

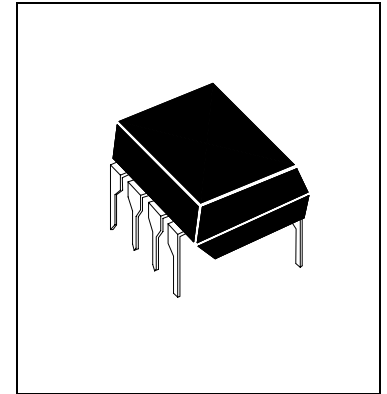


H34063AP

DC-TO-DC CONVERTER INTEGRATE CIRCUIT DEVICES

Description

The H34063AP Series is a monolithic control circuit containing the primary functions required for DC-to-DC converters. These devices consist of an internal temperature compensated reference, comparator, controlled duty cycle oscillator with an active current limit circuit, driver and high current output switch. This series was specifically by Hi-Sincerity Microelectronics Corp.



Features

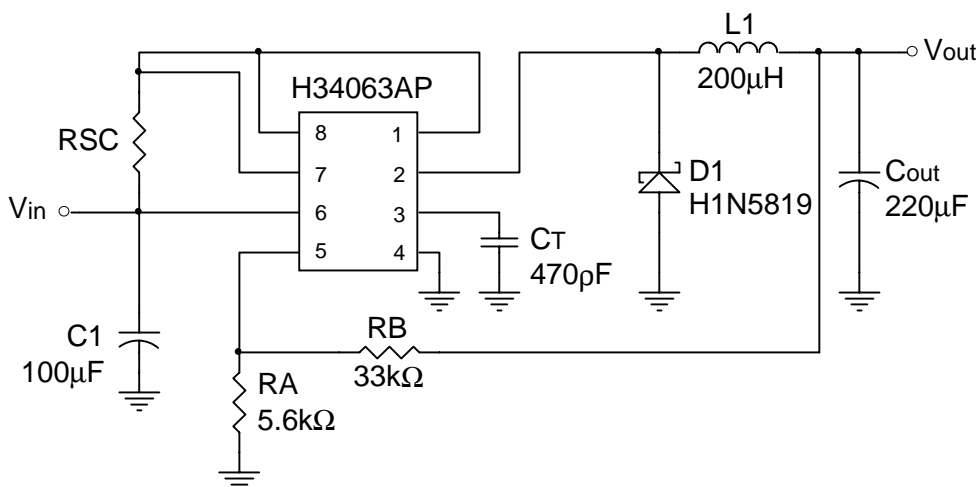
- 3V to 40V Input Voltage Operation
- Internal 1.6A Peak Current Switch
- Internal $\pm 1.8\%$ Reference
- Low Quiescent Current at 1.6mA
- Frequency Operation from 100Hz~100KHz
- Current Limiting

Applications

- Saver for Cellular Phone
- DC-DC Converter Module

Typical Application Circuit

Fig1.Saver Circuit for Cellular Phone





Pin Connections

| | | |
|--|-----------------------|---------------------------------|
| | Pin1:Switch Collector | Pin5:Comparator Inverting Input |
| | Pin2:Switch Emitter | Pin6:Vcc |
| | Pin3:Timing Capacitor | Pin7:Ipk Sense |
| | Pin4:Gnd | Pin8:Driver Collector |

