

RJH60F3DPQ-A0

600 V - 20 A - IGBT
High Speed Power Switching

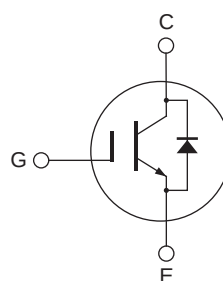
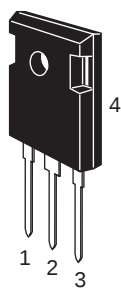
R07DS0391EJ0200
Rev.2.00
Jul 22, 2011

Features

- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.4 \text{ V typ. (} I_C = 20 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Built in fast recovery diode in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 92 \text{ ns typ. (at } I_C = 30 \text{ A, } V_{CE} = 400 \text{ V, } V_{GE} = 15 \text{ V, } R_g = 5 \Omega, T_a = 25^\circ\text{C, inductive load)}$

Outline

RENESAS Package code: PRSS0003ZH-A
(Package name: TO-247A)



1. Gate
2. Collector
3. Emitter
4. Collector

Absolute Maximum Ratings

($T_c = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to Emitter voltage	V_{CES}	600	V
Gate to Emitter voltage	V_{GES}	± 30	V
Collector current	$T_c = 25^\circ\text{C}$	I_C	40
	$T_c = 100^\circ\text{C}$	I_C	20
Collector peak current	$i_{C(peak)}$ ^{Note1}	80	A
Collector to emitter diode forward peak current	$i_{DF(peak)}$ ^{Note2}	80	A
Collector dissipation	P_C	178.5	W
Junction to case thermal impedance (IGBT)	θ_{j-c}	0.7	$^\circ\text{C/W}$
Junction to case thermal impedance (Diode)	θ_{j-c}	2.0	$^\circ\text{C/W}$
Channel temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes: 1. Pulse width limited by safe operating area.

