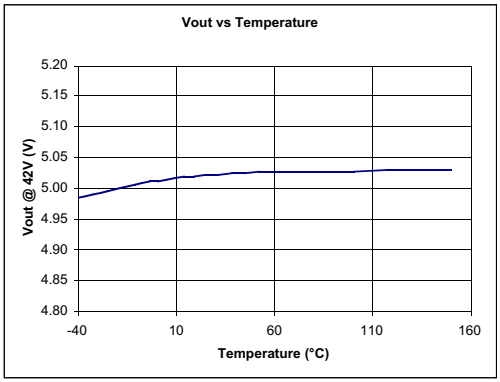


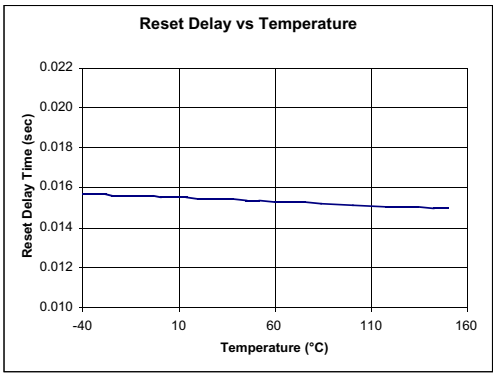


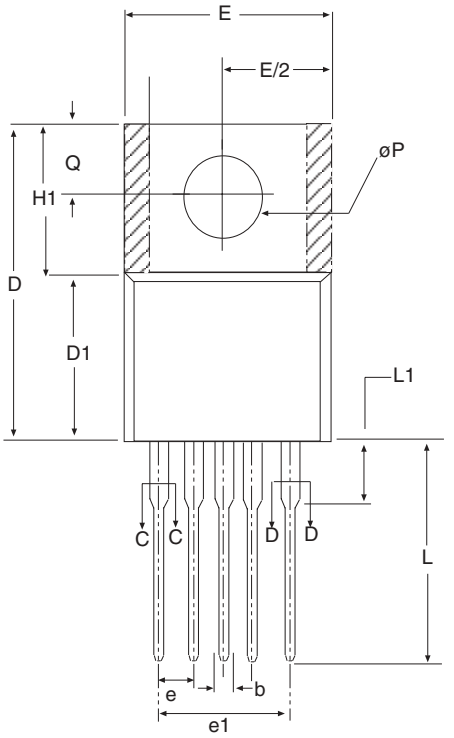


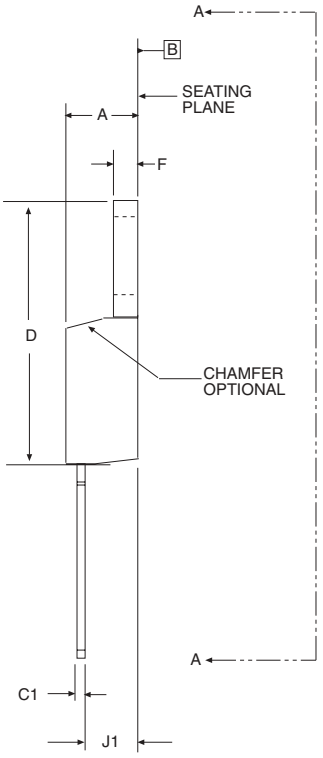






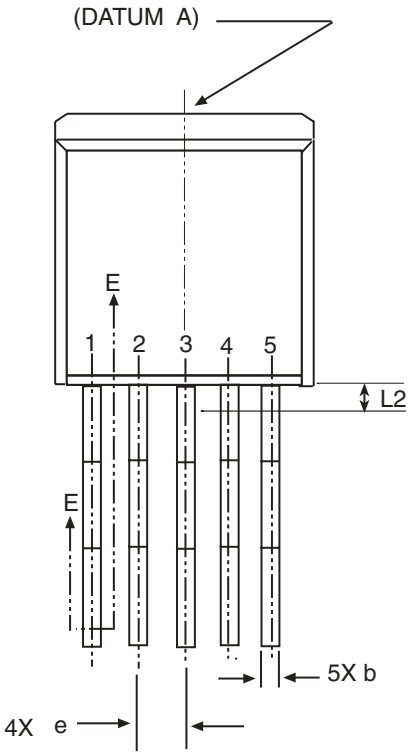


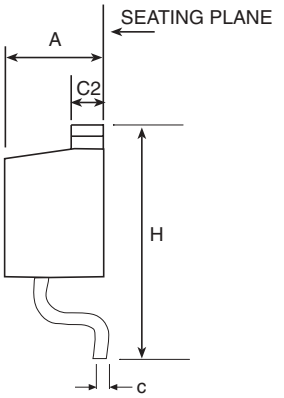


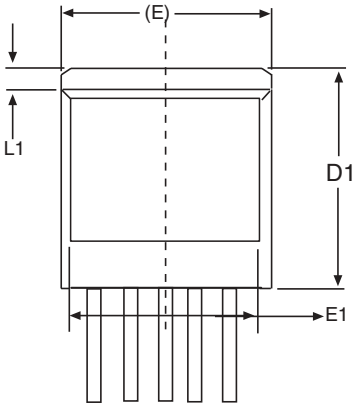


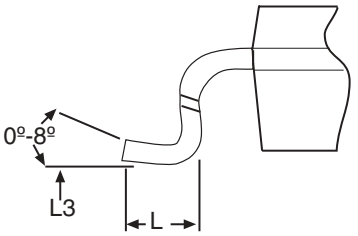
5 PIN TO-220	Dimensions in (inches)		
	MIN	NOM	MAX
A	.160	-	.190
b	.015	-	.040
C1	.014	-	.022
D	.560	-	.590
E	.385	-	.415
e	.385	-	.415
e1	.062	-	.072
F	.045	-	.055
H1	.234	-	.258
J1	.090	-	.115
L	.540	-	.560
L1		-	.250
ΔP	.146	-	.156
Q	.103	-	.113
U	-	.30	-
V	-	.24	-

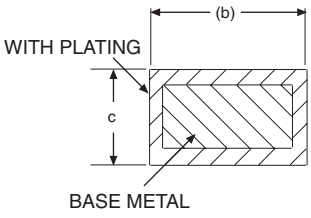
5 PIN TO-220











5 PIN TO-263 JEDEC TO-263 (BB) Variation	Dimensions in (mm)		
	MIN	NOM	MAX
A	.160	-	.190
A1	0	-	.010
b	.020	-	.039
c	.015	-	.029
c2	.045	-	.023
D1	.270	-	-
E	.380	-	.420
E1	.245	-	-
e	.067 BSC		
H	.575	-	.625
L	.070	-	.110
L1	-	-	.066
L2	-	-	.070
L3	.010 BSC		

5 PIN TO-263

ORDERING INFORMATION

Part number	Accuracy	Output Voltage	Package Type
SPX2975U5-5.0	2%	5.0V	5 Lead TO-220
SPX2975T5-5.0	2%	5.0V	5 Lead TO-263
SPX2975T5-5.0/TR	2%	5.0V	5 Lead TO-263

Available in lead free packaging. To order add "-L" suffix to part number.

Example: SPX2975T5-5.0/TR = standard; SPX2975T5-5.0-L/TR = lead free

/TR = Tape and Reel

Pack quantity is 500 for TO-263.

ANALOG EXCELLENCE

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