

M62290L/FP

5.0 V Fixed Output Voltage DC/DC Converter

REJ03D0850-0300

Rev.3.00

Jun 15, 2007

General Description

The M62290L/FP is a general purpose DC/DC converter which provides 5.0 V fixed output.

It is possible to simplify peripheral circuits and to design compact and low cost sets because this IC includes a lot of functions in small 5 or 8-pin packages.

Especially this is most suitable for a local voltage regulator of audio sets as a converter from 12 V to 5 V.

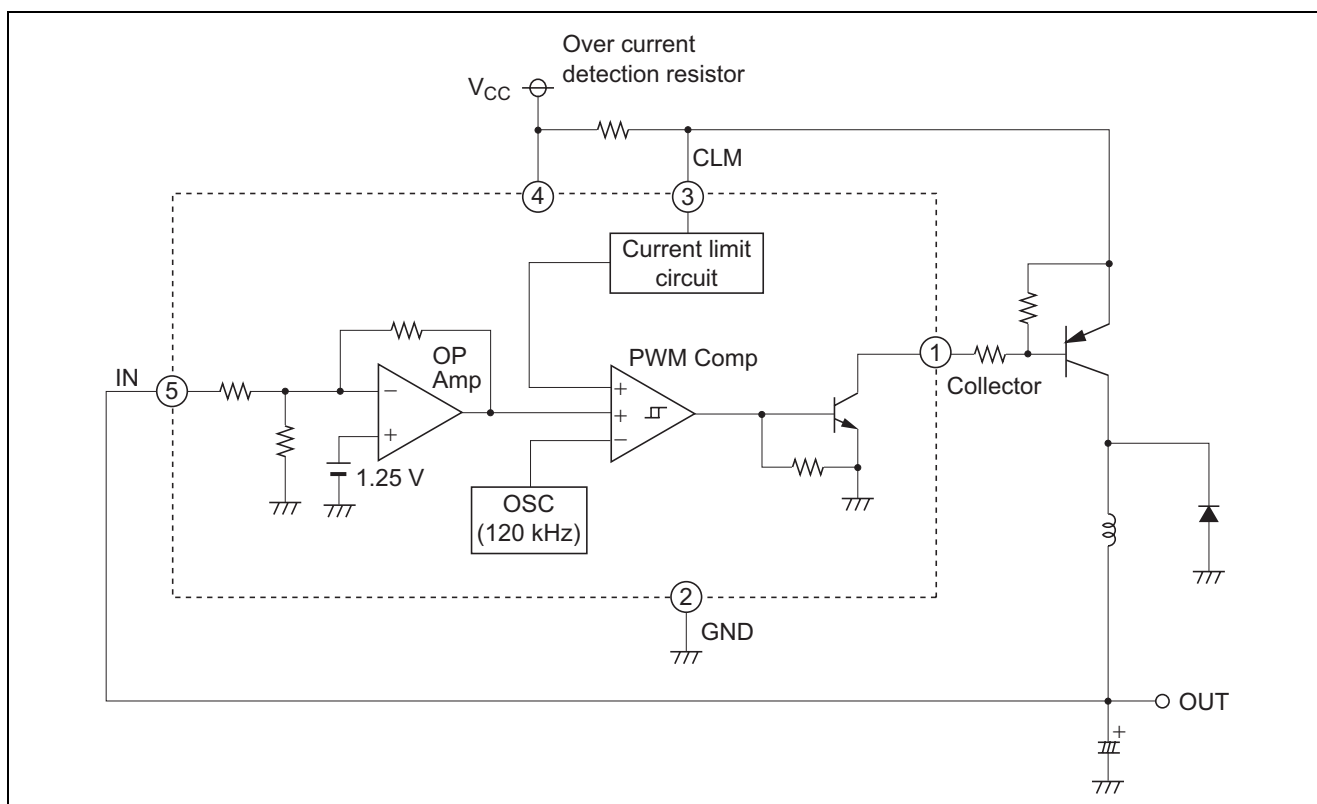
Features

- Wide operation voltage range: 6 to 15 V (typ. $V_{CC} = 12$ V)
- Low power dissipation: 1.1 mA (max., $V_{CC} = 12$ V)
- Built-in oscillator without peripheral devices (120 kHz typ.)
- Built-in over current protection circuit
- Small 5-pin SIP and 8-pin SOP packages

