IP9004A

5-CH MOTOR DRIVE IC

DESCRIPTIONS

The IP9004A is a 5-CH motor driver for CD-P/VCDP/ DVDP systems. It is composed of 4-CH BTL driver and 1-CH forward/reverse controlled DC motor driver.

32SSOPH375-B

FEATURES

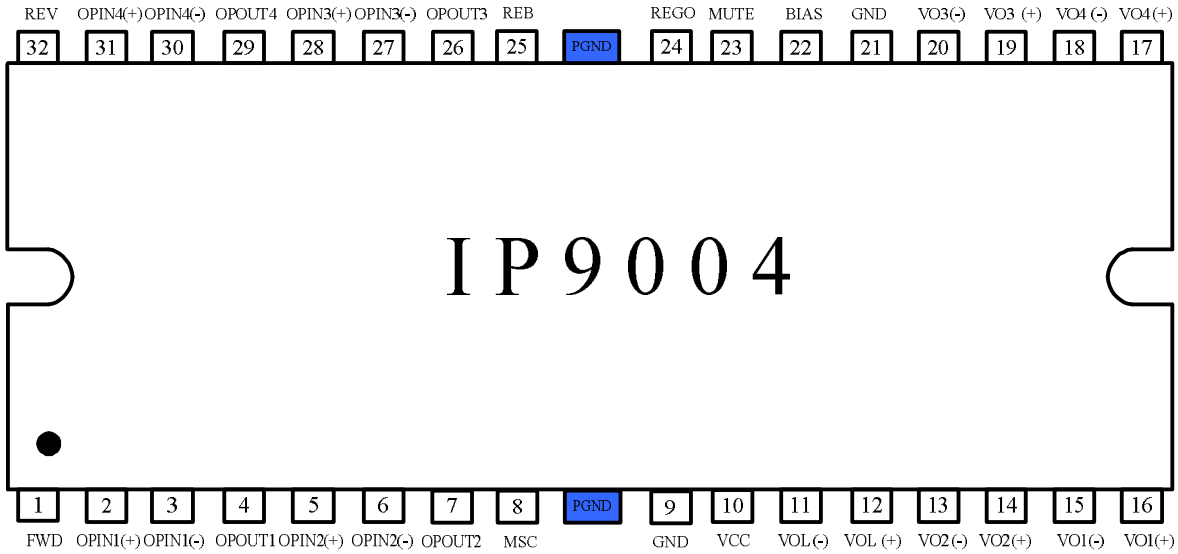
- 4-CH BTL(Balanced Transfomerless) driver
- 1-CH forward/reverse controlled DC motor driver
- Built-in TSD (thermal shut down) circuit
- Built-in mute circuit
- Built-in MSC (motor speed control) circuit
- Built-in 5V regulator with an external PNP TR
- Operating supply voltage (4.5V~13.2V)

ORDER INFORMATION

Device	Package	Operating Temp
IP9004A	32SSOPH	-35°C ~ +85°C
IP9004AL	32SSOPH	-35°C ~ +85°C
IP9004A-TF	32SSOPH	-35°C ~ +85°C
IP9004AL-TF	32SSOPH	-35°C ~ +85°C

- L : Lead Free products
- TF : Tape & Reel packing
- L-TF : Lead Free and Tape & Reel packing