Absolute Maxium Rating

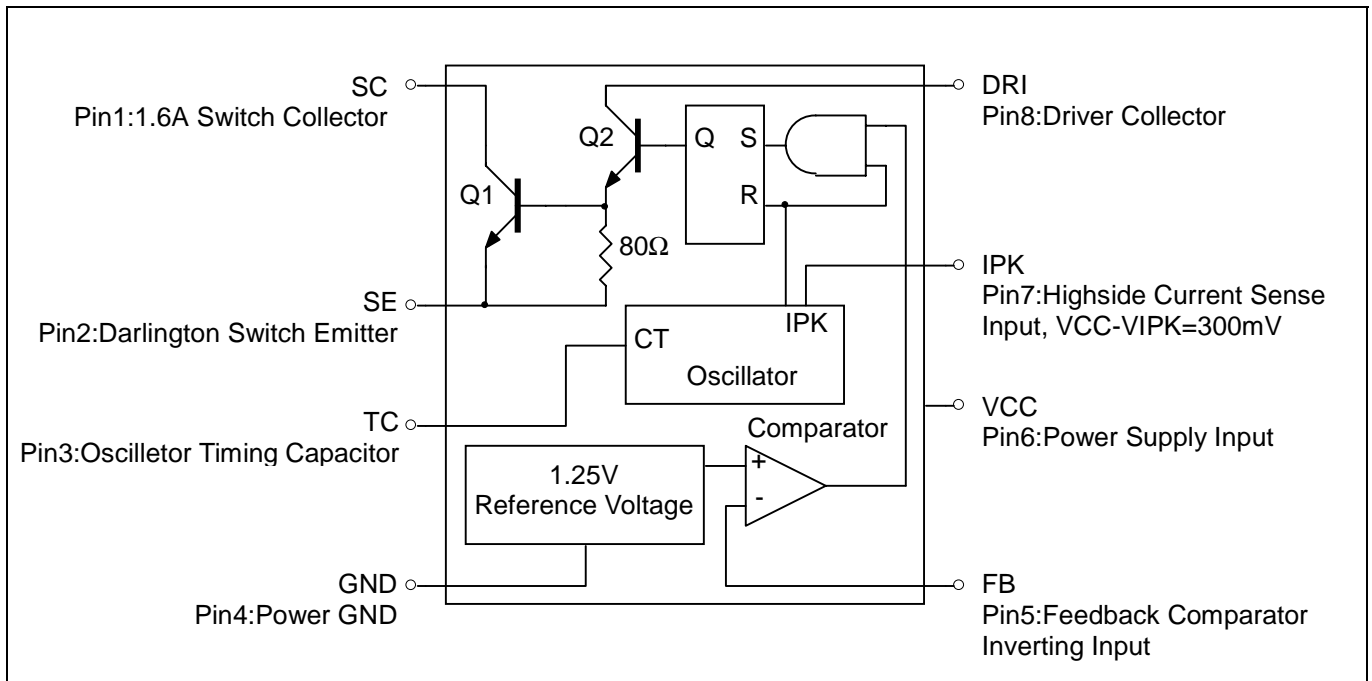
| | |
|---|-----------------|
| Supply Voltage | 40 V |
| Comparator Input Voltage Range | -0.3V ~ 40 V |
| Switch Collector Voltage | 40 V |
| Switch Emitter Voltage | 40 V |
| Switch Collector to Emitter Voltage | 40 V |
| Driver Collector Voltage | 40 V |
| Switch Current | 1.6 A |
| Power Dissipation DIP Package Ta=25°C | 1.0 W |
| Thermal Resistance Junction To Air..... | 125 °C / W |
| Operating Junction Temperature..... | 125 °C |
| Operating Ambient Temperature Range | 0 ~ 70 °C |
| Storage Temperature Range..... | -40 °C ~ 125 °C |

Electrical Characteristics (Vcc=5V,Ta=25°C, unless otherwise specified)

| Parameter | Test Condition | Symbol | Min. | Typ. | Max. | Unit |
|---|--|--------------|-------|-------|-------|------|
| <i>Oscillator</i> | | | | | | |
| Charging Current | 5.0V≤VCC≤40V | Ichg | 24 | 35 | 42 | uA |
| Discharge Current | 5.0V≤VCC≤40V | Idischg | 140 | 220 | 260 | uA |
| Voltage Amplitude | Pin3 | VOSC | - | 0.6 | - | V |
| Discharge to Charge Current Ratio | VIPK(Sense) =VCC | IDischg/Ichg | 5.2 | 6.5 | 7.5 | |
| Current Limit Sense Voltage | IChg=Idischg | VIPK(Sence) | 250 | 300 | 350 | mV |
| <i>Output Switch</i> | | | | | | |
| Saturation Voltage, Darlington Connection | ISW=1.0A, VC(Driver)=VC(Switch) | VCE(Sat) | - | 1.0 | 1.3 | V |
| Saturation Voltage | ISW=1.0A, IC(Driver)=50mA (Forced β ≈ 20) | VCE(Sat) | - | 0.4 | 0.7 | V |
| DC Current Gain | ISW=1.0A, VCE=5.0V | hFE | 50 | 75 | - | V |
| Collector Off-State Current | VCE=30V | ICC(Off) | - | 0.01 | 100 | UA |
| <i>Comparator</i> | | | | | | |
| Threshold Voltage | 0°C≤Ta≤70°C | VFB | 1.227 | 1.250 | 1.273 | V |
| Threshold Voltage | | | 1.210 | - | 1.29 | |
| Threshold Voltage Line Regulation | 3.0V≤VCC≤40V | Regline | - | 1.5 | 6 | mV |
| Input Bias Current | VIN=0V | IIB | - | -20 | -400 | nA |
| Supply Current | VIPK(Sence)=VCC VPin5>VFB, 5.0V≤VCC≤40V CT=0.0001uF,Pin2=Gnd Remaining pins open | ICC | - | 1.6 | 3 | mA |