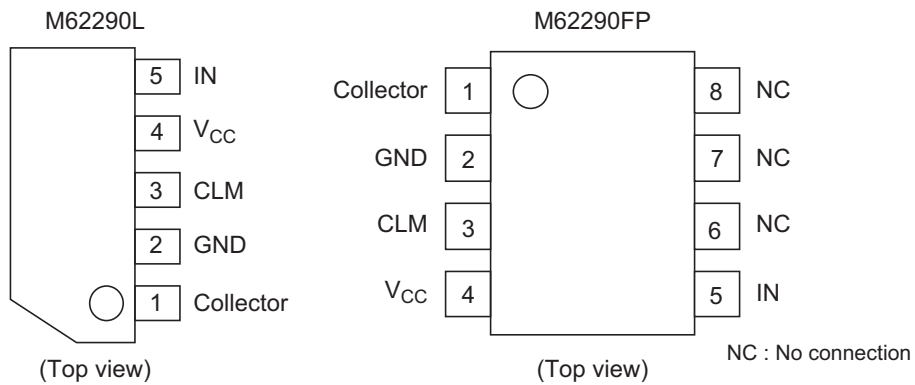
Applications

Local voltage regulator of audio sets and general electric products

Block Diagram



Pin Arrangement



Outline: 5P5T

Outline: PRSP0008DE-C (recommend)

PRSP0008DA-A (8P2S-A) (not recommend for new design)

Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

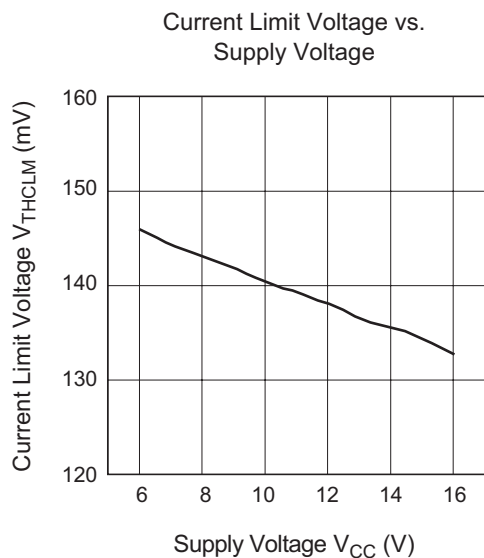
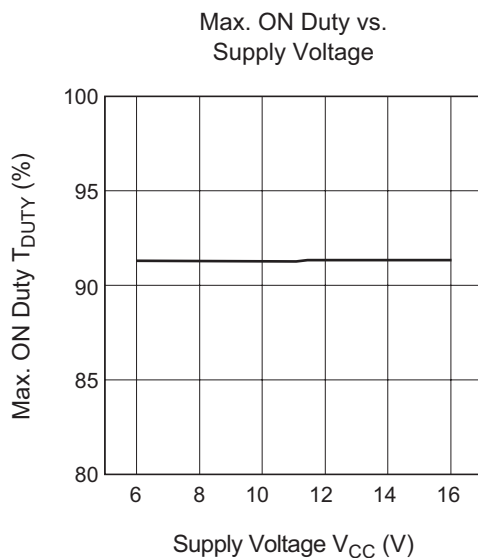
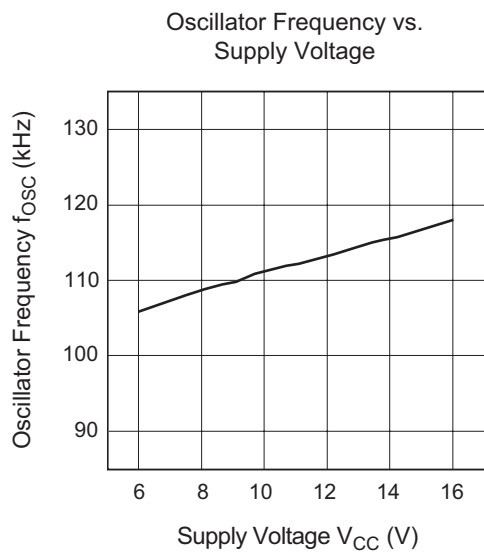
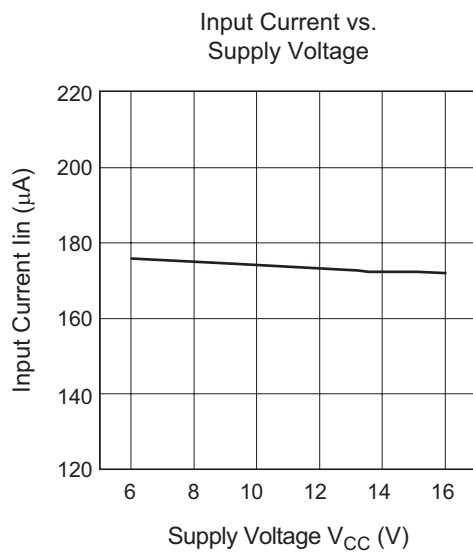
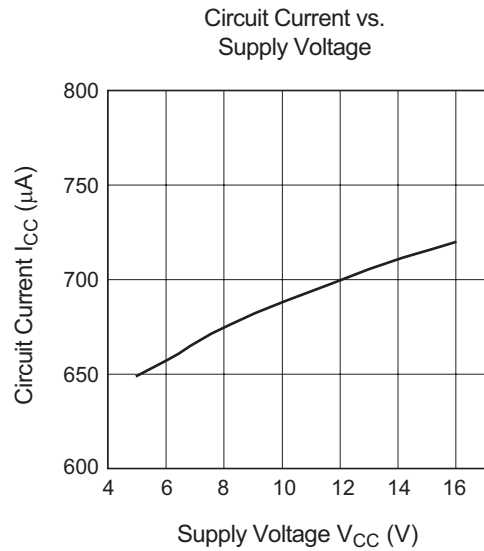
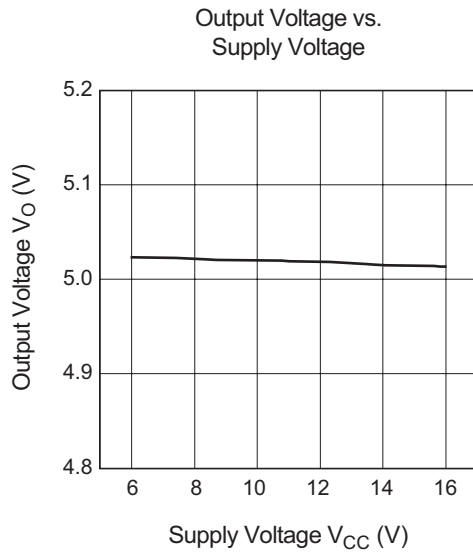
Item	Symbol	Ratings	Unit	Conditions	
Supply voltage	V _{CC}	16	V		
Output current	I _O	100	mA		
Power dissipation	P _d	450	mW	Ta = 25°C	5-pin SIP
		440	mW		8-pin SOP
Thermal derating	K _θ	4.5	mW/°C	Ta > 25°C	5-pin SIP
		4.4	mW/°C		8-pin SOP
Operating temperature	T _{opr}	−20 to +85	°C		
Storage temperature	T _{stg}	−40 to +125	°C		