PIN CONNECTIONS



PIN DESCRIPTIONS

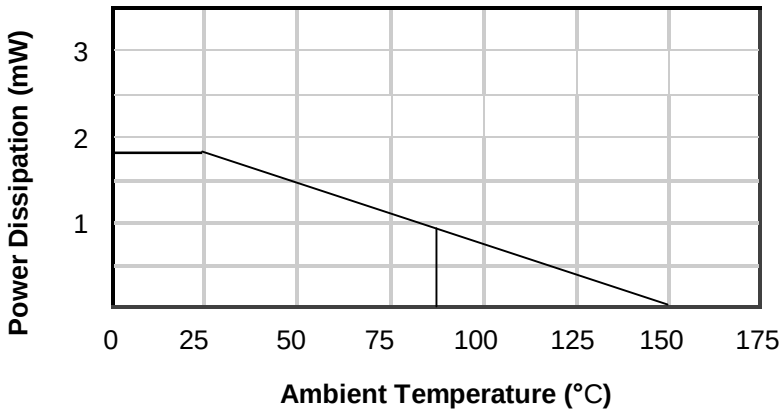
NO	SYMBOL	I/O	DESCRIPTION	NO	SYMBOL	I/O	DESCRIPTION
1	FWD	I	Forward Input	17	V_{O4}(+)	O	CH4 OUPUT(-)
2	OPIN1(+)	I	CH1 OP-AMP Input (+)	18	V_{O4}(-)	O	CH4 OUPUT(+)
3	OPIN1(-)	I	CH1 OP-AMP Input (-)	19	V_{O3}(+)	O	CH3 OUPUT(-)
4	OPOUT1	O	CH1 OP-AMP Output	20	V_{O3}(-)	O	CH3 OUPUT(+)
5	OPIN2(+)	I	CH2 OP-AMP Input (+)	21	GND	-	GROUND
6	OPIN2(-)	I	CH2 OP-AMP Input (-)	22	BIAS	I	BIAS
7	OPOUT2	O	CH2 OP-AMP Output	23	MUTE	I	MUTE
8	MSC	I	MOTOR SPEED CONTROL	24	REGO	O	REGULATOR OUTPUT
9	GND	-	GROUND	25	REB	O	REGULATOR BASE
10	Vcc	I	Supply Voltage	26	OPOUT3	O	CH3 OP-AMP Output
11	V_{OL}(-)	O	LOADING OUPUT(-)	27	OPIN3(-)	I	CH3 OP-AMP Input (-)
12	V_{OL}(+)	O	LOADING OUPUT(+)	28	OPIN3(+)	I	CH3 OP-AMP Input (+)
13	V_{O2}(-)	O	CH2 OUPUT(-)	29	OPOUT4	O	CH4 OP-AMP Output
14	V_{O2}(+)	O	CH2 OUPUT(+)	30	OPIN4(-)	I	CH4 OP-AMP Input (-)
15	V_{O1}(-)	O	CH1 OUPUT(-)	31	OPIN4(+)	I	CH4 OP-AMP Input (+)
16	V_{O1}(+)	O	CH1 OUPUT(+)	32	REV	I	Reverse Input

ABSOLUTE MAXIMUM RATINGS

CHARACTERISTICS	SYMBOL	VALUE	UNIT
Maximum supply voltage	VCCmax	15	V
Power dissipation	Pd	1.8 *	W
Operating temperature	Topr	-35 ~ +85	°C
Storage temperature	Tstg	-55 ~ 150	°C

Note>
1. When mounted on 50mm X 50mm X 1mm PCB (Phenolic resin material).
2. Power dissipation reduces 14.4 mW/°C for using above Ta=25°C
3. Do not exceed Pd and SOA.

POWER DISSIPATION CURVE



RECOMMENDED OPERATING CONDITIONS

CHARACTERISTICS	SYMBOL	VALUE	UNIT
Supply Voltage	VCC	*4.5 ~ 13.2	V

* Supply voltage must be larger than 6.0V, when 5.0V regulator is used.

ELECTRICAL CHARACTERISTICS

(VCC=8V, RL = 12ohm, Ta = 25°C unless otherwise specified.)