2. $PW \leq 5 \mu\text{s}$, duty cycle $\leq 1\%$

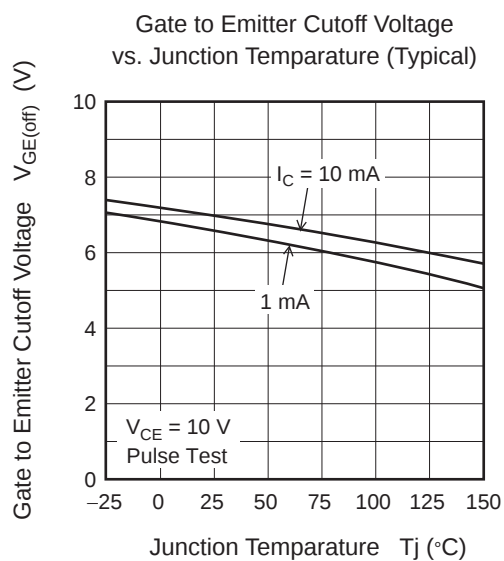
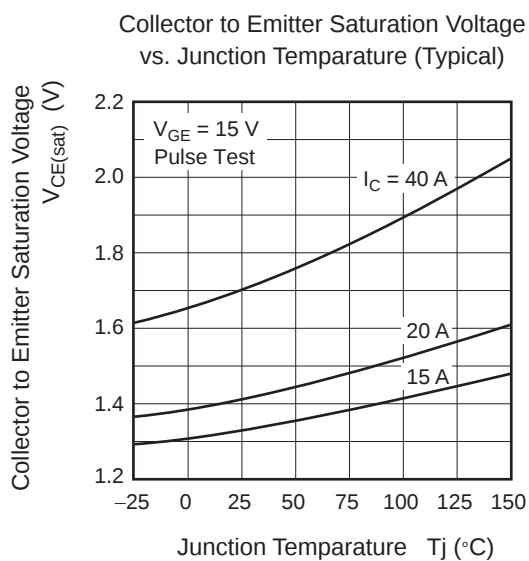
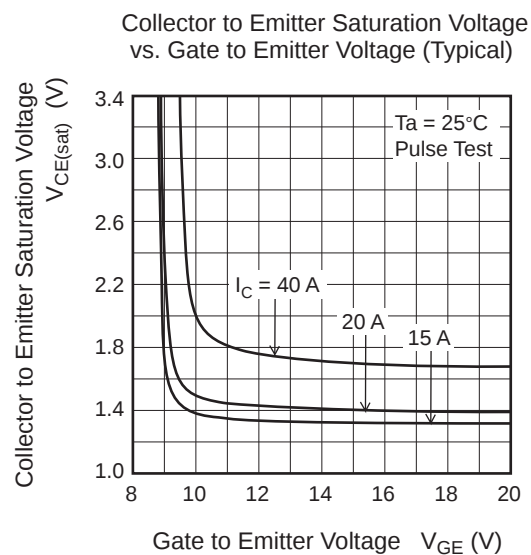
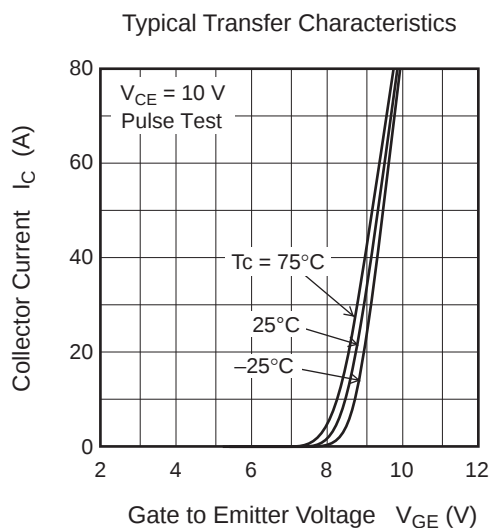
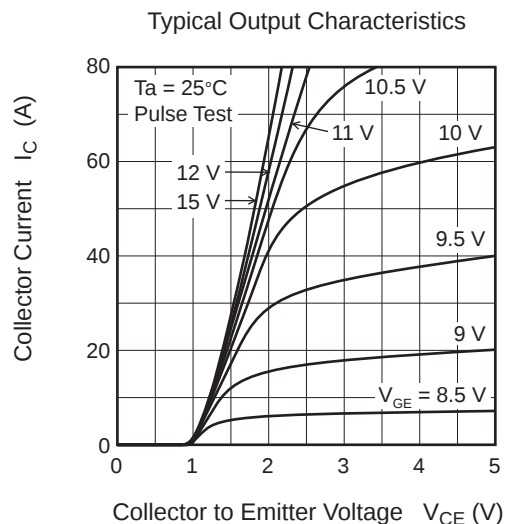
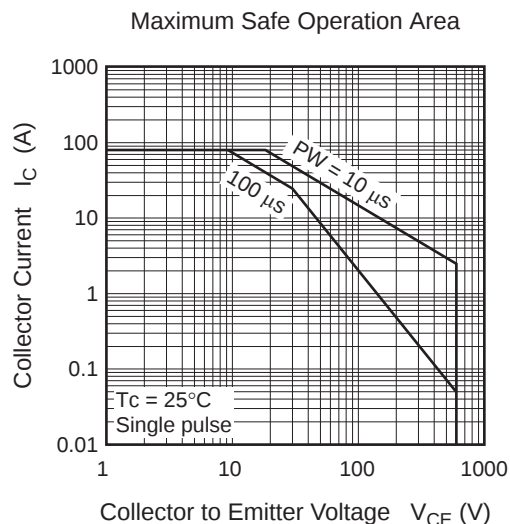
Electrical Characteristics

(Tj = 25°C)

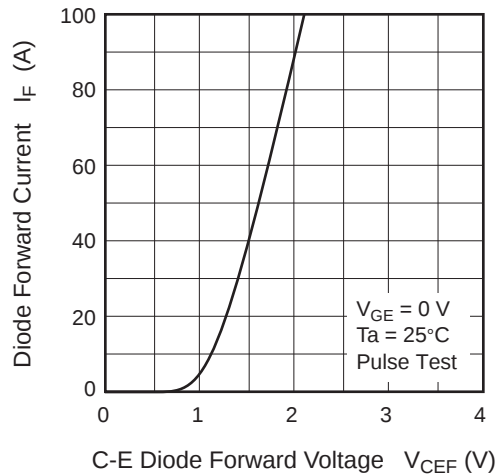
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I _{CES}	—	—	100	μA	V _{CE} = 600V, V _{GE} = 0
Gate to emitter leak current	I _{GES}	—	—	±1	μA	V _{GE} = ±30 V, V _{CE} = 0
Gate to emitter cutoff voltage	V _{GE(off)}	4	—	8	V	V _{CE} = 10 V, I _C = 1 mA
Collector to emitter saturation voltage	V _{CE(sat)}	—	1.4	1.82	V	I _C = 20 A, V _{GE} = 15 V ^{Note3}
		—	1.6	—	V	I _C = 40 A, V _{GE} = 15 V ^{Note3}
Input capacitance	C _{ies}	—	1260	—	pF	V _{CE} = 25 V
Output capacitance	C _{oes}	—	73	—	pF	V _{GE} = 0
Reverse transfer capacitance	C _{res}	—	21	—	pF	f = 1 MHz
Switching time	t _{d(on)}	—	44	—	ns	I _C = 30 A
	t _r	—	96	—	ns	V _{CE} = 400 V, V _{GE} = 15 V
	t _{d(off)}	—	65	—	ns	R _g = 5 Ω ^{Note3}
	t _f	—	92	—	ns	Inductive Load
C-E diode forward voltage	V _{ECF1}	—	1.2	2.1	V	I _F = 20 A ^{Note3}
	V _{ECF2}	—	1.5	—	V	I _F = 40 A ^{Note3}
C-E diode reverse recovery time	t _{rr}	—	90	—	ns	I _F = 20 A di _F /dt = 100 A/μs