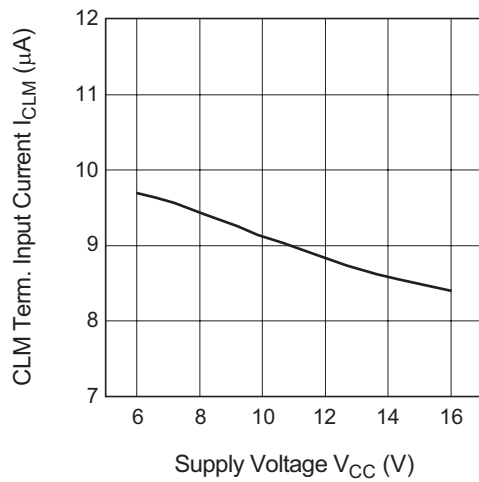
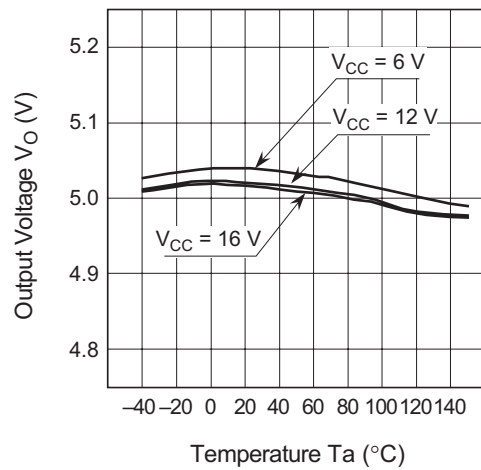
Electrical Characteristics

(Ta = 25°C, V_{CC} = 12 V, unless otherwise noted)

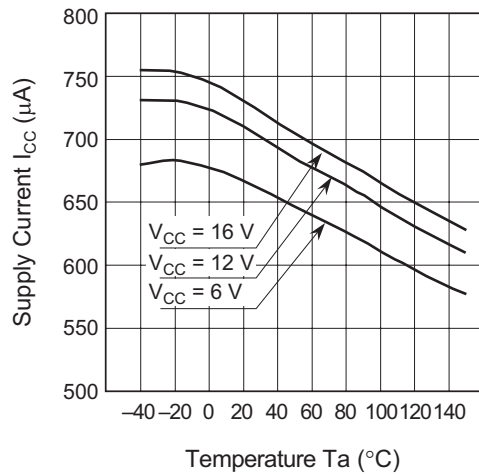
Block	Item	Symbol	Limits			Unit	Test Conditions
			Min	Typ	Max		
All block	Supply voltage	V _{CC}	6.0	—	15	V	
	Supply current	I _{CC}	—	780	1100	μA	Without load
Error Amp.	Output voltage	V _O	4.75	5.00	5.25	V	
	REF line regulation	V _{reg-L}	—	5	30	mV	V _{CC} = 6 to 15 V
	IN input current	I _{in}	—	160	300	μA	
Oscillator	Oscillator frequency	f _{OSC}	70	120	170	kHz	
	Maximum on duty	T _{DUTY}	—	90	—	%	
CLM	Current limit voltage	V _{THCLM}	110	140	170	mV	V _{CC} – CLM
Output	Output leakage current	I _{CL}	−1	—	1	μA	V _{CC} = 15 V, V _C = 15 V
	Output saturation voltage	V _{sat}	—	0.1	0.3	V	I _O = 100 mA

