

## N-Channel Enhancement Mode MOSFET

### Features

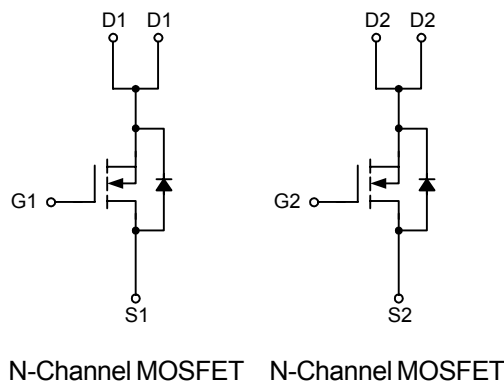
- 30V/6A ,  $R_{DS(ON)}=21m\Omega(\text{typ.}) @ V_{GS}=10V$   
 $R_{DS(ON)}=32m\Omega(\text{typ.}) @ V_{GS}=5V$
- Super High Dense Cell Design for Extremely Low  $R_{DS(ON)}$
- Reliable and Rugged
- SO-8 Package

### Pin Description



### Applications

- Power Management in Notebook Computer , Portable Equipment and Battery Powered Systems.



### Ordering and Marking Information

<p>APM7314 □□-□□</p> <p>Handling Code Temp. Range Package Code</p>	<p>Package Code K : SO-8 Temp. Range C : 0 to 70°C Handling Code TR : Tape &amp; Reel</p>
<p>APM7314 K : <span style="border: 1px solid black; padding: 2px;">APM7314 XXXXX</span></p>	<p>XXXXX - Date Code</p>

ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Unit	
$V_{DSS}$	Drain-Source Voltage	30	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 20$		
$I_D^*$	Maximum Drain Current – Continuous	6	A	
$I_{DM}$	Maximum Drain Current – Pulsed	24		
$P_D$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	1.6	W
		$T_A=100^\circ\text{C}$	0.625	W
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
$R_{\theta JA}$	Thermal Resistance – Junction to Ambient	80	$^\circ\text{C/W}$	

\* Surface Mounted on FR4 Board,  $t \leq 10$  sec.

## Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	APM7314			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu\text{A}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$			1	$\mu\text{A}$
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ\text{C}$			5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	1		3	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^a$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=3.5A$		21	24	m $\Omega$
		$V_{GS}=5V, I_{DS}=2A$		32	35	
$V_{SD}^a$	Diode Forward Voltage	$I_{SD}=2A, V_{GS}=0V$	0.6		1.1	V

## Electrical Characteristics Cont. (T<sub>A</sub> = 25°C unless otherwise noted)

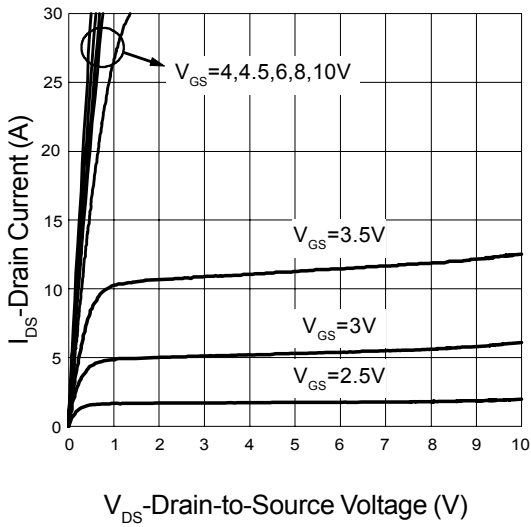
Symbol	Parameter	Test Condition	APM7314			Unit
			Min.	Typ.	Max.	
<b>Dynamic<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V , I <sub>DS</sub> = 10A		15	20	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>GS</sub> =5V ,		5.8		
Q <sub>gd</sub>	Gate-Drain Charge			3.8		
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V , I <sub>DS</sub> =2A , V <sub>GEN</sub> =10V , R <sub>G</sub> =6Ω		11	18	ns
T <sub>r</sub>	Turn-on Rise Time			17	26	
t <sub>d(OFF)</sub>	Turn-off Delay Time			37	54	
T <sub>f</sub>	Turn-off Fall Time			20	30	
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V		1200		pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =15V		220		
C <sub>riss</sub>	Reverse Transfer Capacitance	Frequency=1.0MHz		100		

