

M62292FP

3.3 V, 1.8 V Fixed 2-Output Voltage DC/DC Converter

REJ03D0852-0300

Rev.3.00

Jun 15, 2007

Description

M62292FP is 3.3 V and 1.8 V fixed stable 2-output step-down DC/DC converter.

It is possible to simplify peripheral circuit and to design compact and low cost sets because this device includes peripheral devices in small size 8-pin package.

The IC also has Reset circuit with time delay that monitors power supply ($V_{CC} = 5\text{ V}$) and one regulator output ($V_{out1} = 3.3\text{ V}$; IN1 terminal), therefore an application system is protected system errors.

Especially this is most suitable for application system with microprocessor and ASIC.

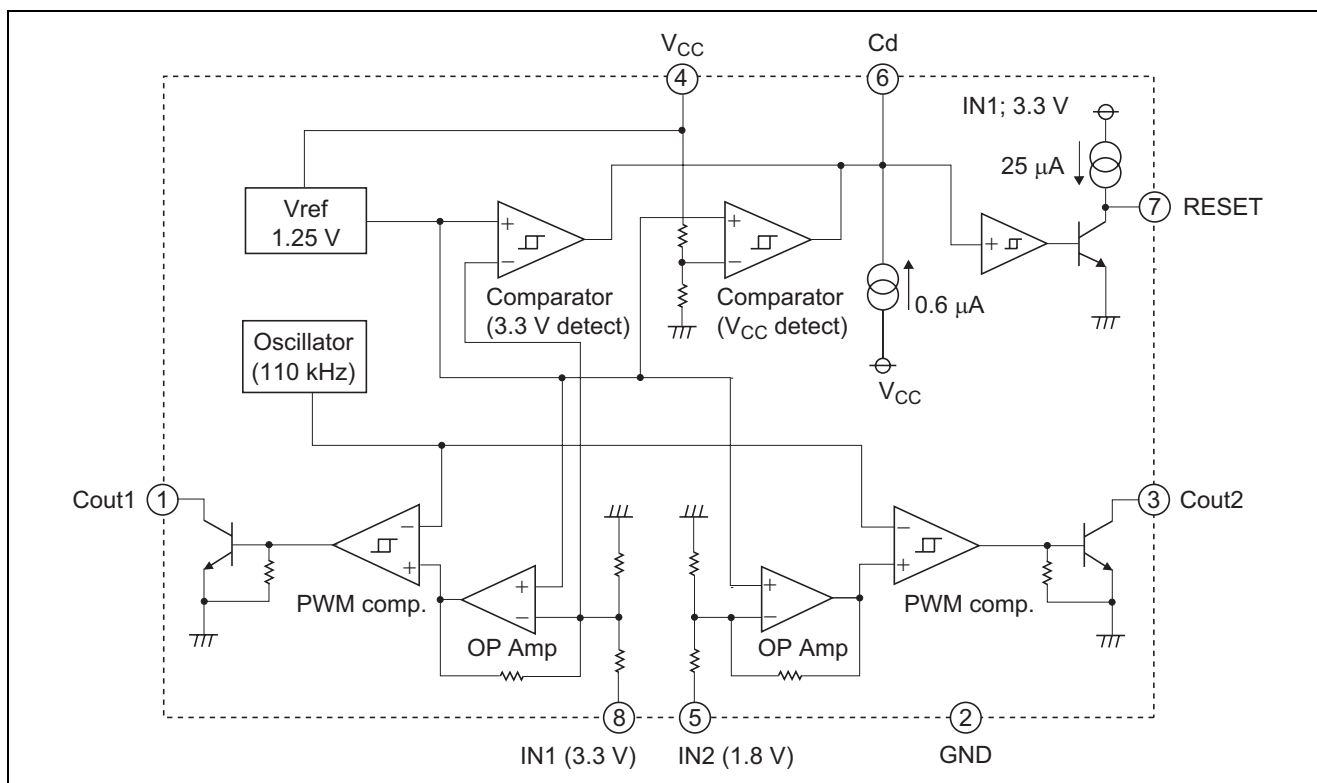
Features

- 3.3 V and 1.8 V step-down converter
- 4 to 15 V wide input supply voltage ($V_{CC} = 5\text{ V typ.}$)
- Reset circuit with time delay monitors
- Supply voltage ($V_{CC} = 5\text{ V}$) and regulator output (3.3 V)
- 110 kHz fixed frequency oscillator without peripheral devices
- 8-pin SOP package