Typical Characteristics

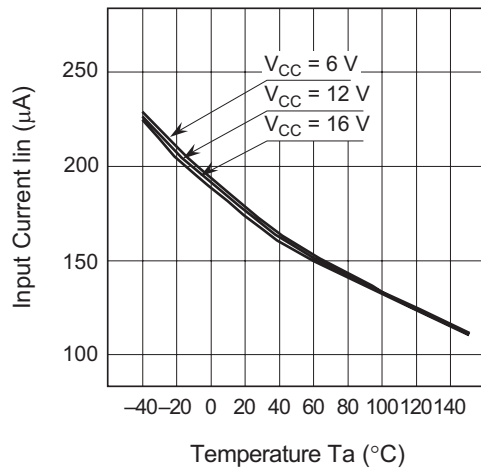
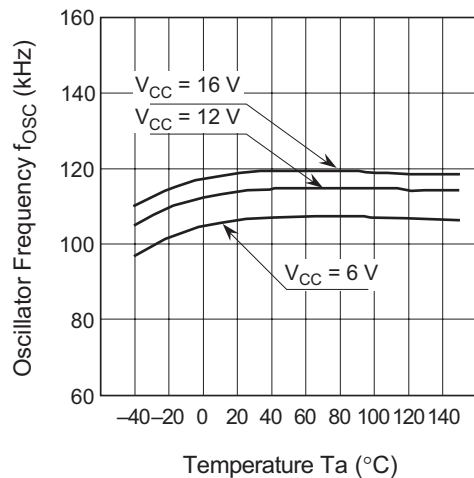


CLM Term. Input Current vs.
Supply VoltageOutput Voltage vs.
Temperature

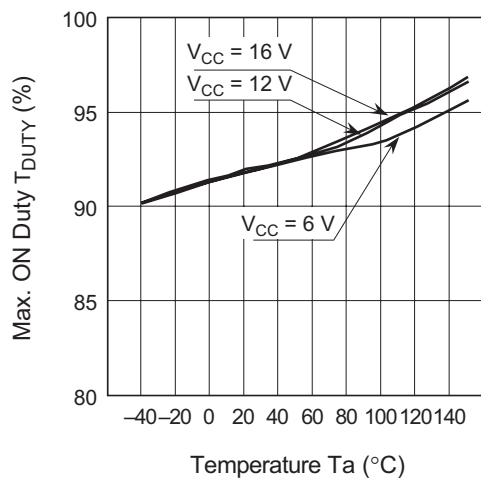
Supply Current vs. Temperature

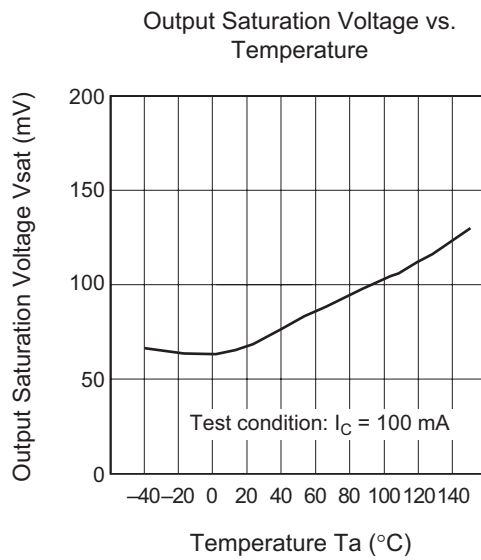
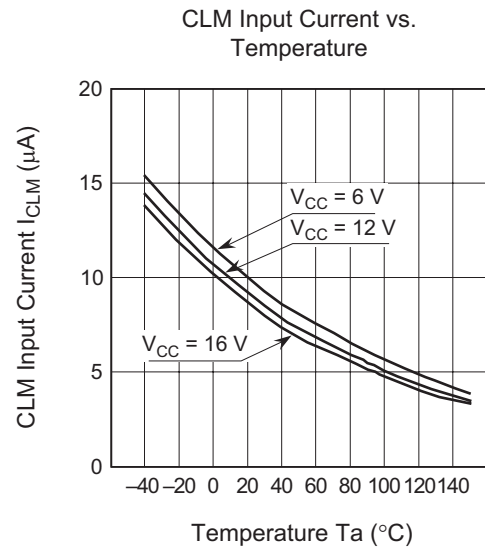
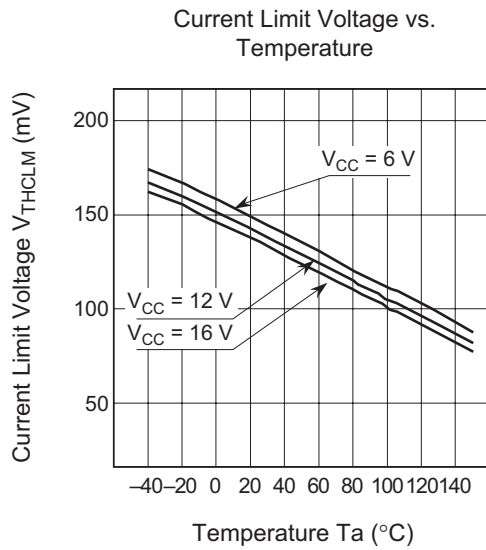