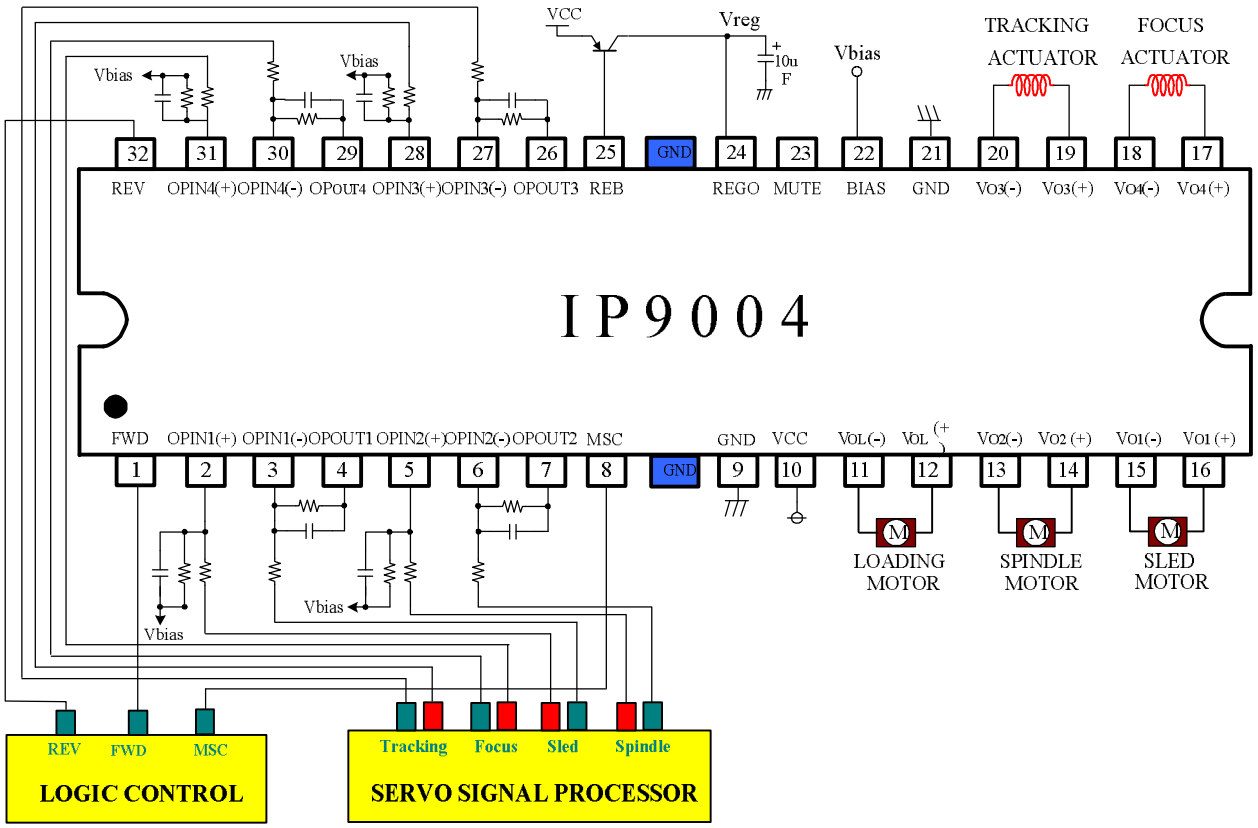
CHARACTERISTICS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent circuit current	Icc	No Load	-	24	-	mA
Mute on voltage	Vmon	Pin23=Variable	-	-	0.5	V
Mute off voltage	Vmoff	Pin23=Variable	1.5	-	-	V
[BTL DRIVER PART]						
Output offset voltage	Voo		-80	0	80	mV
Maximum output voltage	Vom	RL=12ohm	4.7	5.3	-	V
Voltage gain	Gvc	Vin=0.1Vrms, f=1Khz	14	16	18	dB
Ripple rejection ratio	RR	Vin=0.1Vrms, f=120Hz	50	60	-	dB
Slew rate	SR	Vout=4Vp-p, square	-	1.5	-	V/us
[INPUT OPAMP CIRCUIT]						
Common Mode Input Range	V_{ICM}	-	0.5	-	6.8	V
High level output voltage	V_{OHOP}	-	7.0	-	-	V
Low level output voltage	V_{OLOP}	-	-	-	0.5	V
Output sink current	I_{SINK}	R_{Vcc}=50ohm	1	-	-	mA
Output source current	I_{SOU}	R_{GND}=50ohm	1	-	-	mA
[LOADING DRIVER PART]						
Input high level voltage	Vih	-	2	-	-	V
Input high level voltage	Vil	-	-	-	0.5	V
Output voltage	Vo	RL=45ohm,Pin8=open	5.4	6.0	-	V
Output voltage regulation	Vo	RL=45ohm, ΔV_{Pin8}=1.0 V	2	2.5	3	V
Output offset voltage 1	△Voo1	Pin1,Pin32=5V	-80	-	+80	mV
Output offset voltage 2	Voo2	Pin1,Pin32=0V	-80	-	+80	mV