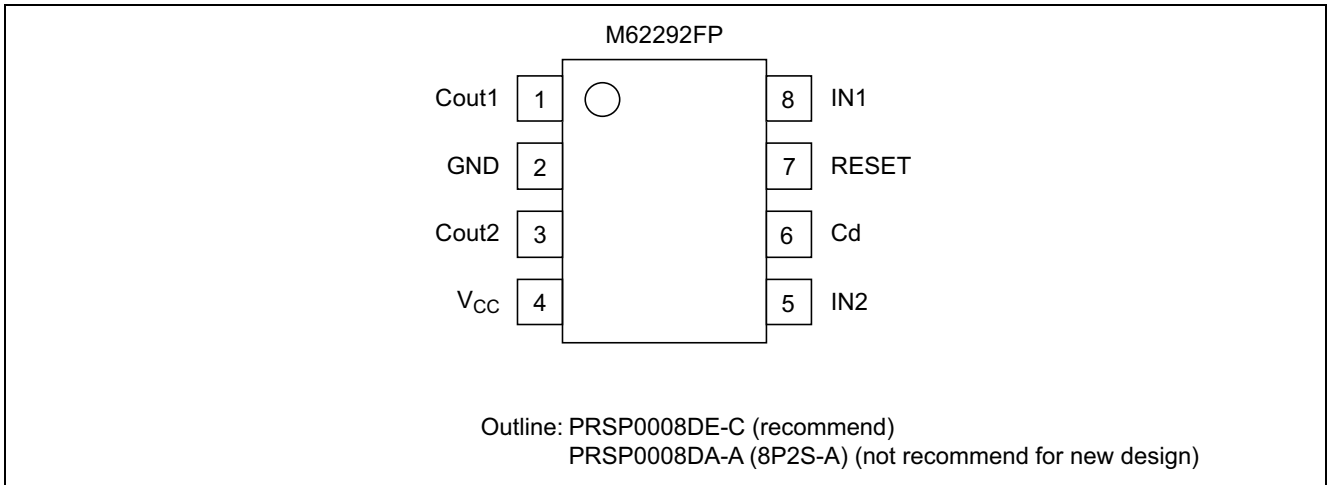
Application

Application system with microprocessor and ASIC

Block Diagram



Pin Arrangement



Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

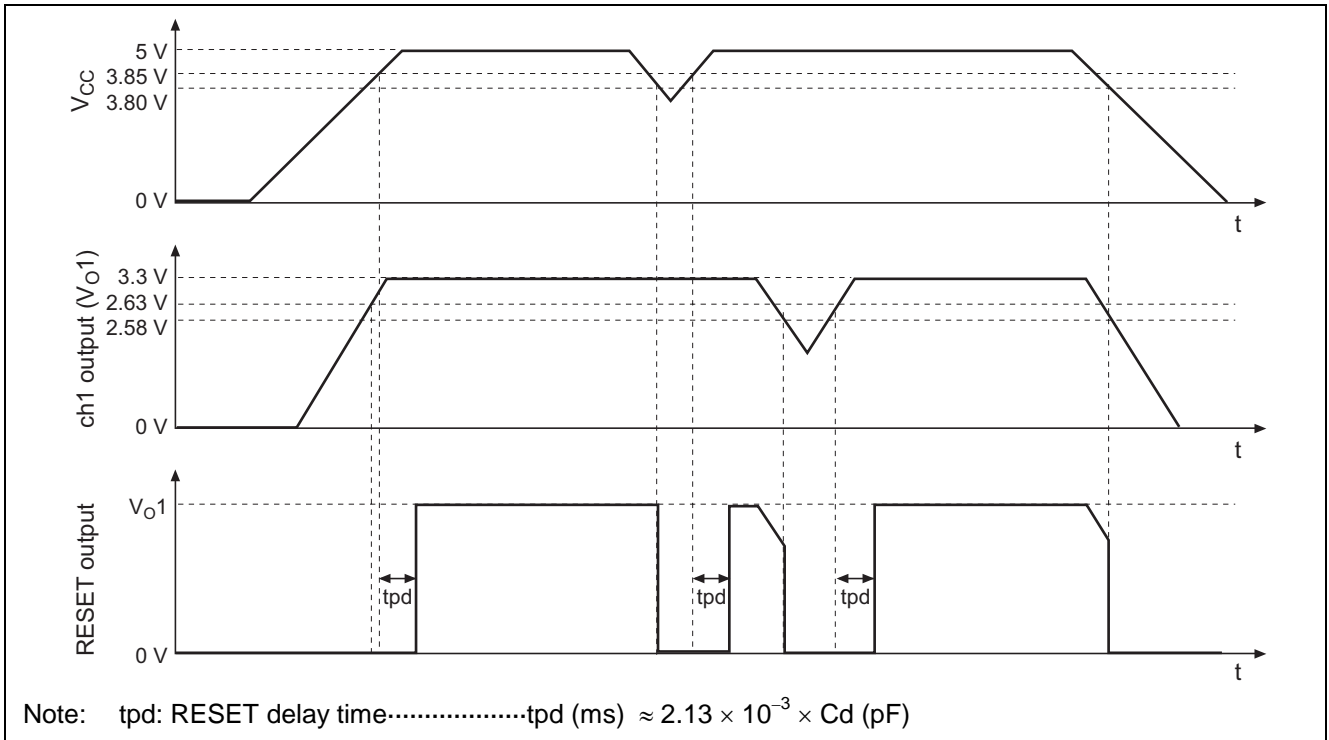
| Item | Symbol | Ratings | Unit | Conditions |
|--|---------------------|-------------|-------|------------|
| Supply voltage | V _{CC} | 16 | V | |
| Output current (DC/DC converter block) | I _O | 30 | mA | ch1, ch2 |