Input Current vs. Temperature

Oscillator Frequency vs.
Temperature

Max. ON Duty vs. Temperature





Application Circuit (5 V Output DC/DC Converter)

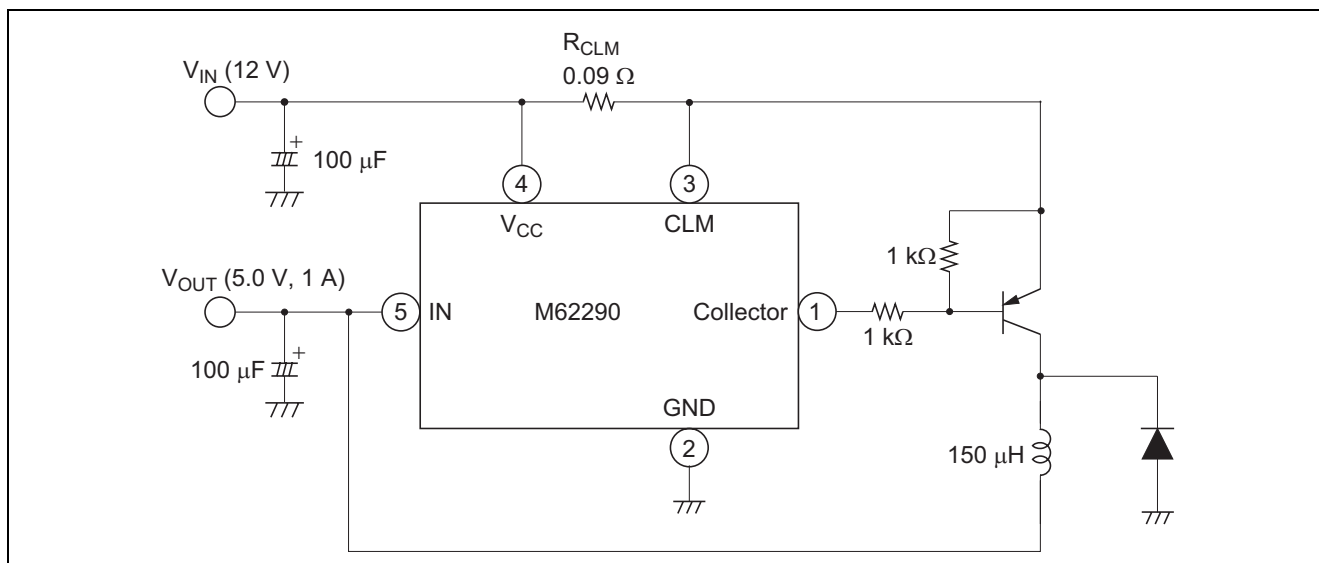


Figure 1 Example of Application Circuit of the M62290L/FP

- Current limit detection:
When the voltage drop between pin 3 and pin 4 becomes more than 140 mV, the current limit detection circuit begins operating. The peak switch current "I_{pk}" is limited to $140 \text{ mV} / R_{\text{CLM}}$. In the example of application (Figure 1), the current is limited to 1.5 A.