### Notes

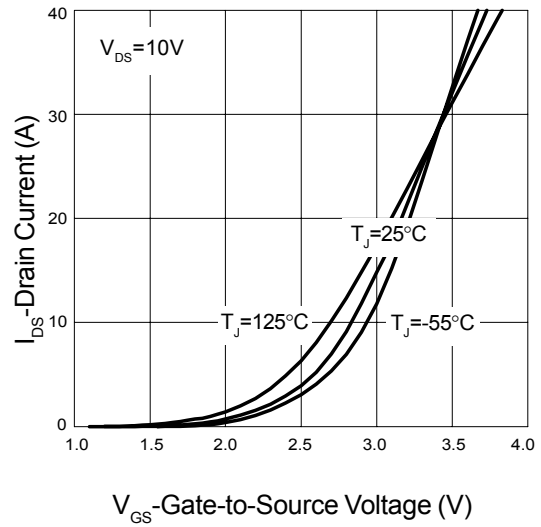
- <sup>a</sup> : Pulse test ; pulse width ≤300μs, duty cycle ≤ 2%
- <sup>b</sup> : Guaranteed by design, not subject to production testing

## Typical Characteristics

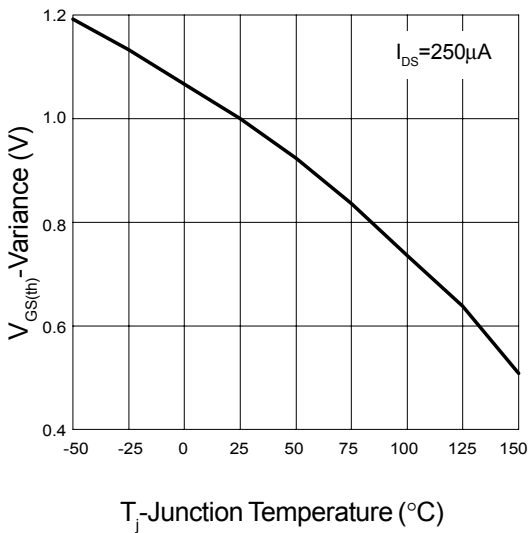
Output Characteristics



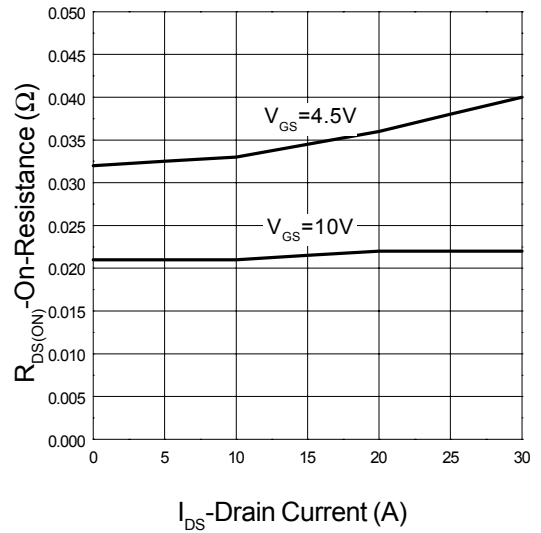
Transfer Characteristics



Threshold Voltage vs. Junction Temperature

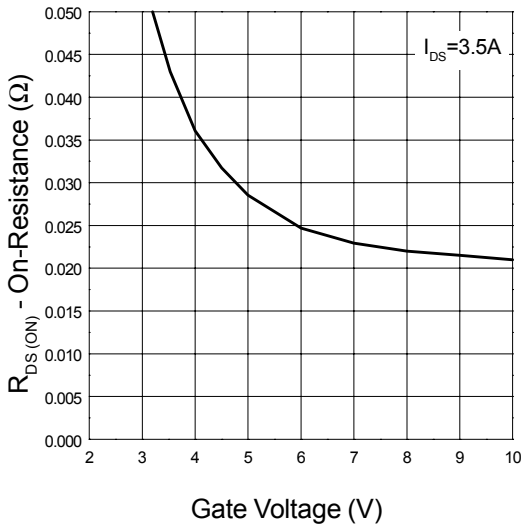


On-Resistance vs. Drain Current

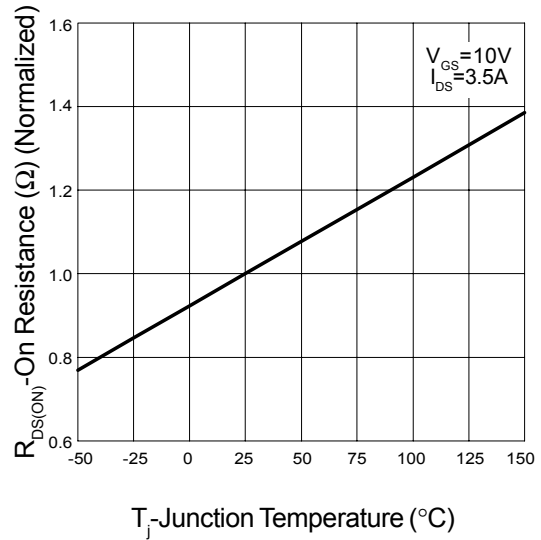


Typical Characteristics Cont.