ELECTRICAL CHARACTERISTICS

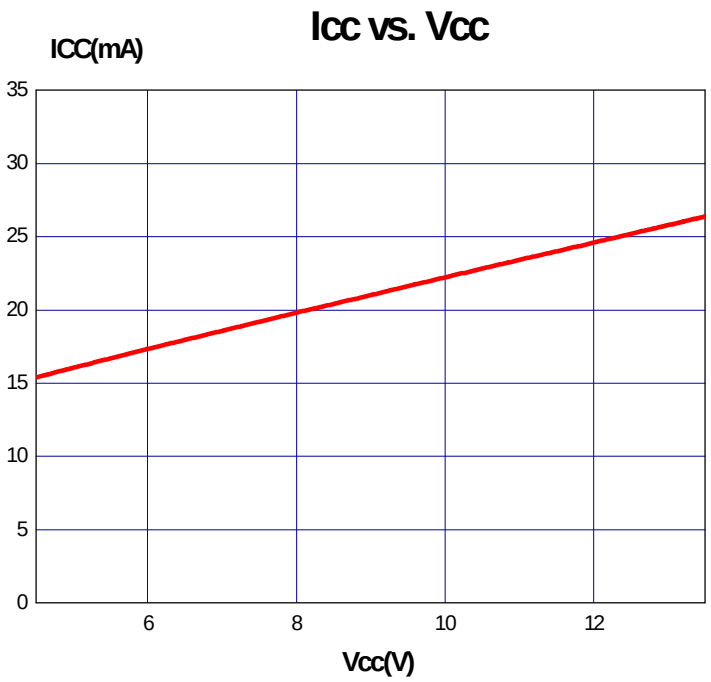
(VCC=8V, RL = 8ohm, Ta = 25°C unless otherwise specified.)

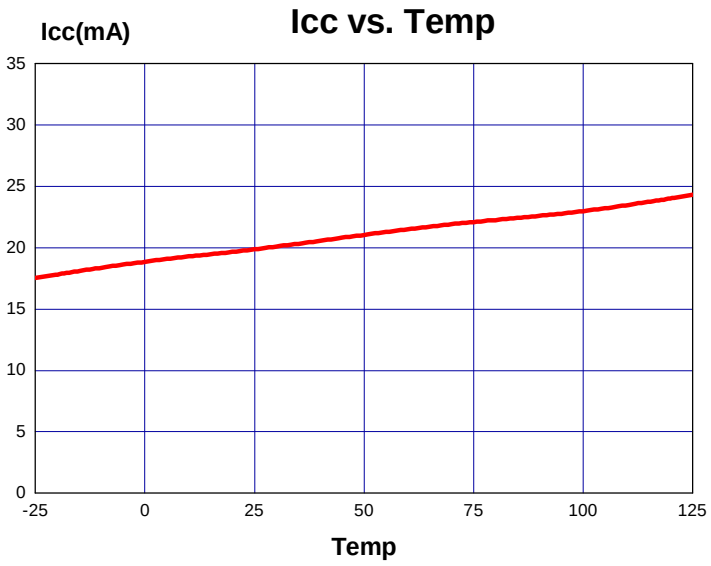
CHARACTERISTICS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
[REGULATOR PART]						
Output voltage	V_{REG}	IL=100mA	4.7	5.0	5.3	V
Load Regulation	ΔVom	IL=0->200mA	-50	0	50	mV
Line Regulation	ΔVcc	Vcc=6->10V,IL=100mA	-60	0	60	mV