Block Diagram



Application Information

Design Formula Table

| Calculation | Step-Down | Step-Up | Voltage-Inverting |
|------------------|---|---|---|
| ton / toff | $\frac{V_{out}+V_F}{V_{in(min)} - V_{sat}-V_{Out}}$ | $\frac{V_{out}+V_F-V_{in(min)}}{V_{in(min)}-V_{sat}}$ | $\frac{ V_{out} + V_F}{V_{in}-V_{sat}}$ |
| (ton + toff) max | 1/Fmin | 1/Fmin | 1/Fmin |
| CT | $4*10^{-5}ton$ | $4*10^{-5}ton$ | $4*10^{-5}ton$ |
| IC(switch) | 2*Iout(max) | 2*Iout(max)(ton+toff/toff) | 2*Iout(max)(ton+toff/toff) |
| RS | 0.3 / IC(switch) | 0.3 / IC(switch) | 0.3 / IC(switch) |
| L(min) | $\frac{(V_{in(min)}-V_{sat}-V_{out})}{IC(switch)} * ton(max)$ | $\frac{(V_{in(min)}-V_{sat})}{IC(switch)} * ton(max)$ | $\frac{(V_{in(min)}-V_{sat})}{IC(switch)} * ton(max)$ |
| Co | $\frac{IC(switch)*(ton+toff)}{8VRipple(P-P)}$ | $\frac{lout*ton}{VRipple(P-P)}$ | $\frac{lout*ton}{VRipple(P-P)}$ |

Vsat : Saturation voltage of the output switch.

VF : Forward voltage drop of the ringback rectifier.

The following power supply characteristics must be chosen :

Vin : Nominal input voltage.

Vout : Desired output voltage. $|V_{out}|=1.25*(1+R_B/R_A)$

Iout- Desired output current

Fmin : Minimum desired output switching frequency at the selected values for Vin and Iout.

VRipple(P-P) : Desired peak to peak output ripple voltage in practice, the calculated value will need to be increased due to the capacitor equivalent series resistance and board layout. The ripple voltage should be kept to a low value since it will directly effect the line and load regulation.



Application Information (Continuos)