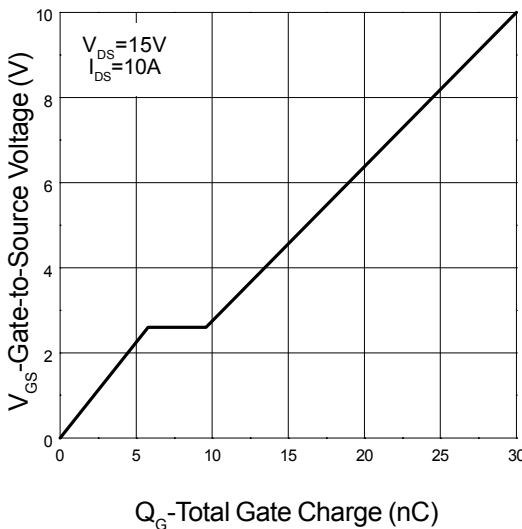
On-Resistance vs. Gate-to-Source Voltage



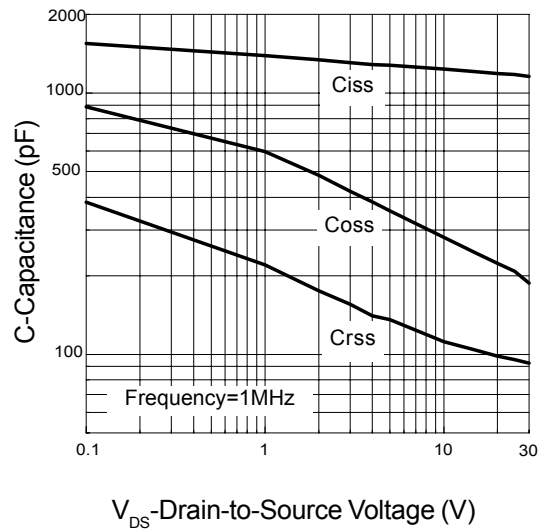
On-Resistance vs. Junction Temperature



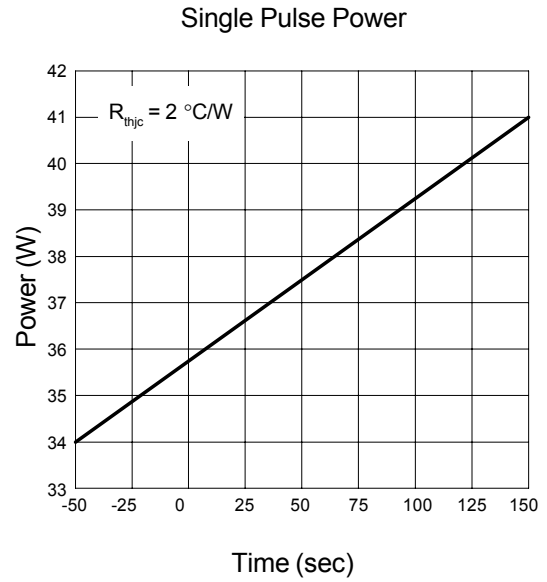
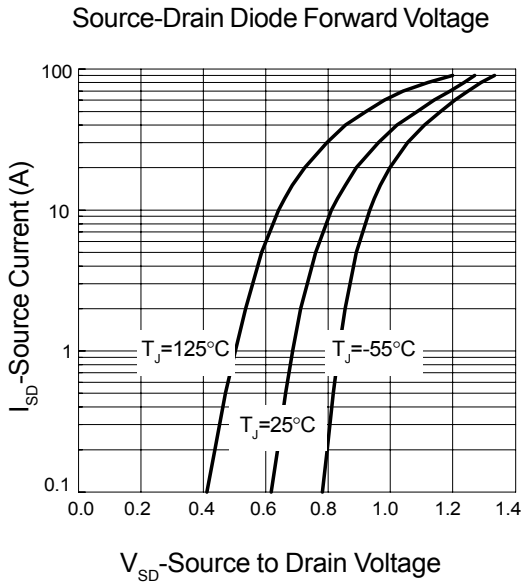
Gate Charge