TYPICAL APPLICATION CIRCUIT



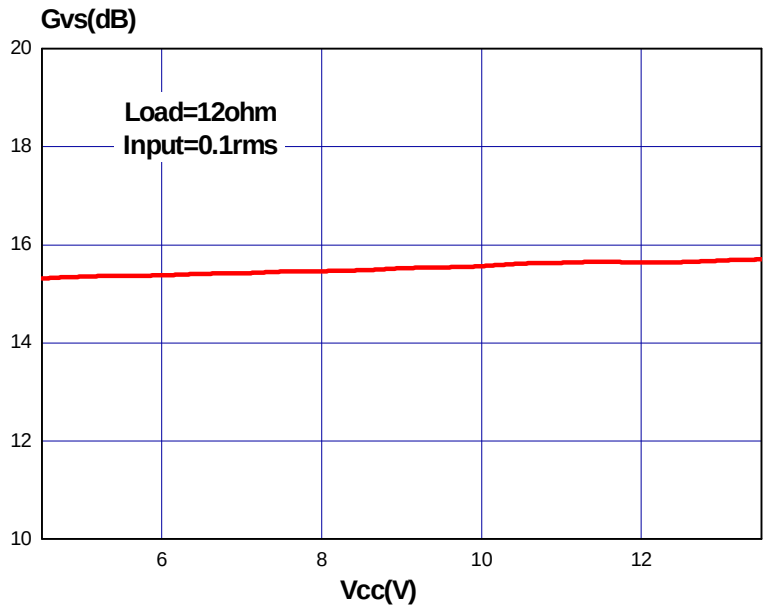
ELECTRICAL CHARACTERISTICS CURVES



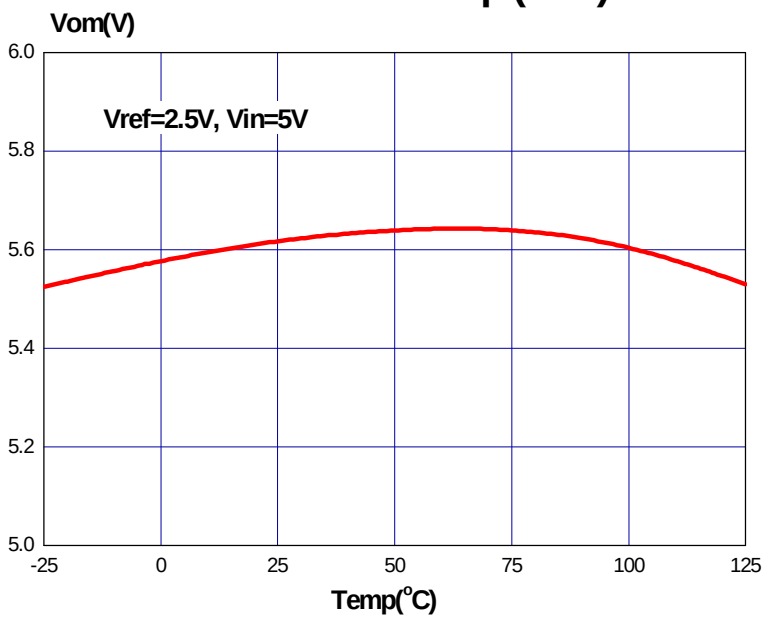


ELECTRICAL CHARACTERISTICS CURVES (Continued)

Gvs vs. Vcc (CH3)