Fig.2 Step-Up Converter

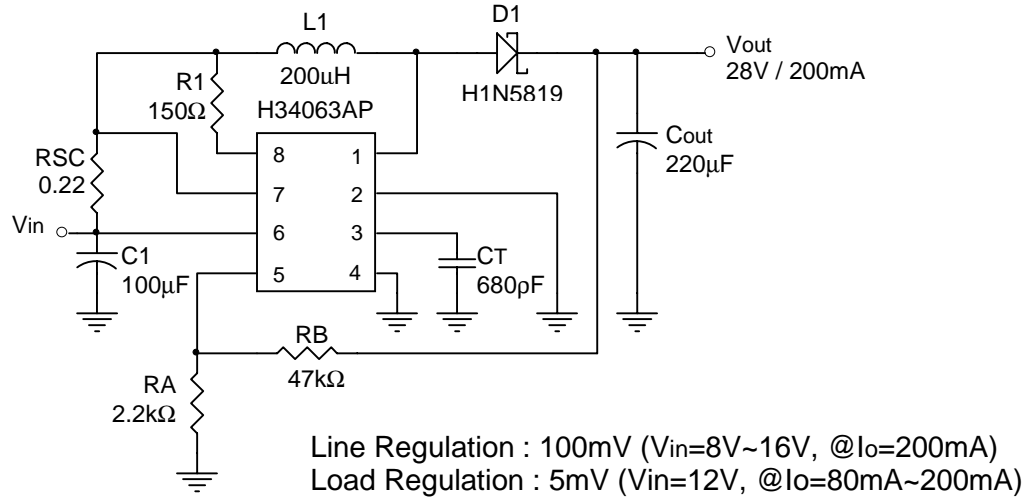


Fig.3 Step-Up Converter With External NPN Switch

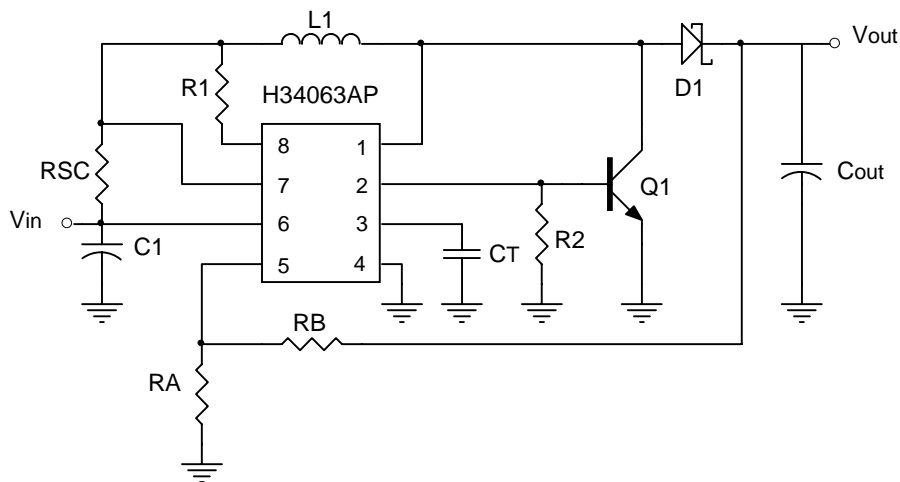


Fig.4 Step-Down Converter

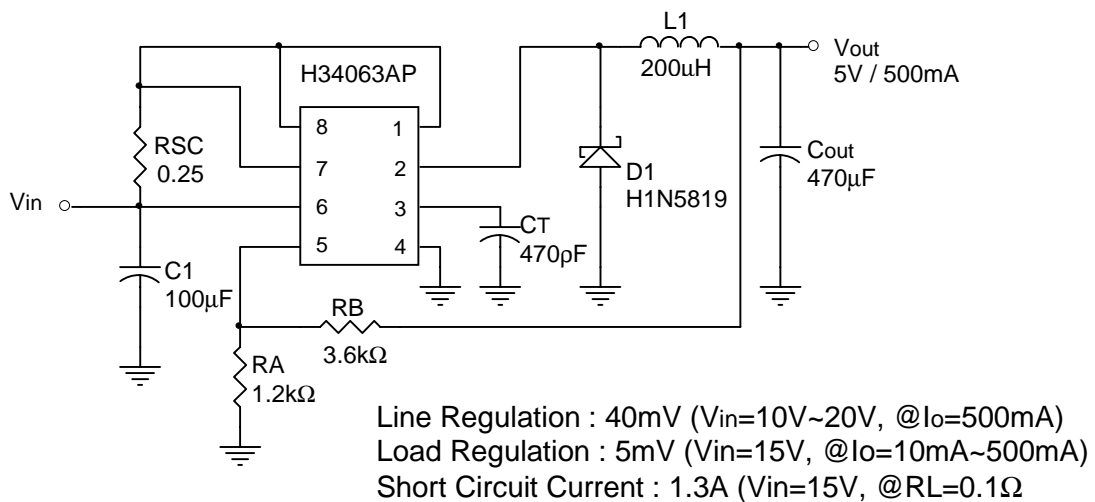