Notes: 3. Pulse test

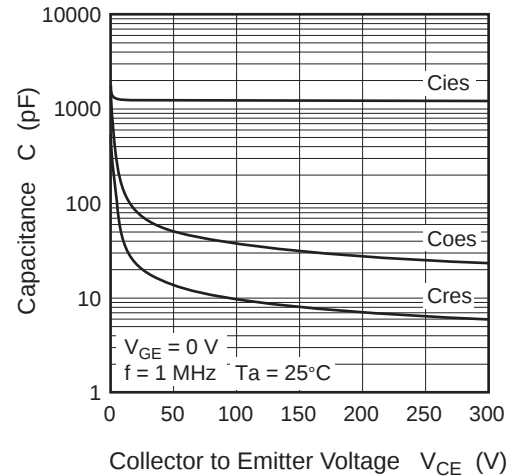
Main Characteristics



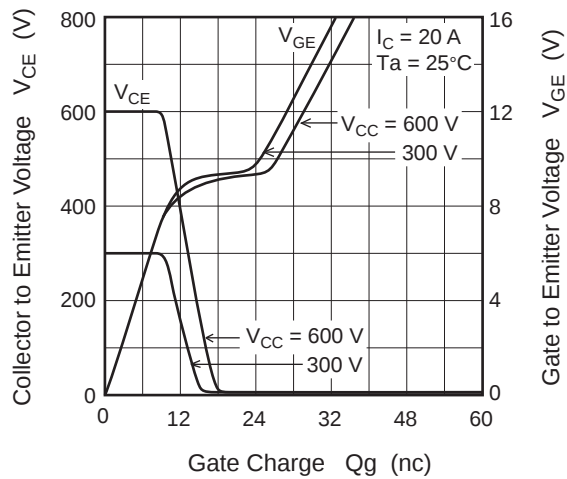
Forward Current vs. Forward Voltage (Typical)



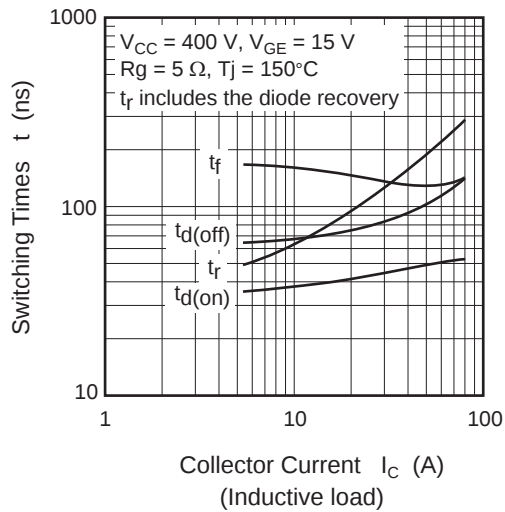
Typical Capacitance vs. Collector to Emitter Voltage



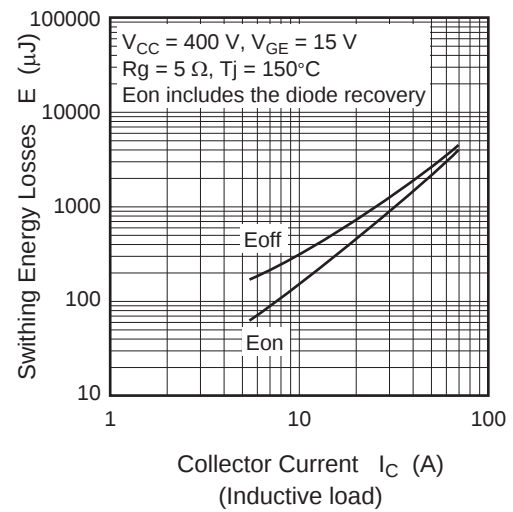
Dynamic Input Characteristics (Typical)