| Output current (Reset block) | I _{ORESET} | 6 | mA | |
| Power dissipation | P _d | 440 | mW | Ta = 25°C |
| Thermal derating | K _θ | 4.4 | mW/°C | Ta > 25°C |
| Operating temperature | Topr | -20 to +85 | °C | |
| Storage temperature | Tstg | -40 to +125 | °C | |

Electrical Characteristics

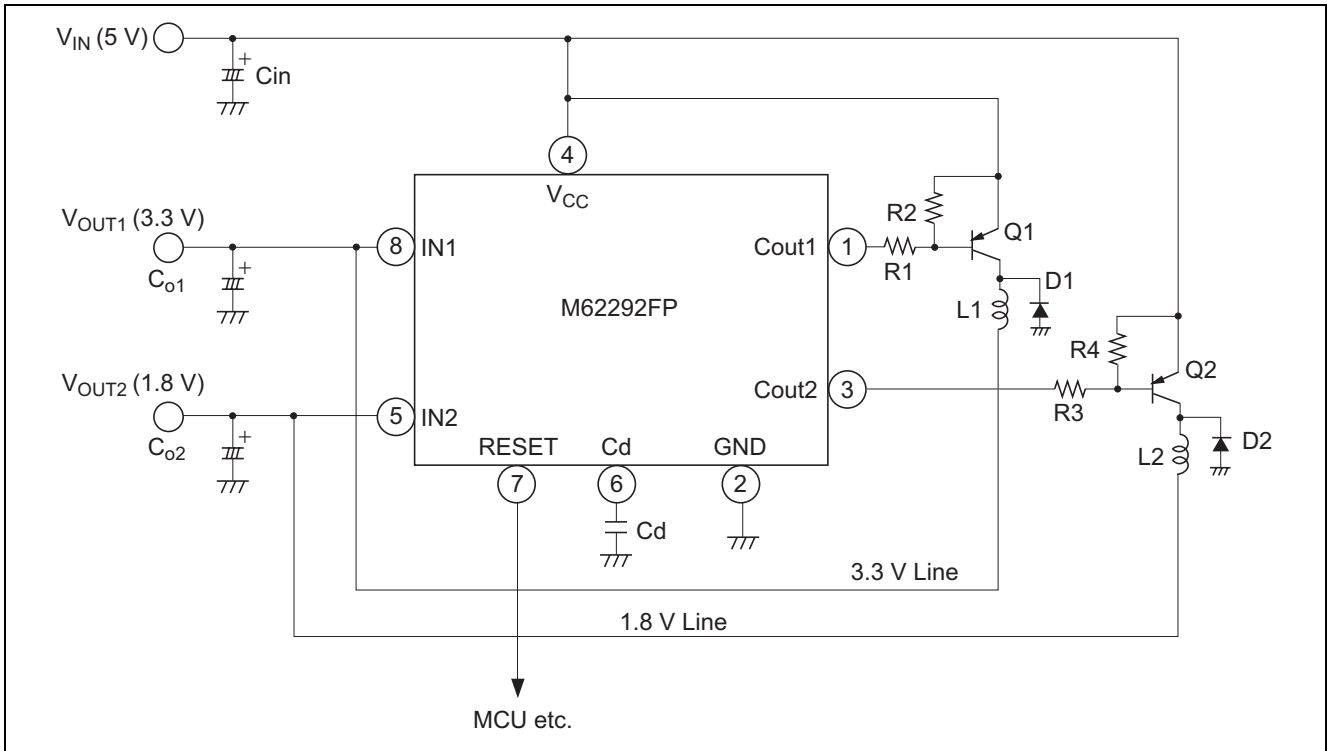
(Ta = 25°C, V_{CC} = 5 V, unless otherwise noted)