The Expression of Circuit Constants

Constants	Expressions
$\frac{T_{\text{ON}}}{T_{\text{OFF}}}$	$\frac{V_O + V_F}{V_{\text{IN}} - V_{\text{CE(sat)}} - V_O}$
$(T_{\text{ON}} + T_{\text{OFF}})_{\text{MAX}}$	$\frac{1}{f_{\text{OSC}}} \quad f_{\text{OSC}}: 120 \text{ kHz} (V_{\text{CC}} = 12 \text{ V})$
$T_{\text{OFF (MIN)}}$	$(T_{\text{ON}} + T_{\text{OFF}}) / (1 + \frac{T_{\text{ON}}}{T_{\text{OFF}}})$
$T_{\text{ON (MAX)}}$	$\frac{1}{f_{\text{OSC}}} - T_{\text{OFF}}$
$L_{\text{(MIN)}}$	$\frac{(V_{\text{IN}} - V_{\text{CE(sat)}} - V_O) \times T_{\text{ON (MAX)}}}{\Delta I_O}$
I_{pk}	$I_O + \frac{1}{2} \Delta I_O$
R_{CLM}	$\frac{0.14}{I_{\text{pk}}} \quad \Delta V_{\text{CLM}}: 140 \text{ mV} (V_{\text{CC}} = 12 \text{ V})$

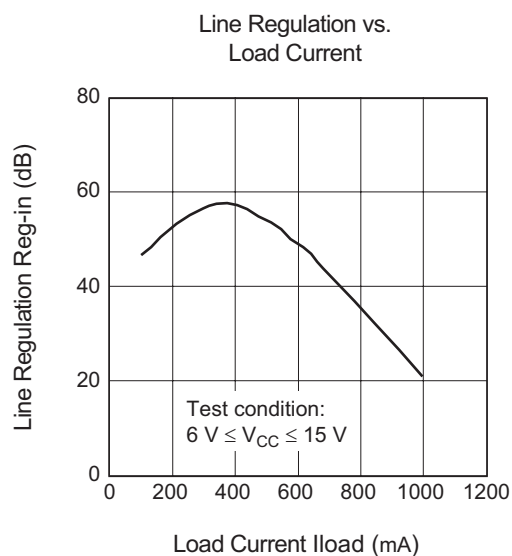
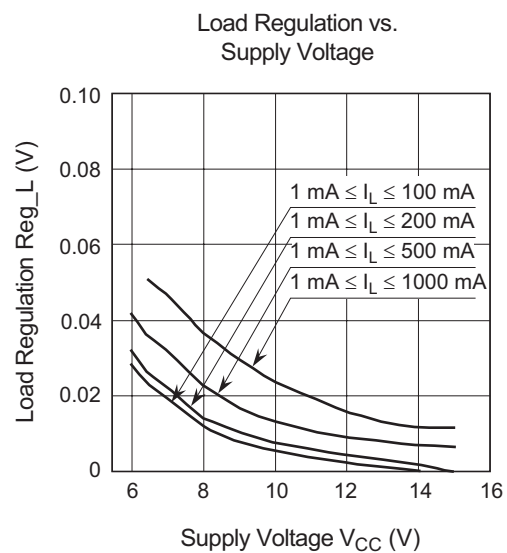
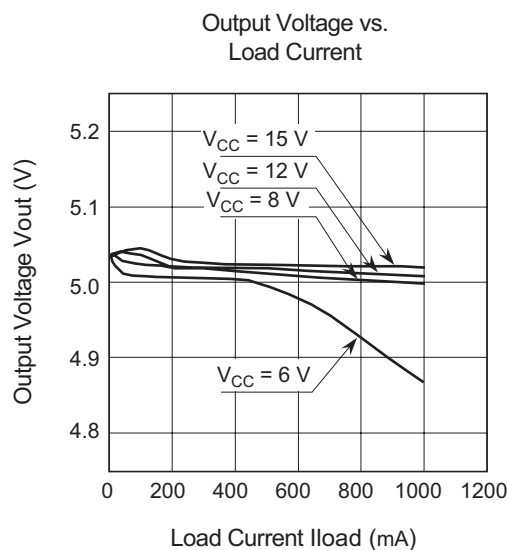
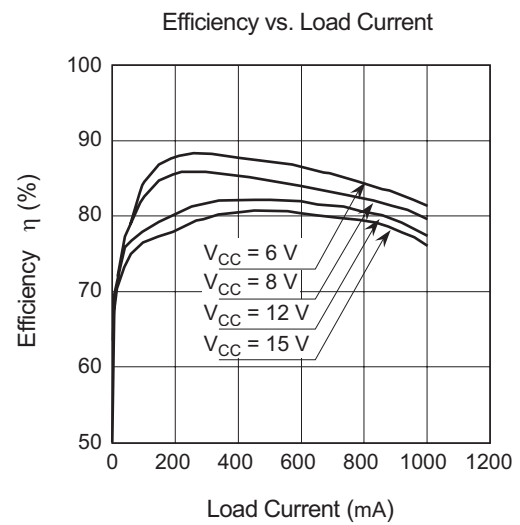
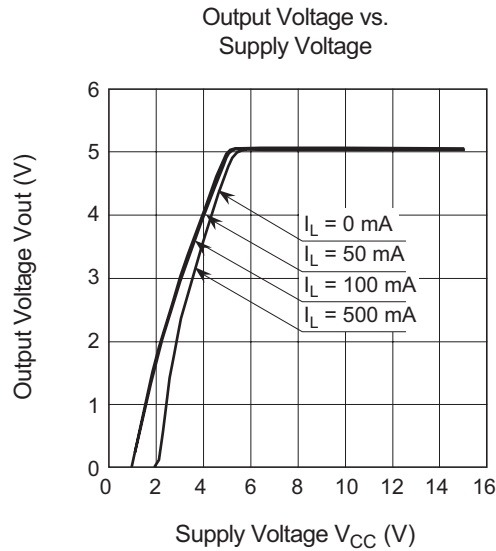
Note: V_F : Forward voltage drop of an external diode.