Capacitance Characteristics

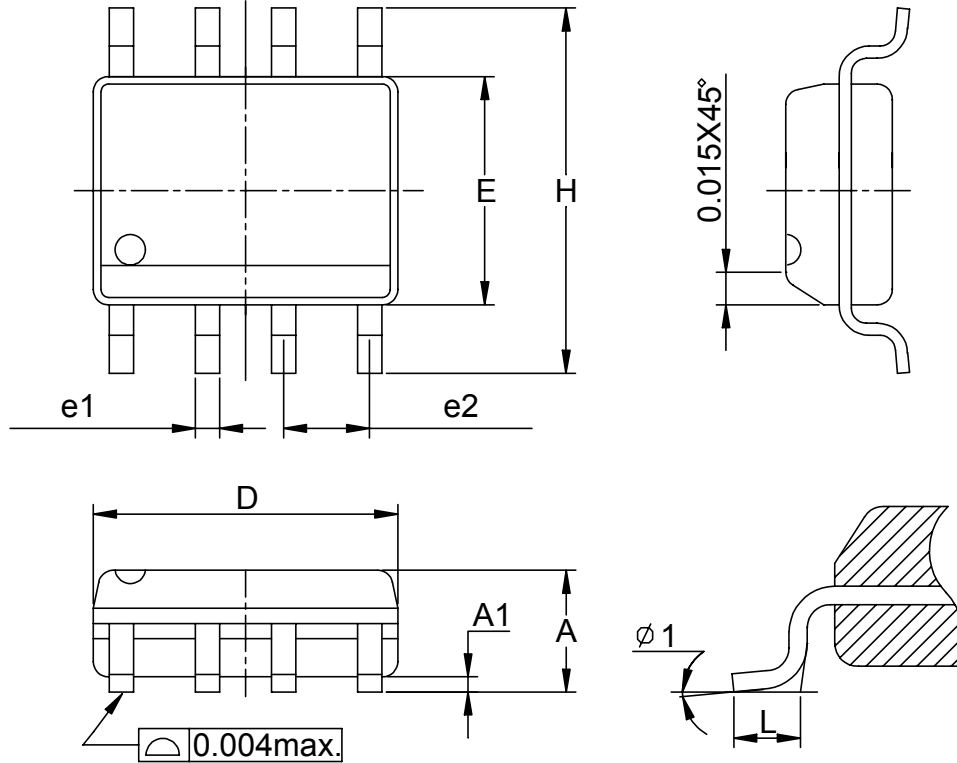


Typical Characteristics Cont.



## Packaging Information

SOP-8 pin ( Reference JEDEC Registration MS-012)



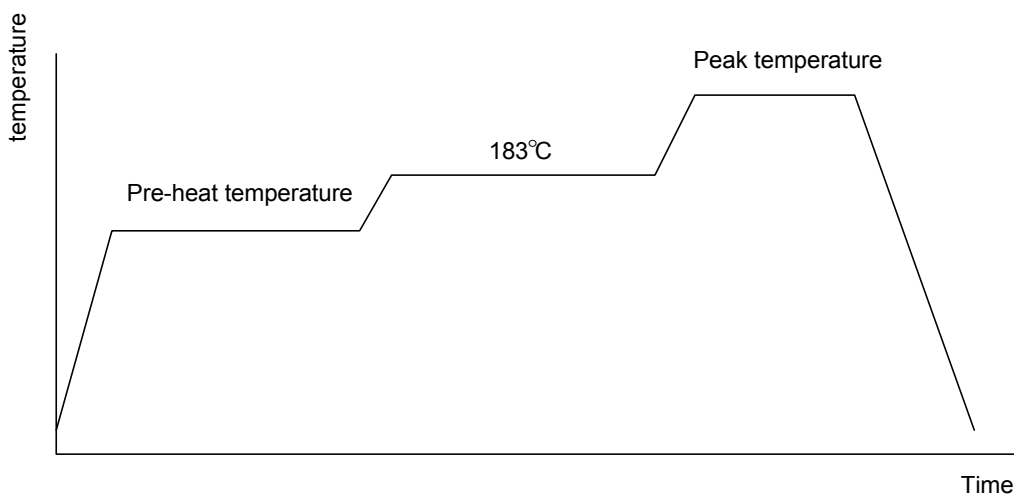
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
φ 1	8°		8°	

## Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb)
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.
Packaging	2500 devices per reel

## Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A APRIL 1999



## Classification Reflow Profiles

	Convection or IR/ Convection	VPR
Average ramp-up rate(183°C to Peak)	3°C/second max.	10 °C /second max.
Preheat temperature 125 ± 25°C)	120 seconds max	
Temperature maintained above 183°C	60 – 150 seconds	
Time within 5°C of actual peak temperature	10 –20 seconds	60 seconds
Peak temperature range	220 +5/-0°C or 235 +5/-0°C	215-219°C or 235 +5/-0°C
Ramp-down rate	6 °C /second max.	10 °C /second max.
Time 25°C to peak temperature	6 minutes max.	