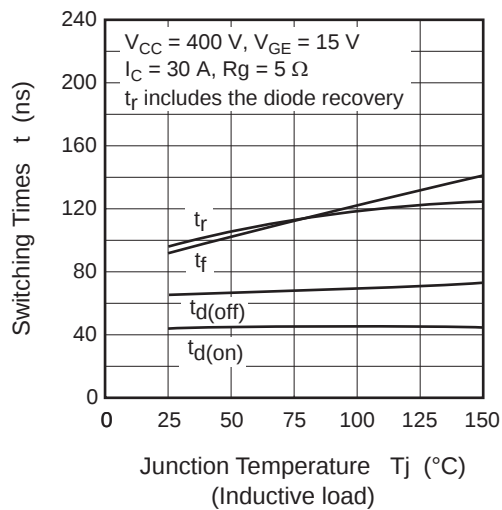
Switching Characteristics (Typical) (1)



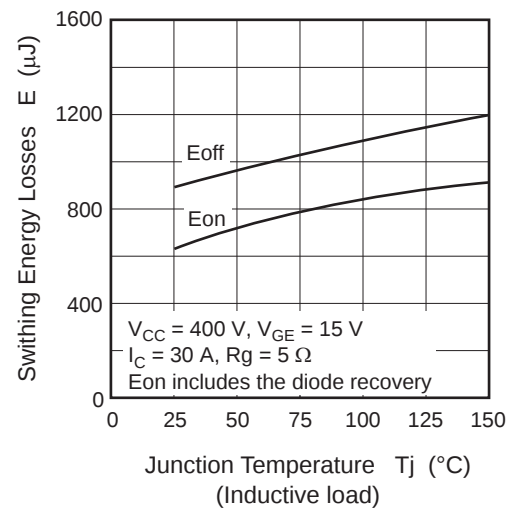
Switching Characteristics (Typical) (2)

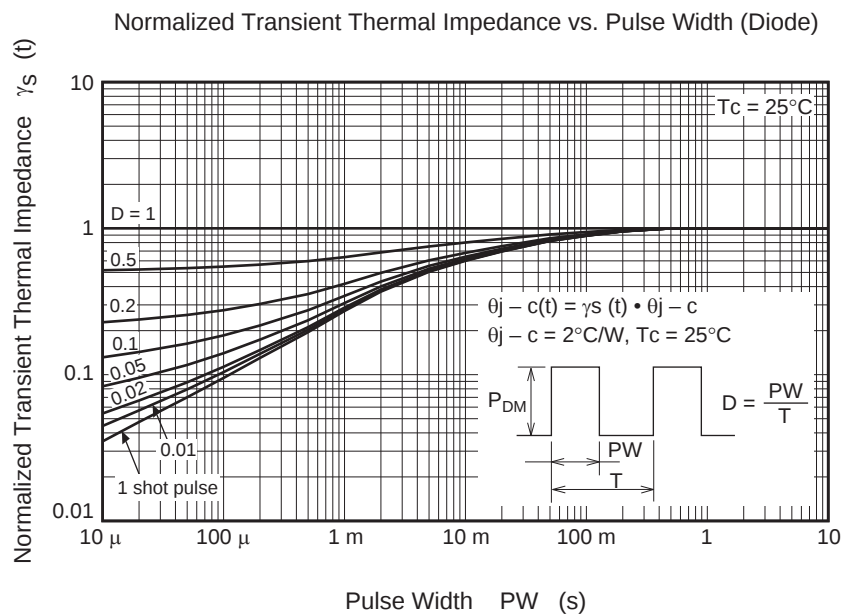
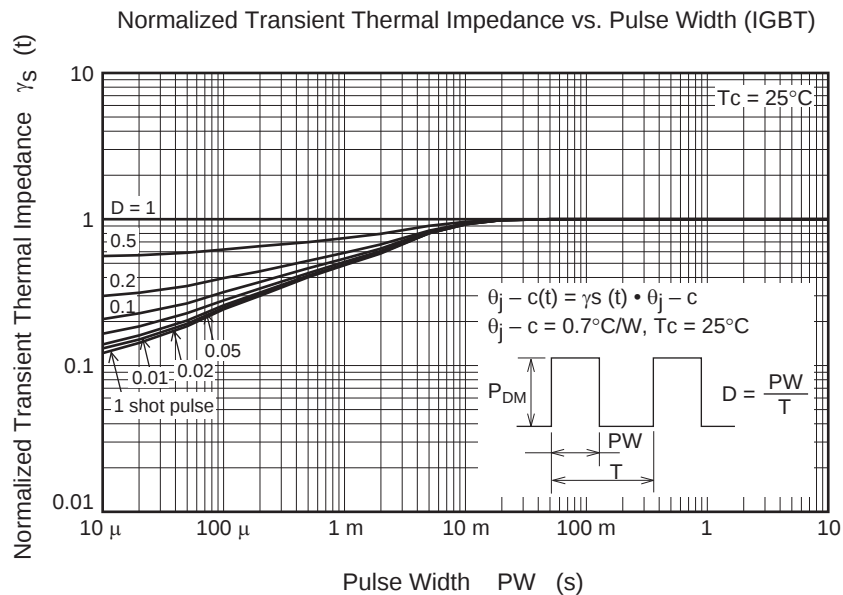