Fig.5 Step-Down Converter With External PNP Saturation Switch

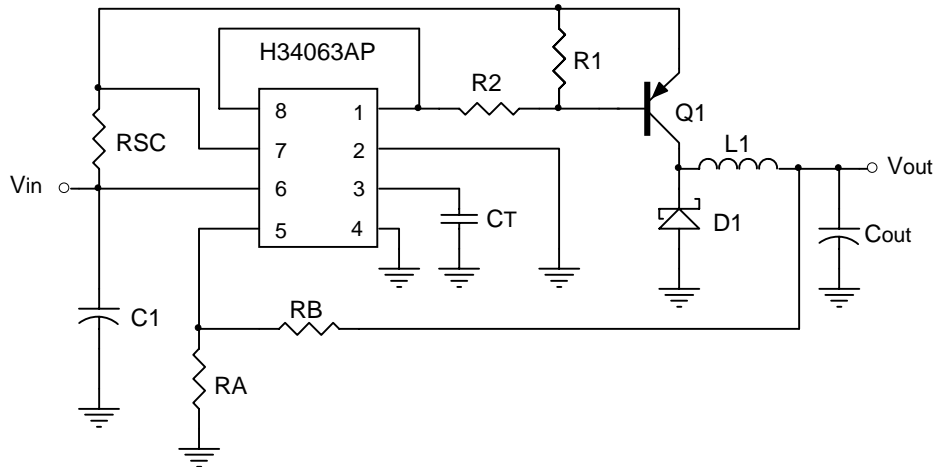


Fig.6 Voltage Inverting Converter

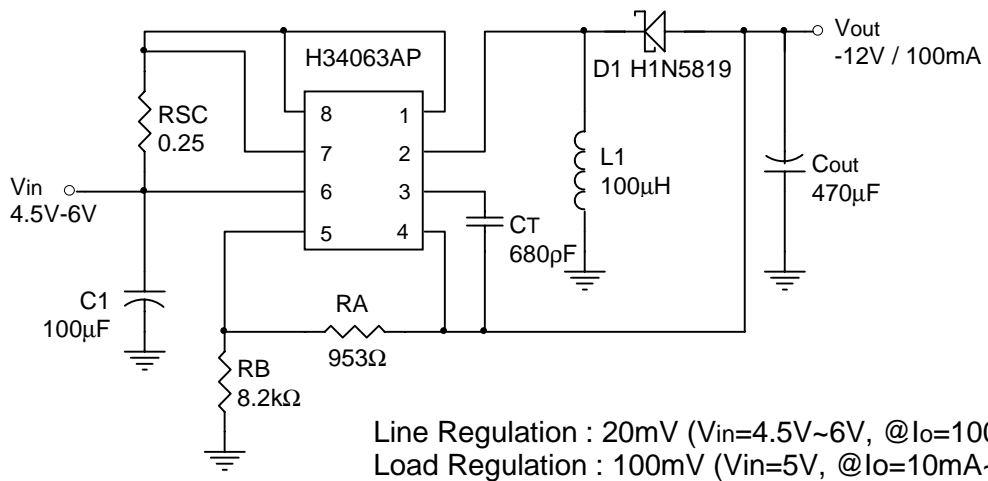
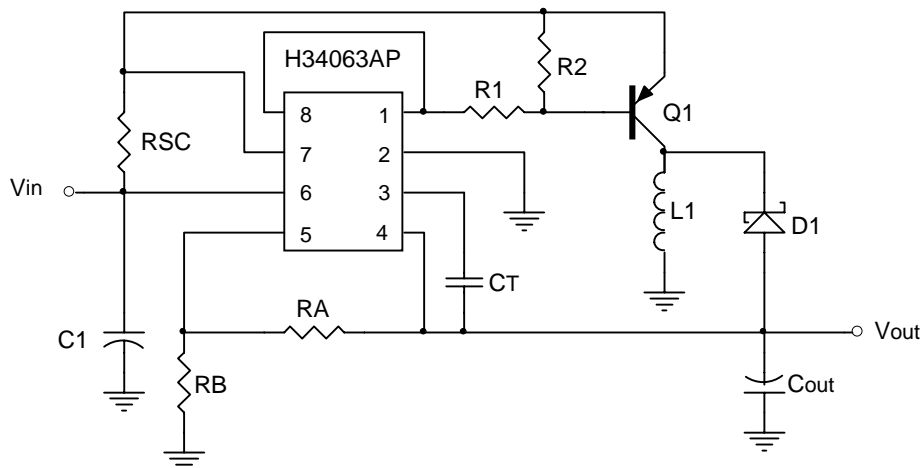
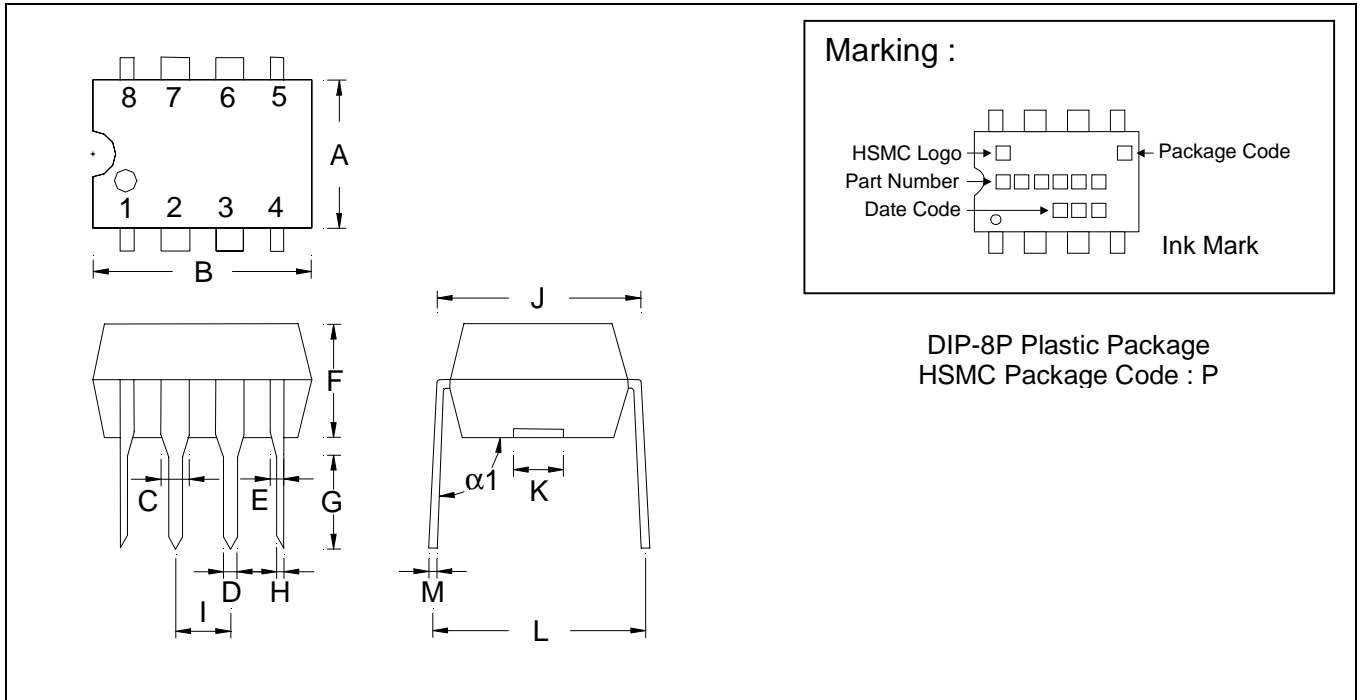


