

New !

Fuji Smart power device :[M-POWER2](#)
for Multi-oscillated current resonant type power supply

Summary

System: The ideal and Fuji's original system
It includes many functions(Soft-switching,stand-by).

Device: Multiple-chip Power Device: M-POWER2
contains IC and two MOSFETs in SIP-13pin package.
M-POWER has various types of protection functions.

Features

1. High efficiency (a reduction in SMPS size is possible.)

DC/DC : 92.3%(DC input:400V,output:16V)

PFC+DC/DC :87.0%(AC100V),89.5%(AC200V)

2. Built in stand-by mode (An auxiliary power supply is unnecessary.)

$P_{in} < 0.4W$ at $P_{out} = 0.0W$

$P_{in} < 1.0W$ at $P_{out} = 0.5W$

$P_{in} < 4.0W$ at $P_{out} = 2.0W$

3. Low noise

(a reduction in the noise suppression parts is possible.)

MOSFETs: Turn-on : ZVS+ZCS

Turn-off : ZVS

Diodes(secondary side)

Surge voltage does not occur at reverse recovery.

4. Fail-safety (Built in protection functions:OC,SC,OV,Tj(OH))

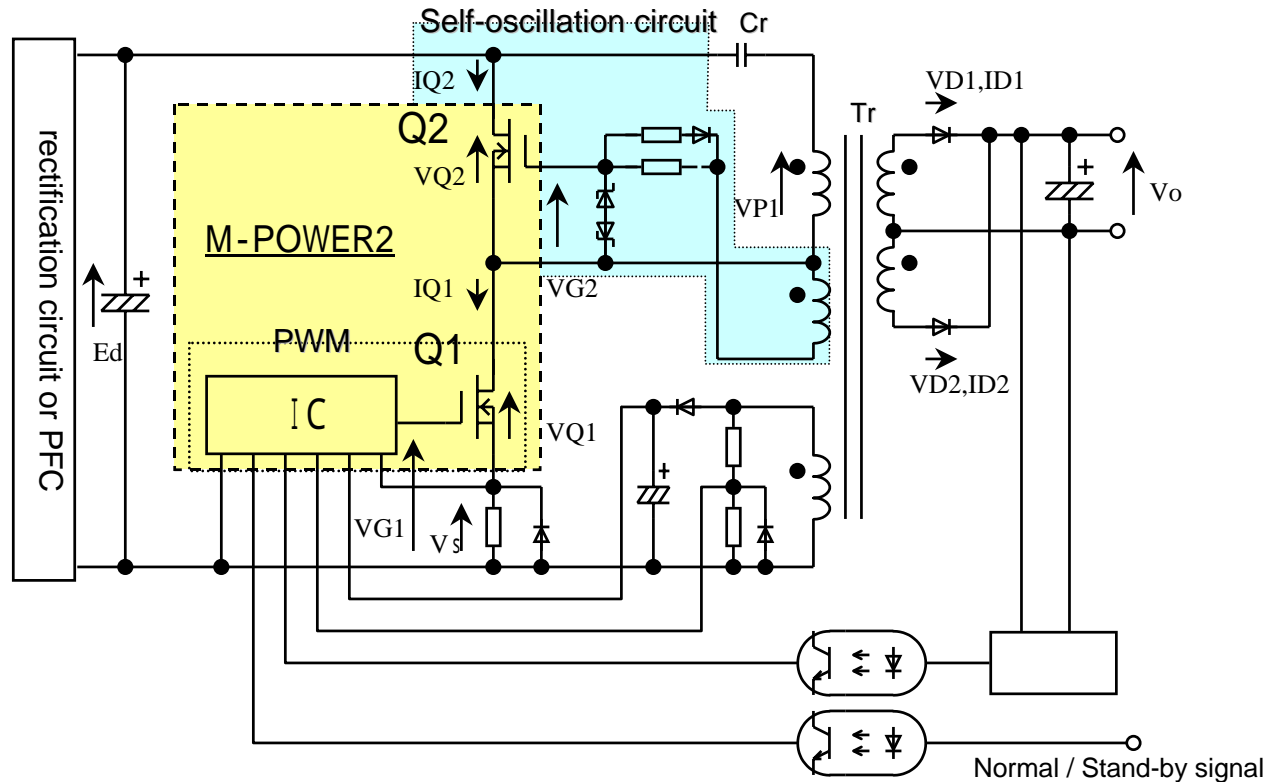
5. Easy design power supply (Reduction of design time)