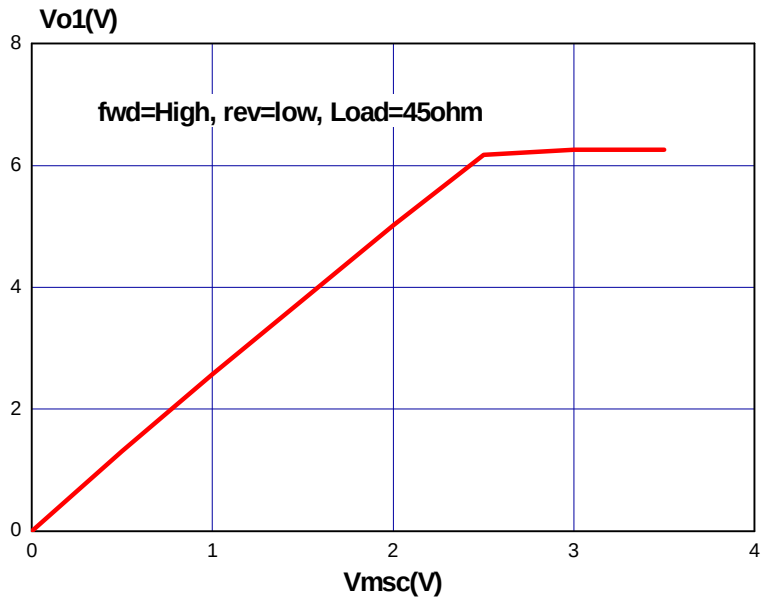


Vom vs. Temp (CH3)

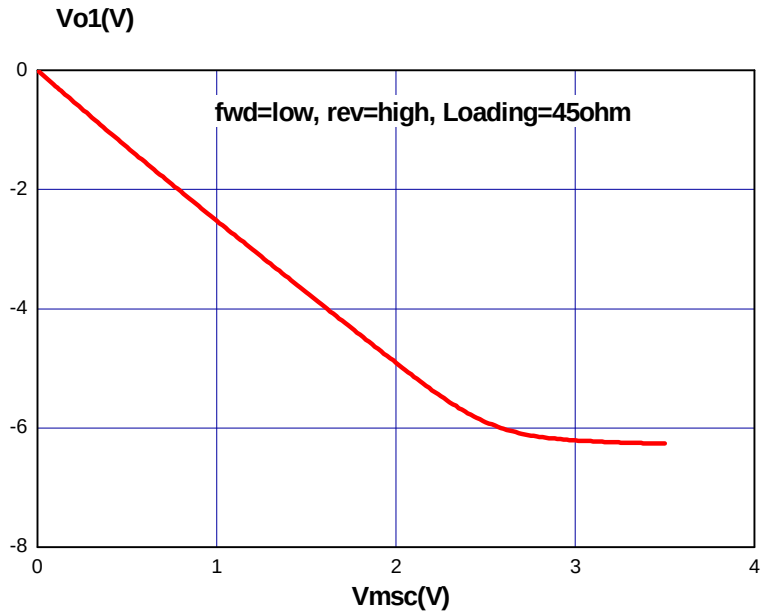


ELECTRICAL CHARACTERISTICS CURVES (Continued)

Vo1 vs. Vmsc (loading)

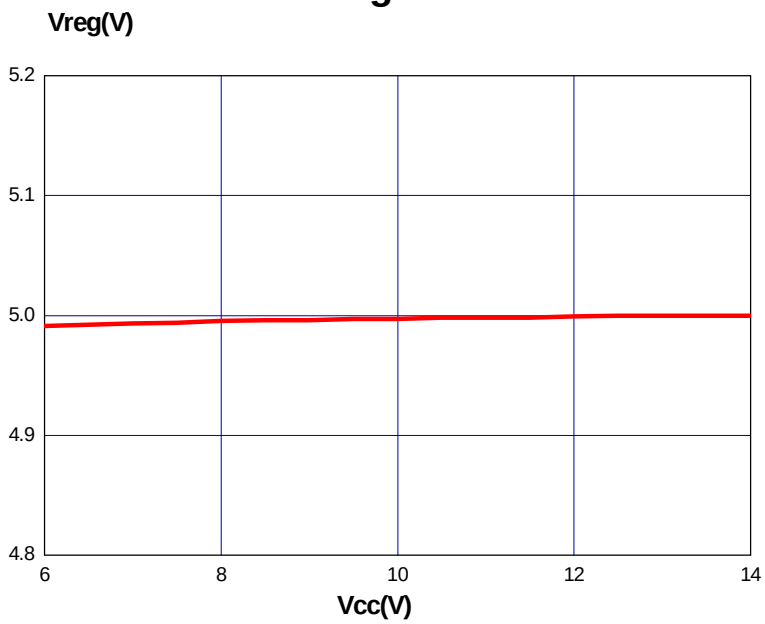


Vo1 vs. Vmsc(loading)