| Block | Item | Symbol | Limits | | | Unit | Test Condition |
|-----------------------|---------------------------|--------------------|---------------------|------|---------------------|------|---|
| | | | Min | Typ | Max | | |
| All blocks | Supply voltage | V _{CC} | 4.0 | 5.0 | 15 | V | |
| | Supply current | I _{CC} | — | 1.5 | 2.8 | mA | Without load |
| DC/DC converter block | | | | | | | |
| Error Amp. | Output voltage | V _{O1} | 3.15 | 3.30 | 3.45 | V | ch1 output |
| | | V _{O2} | 1.71 | 1.80 | 1.89 | | ch2 output |
| | Line regulation | V _{reg-L} | — | 5 | 15 | mV | V _{CC} = 4 to 12 V |
| | Input current 1 | I _{in} | — | 150 | 450 | μA | ch1 |
| | Input current 2 | I _{in} | — | 100 | 300 | μA | ch2 |
| Oscillator | Oscillator frequency | f _{OSC} | 65 | 110 | 160 | kHz | |
| Output | Maximum on duty | T _{DUTY} | — | 90 | — | % | |
| | Output leakage current | I _{CL} | -1 | — | 1 | V | V _{CC} = 12 V, V _C = 12 V |
| | Output saturation voltage | V _{sat} | — | 1.2 | 2.0 | V | I _O = 10 mA, Darlington connection |
| Reset circuit block | | | | | | | |
| Reset circuit | Detecting voltage 1 | V _{S1} | 3.6 | 3.8 | 4.0 | V | V _{CC} = 5 V detection |
| | Hysteresis voltage 1 | ΔV _{S1} | 30 | 50 | 80 | mV | |
| | Detecting voltage 2 | V _{S2} | 2.46 | 2.58 | 2.70 | V | ch1 output (3.3 V) detection |
| | Hysteresis voltage 2 | ΔV _{S2} | 30 | 50 | 80 | mV | |
| | Cd output current | I _{PD} | -1.1 | -0.6 | -0.3 | μA | |
| | Delay time | t _{pd} | 5 | 10 | 20 | ms | Cd = 4700 pF |
| | RESET output current | I _{OC} | -40 | -25 | -17 | μA | V _{CC} = 5 V, V _O = 1/2 × V _{CC} |
| | RESET low voltage | V _{OL} | — | — | 0.2 V _{O1} | V | I _{ORESET} = 4 mA |
| | RESET high voltage | V _{OH} | 0.8 V _{O1} | — | — | V | |

Reset Block Timing Chart



Application Circuit (3.3 V and 1.8 V 2-output Voltage DC/DC Converter)