Switching Characteristics (Typical) (3)

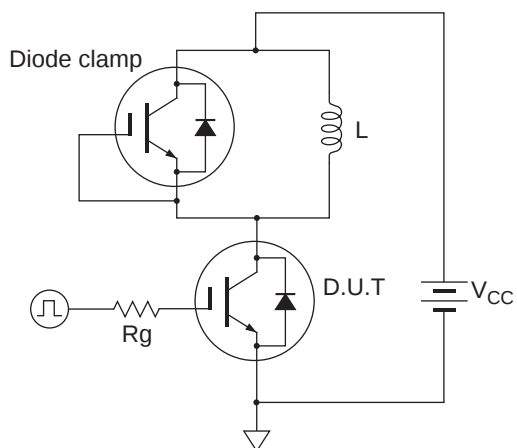


Switching Characteristics (Typical) (4)

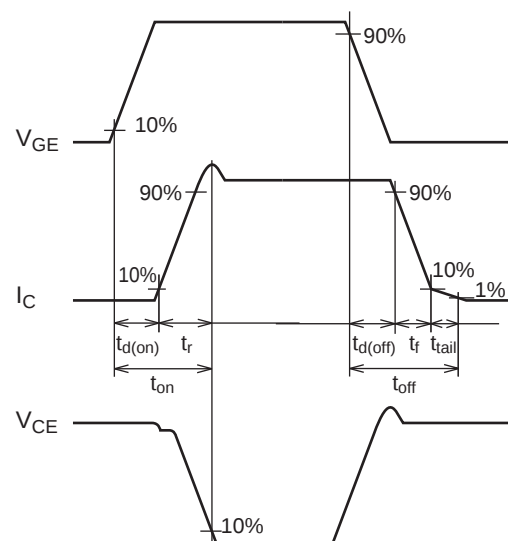




Switching Time Test Circuit



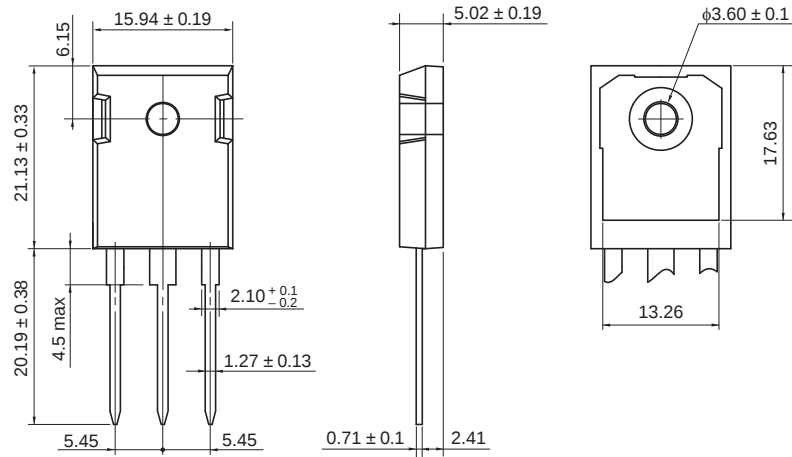
Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-247A	—	PRSS0003ZH-A	—	6.14g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60F3DPQ-A0-T0	240 pcs	Box (Tube)

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Laved' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141