Fig.7 Voltage Inverting Converter With External PNP Saturation Switch





DIP-8P Dimension



*:Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|---------|-------------|-------|------------|--------|---------|-------------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.2480 | 0.2520 | 6.29 | 6.40 | H | 0.0150 | 0.0210 | 0.38 | 0.53 |
| B | 0.3630 | 0.3670 | 9.22 | 9.32 | I | 0.0898 | 0.1098 | 2.28 | 2.79 |
| C | - | *0.0600 | - | *1.52 | J | 0.2950 | 0.3050 | 7.49 | 7.74 |
| D | - | *0.0500 | - | *1.27 | K | - | *0.1181 | - | *3.00 |
| E | - | *0.0390 | - | *0.99 | L | 0.3370 | 0.7470 | 8.56 | 8.81 |
| F | 0.1280 | 0.1320 | 3.25 | 3.35 | M | 0.0090 | 0.0150 | 0.229 | 0.381 |
| G | 0.1250 | 0.1400 | 3.17 | 3.55 | $\alpha 1$ | 94° | 97° | 94° | 97° |

- Notes : 1.Dimension and tolerance based on our Spec. dated Sep. 07,1997.
 2.Controlling dimension : millimeters.
 3.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 4.If there is any question with packing specification or packing method, please contact your local HSMC sales office.

Material :

- Lead : 42 Alloy ; solder plating
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0

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