V_{sat} : Output saturation voltage of an external switching transistor.

ΔI_O : Set between 1/3 and 1/5 of the maximum output current.

An external transistor, diode and inductor must be have a peak current capability of approximately greater than "I_{pk}".

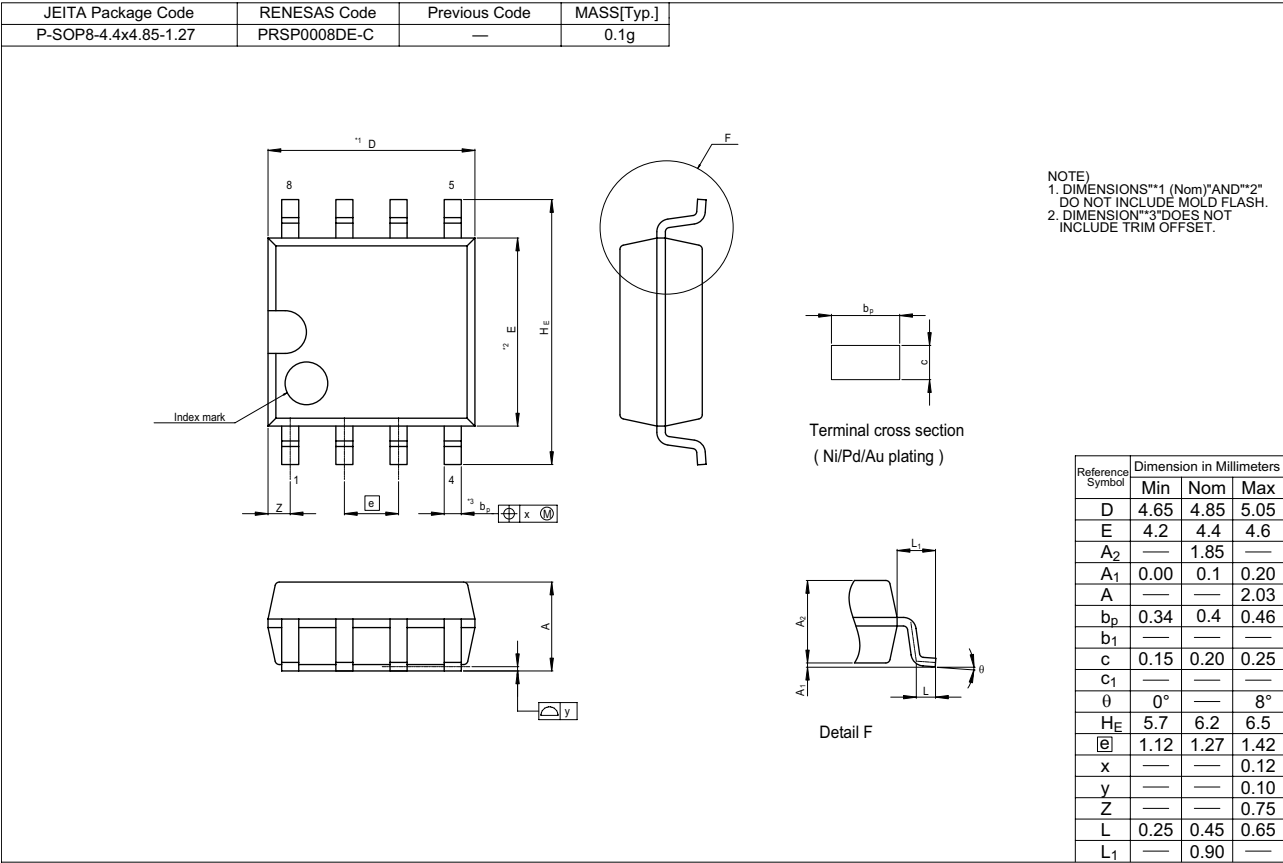
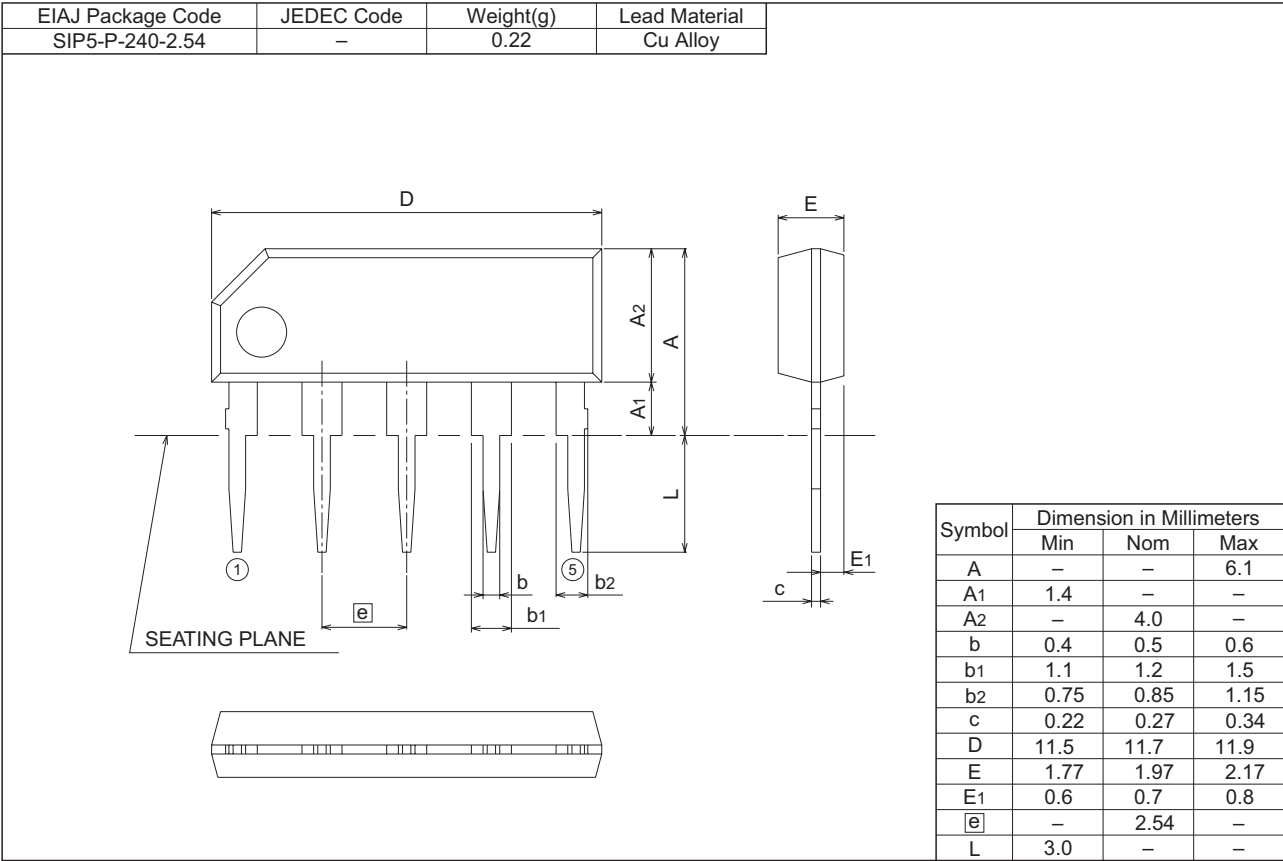
Application Circuit Characteristics