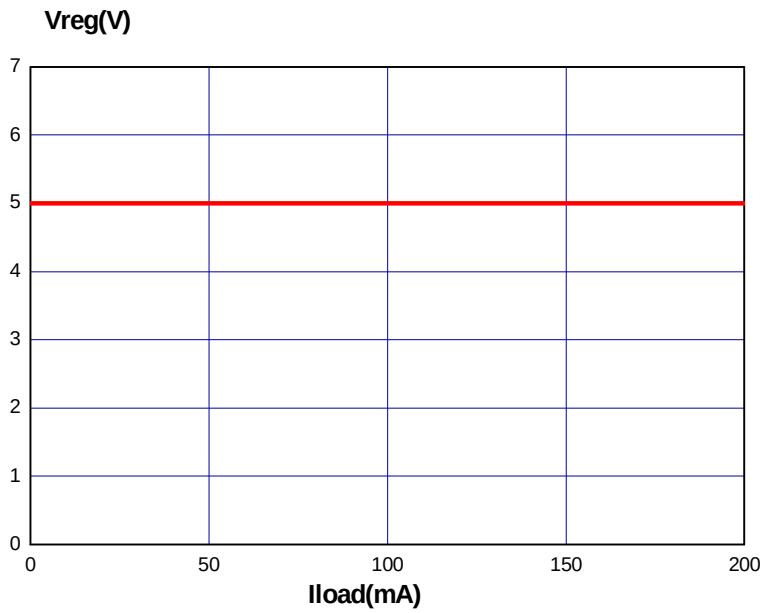


ELECTRICAL CHARACTERISTICS CURVES (Continued)

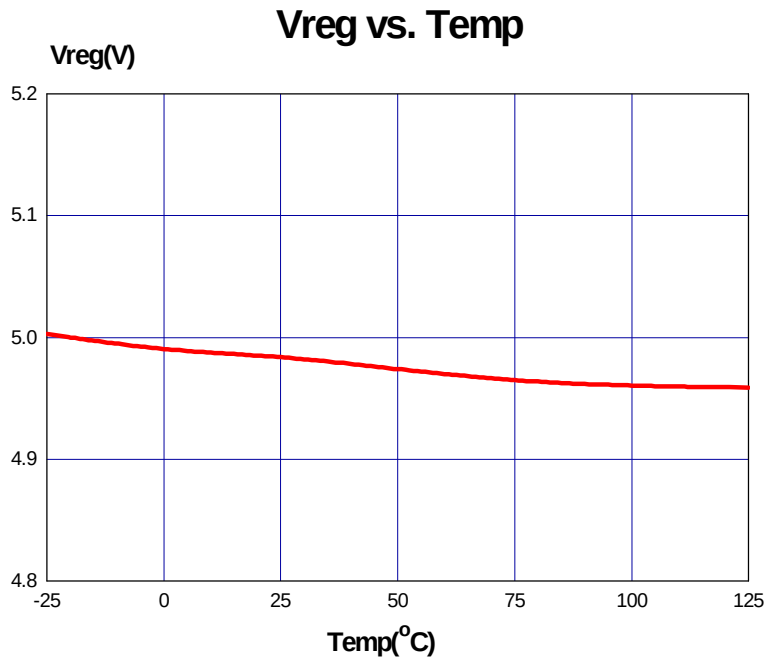
Vreg vs. Vcc



Vreg vs. Iload



ELECTRICAL CHARACTERISTICS CURVES (Continued)



PACKAGE DIMENSION

[32SSOPH