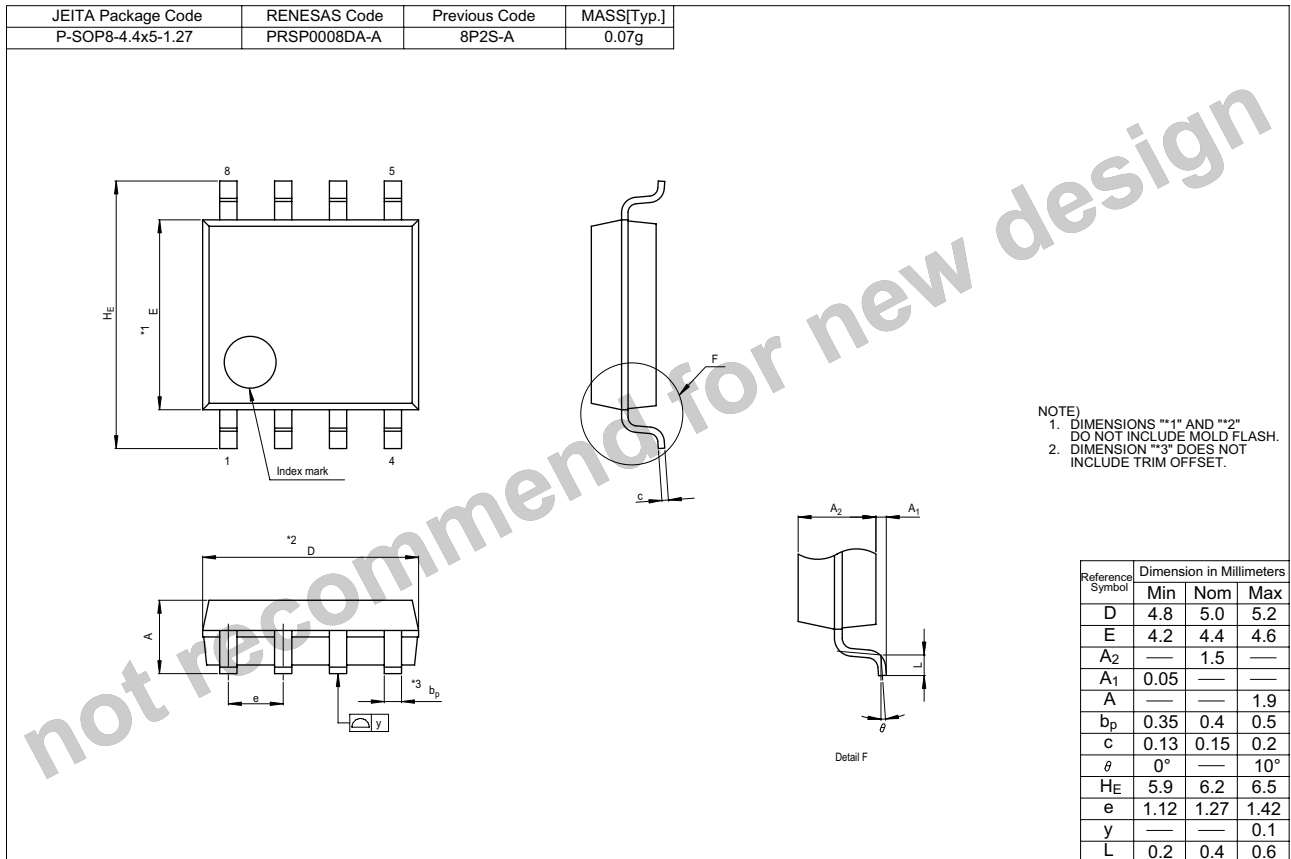
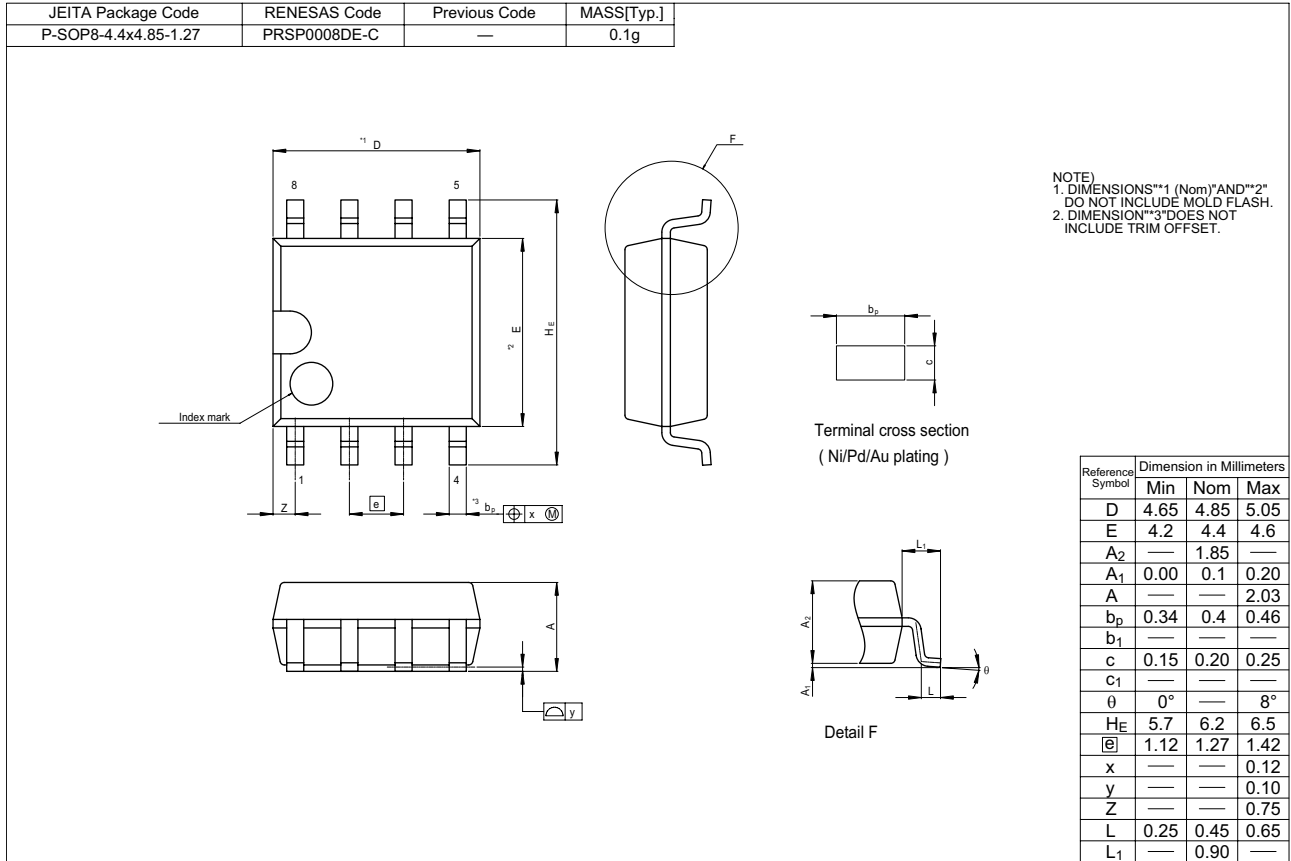