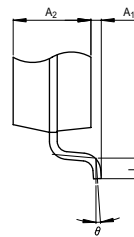
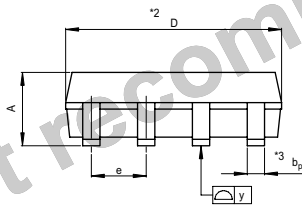
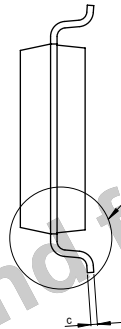
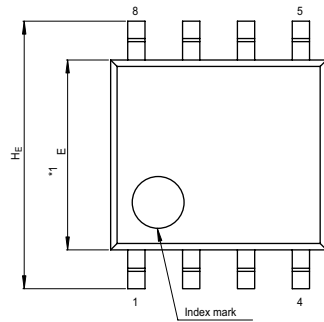
Package Dimensions

5P5T

Plastic 5pin 240mil SIP



JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x5-1.27	PRSP0008DA-A	8P2S-A	0.07g



NOTE)
1. DIMENSIONS **1* AND **2*
DO NOT INCLUDE MOLD FLASH.
2. DIMENSION **3* DOES NOT
INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.8	5.0	5.2
E	4.2	4.4	4.6
A ₂	—	1.5	—
A ₁	0.05	—	—
A	—	—	1.9
b _p	0.35	0.4	0.5
c	0.13	0.15	0.2
θ	0°	—	10°
H _E	5.9	6.2	6.5
e	1.12	1.27	1.42
y	—	—	0.1
L	0.2	0.4	0.6

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