## Package Reflow Conditions

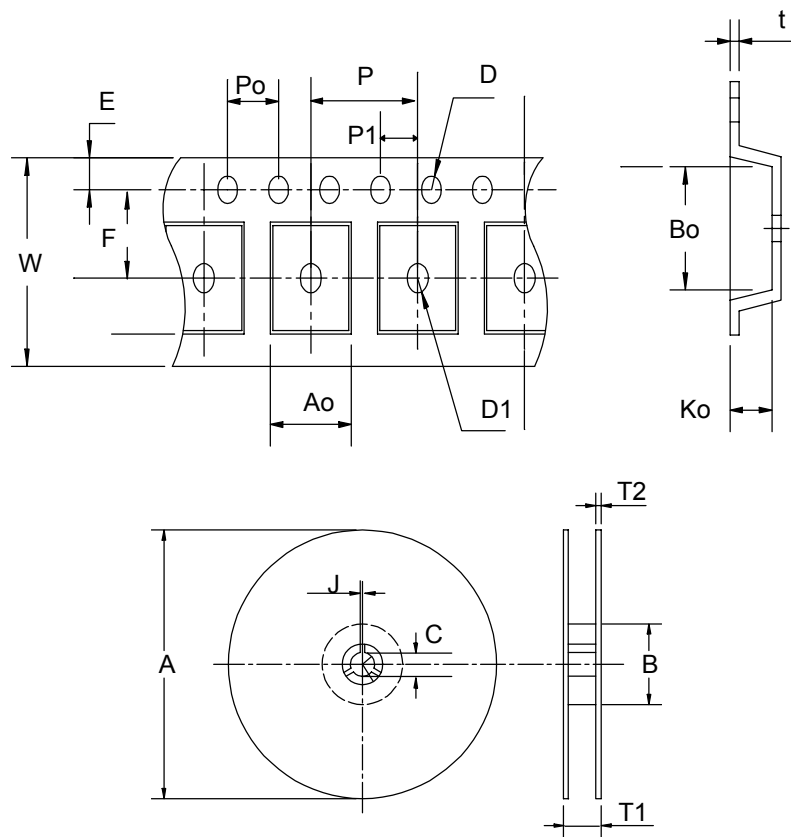
pkg. thickness ≥ 2.5mm and all bgas	pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm <sup>3</sup>	pkg. thickness < 2.5mm and pkg. volume < 350mm <sup>3</sup>
Convection 220 +5/-0 °C		Convection 235 +5/-0 °C
VPR 215-219 °C		VPR 235 +5/-0 °C
IR/Convection 220 +5/-0 °C		IR/Convection 235 +5/-0 °C



## Reliability test program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C, 5 SEC
HOLT	MIL-STD 883D-1005.7	1000 Hrs Bias @ 125°C
PCT	JESD-22-B, A102	168 Hrs, 100% RH, 121°C
TST	MIL-STD 883D-1011.9	-65°C ~ 150°C, 200 Cycles

## Carrier Tape & Reel Dimensions



<b>Application</b>	A	B	C	J	T1	T2	W	P	E
<b>SOP-8</b>	330±1	62 ± 1.5	12.75 + 0.15	2 + 0.5	12.4 +0.2	2± 0.2	12 + 0.3 - 0.1	8± 0.1	1.75± 0.1
<b>Application</b>	F	D	D1	Po	P1	Ao	Bo	Ko	t
<b>SOP-8</b>	5.5 ± 0.1	1.55±0.1	1.55+ 0.25	4.0 ± 0.1	2.0 ± 0.1	6.4 ± 0.1	5.2± 0.1	2.1± 0.1	0.3±0.013

(mm)

**Cover Tape Dimensions**

Carrier Width	12
Cover Tape Width	9.3

(mm)

**Customer Service****Anpec Electronics Corp.**

Head Office :

5F, No. 2 Li-Hsin Road, SBIP,

Hsin-Chu, Taiwan, R.O.C.

Tel : 886-3-5642000

Fax : 886-3-5642050

Taipei Branch :

7F, No. 137, Lane 235, Pac Chiao Rd.,

Hsin Tien City, Taipei Hsien, Taiwan, R. O. C.

Tel : 886-2-89191368

Fax : 886-2-89191369