The Expression of Circuit Constants

| Constants | Expressions |
|----------------------------|--|
| $\frac{T_{ON}}{T_{OFF}}$ | $\frac{V_O + V_F}{V_{IN} - V_{CE(sat)} - V_O}$ |
| $(T_{ON} + T_{OFF})_{MAX}$ | $\frac{1}{f_{OSC}} f_{OSC}: 110 \text{ kHz } (V_{CC} = 5 \text{ V})$ |
| $T_{OFF(MIN)}$ | $(T_{ON} + T_{OFF}) / (1 + \frac{T_{ON}}{T_{OFF}})$ |
| $T_{ON(MAX)}$ | $\frac{1}{f_{OSC}} - T_{OFF}$ |
| $L(MIN)$ | $\frac{(V_{IN} - V_{CE(sat)} - V_O) \times T_{ON(MAX)}}{\Delta I_O}$ |
| I_{pk} | $I_O + \frac{1}{2} \Delta I_O$ |

Note: V_F : Forward voltage drop of an external diode.
 V_{sat} : Output saturation voltage of an external switching transistor.
 ΔI_O : Set to 1/3 to 1/5 of maximum output current.
 Choose an external transistor, diode and inductor with peak current rating approximately greater than "Ipk".

Package Dimensions



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Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.

Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7898

Renesas Technology Hong Kong Ltd.

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510