Down size your SMPS

Circuit configuration

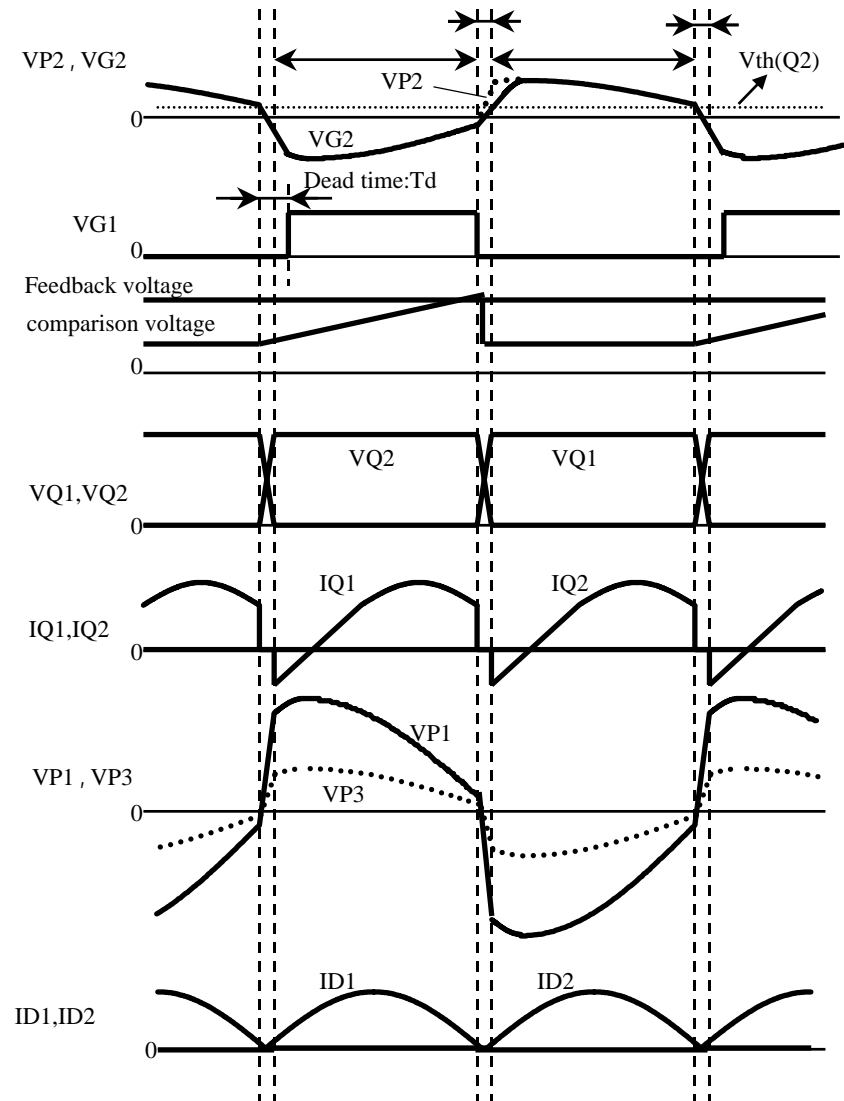
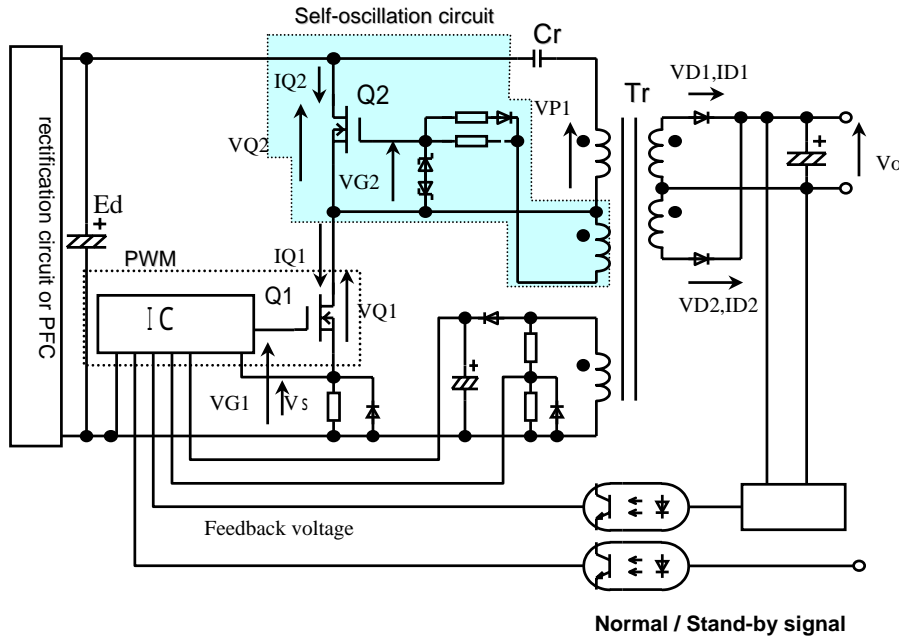
Multi-oscillated current resonant type power supply



Q1 ----- PWM oscillation

Q2 ----- self-oscillation (driven by winding voltage).

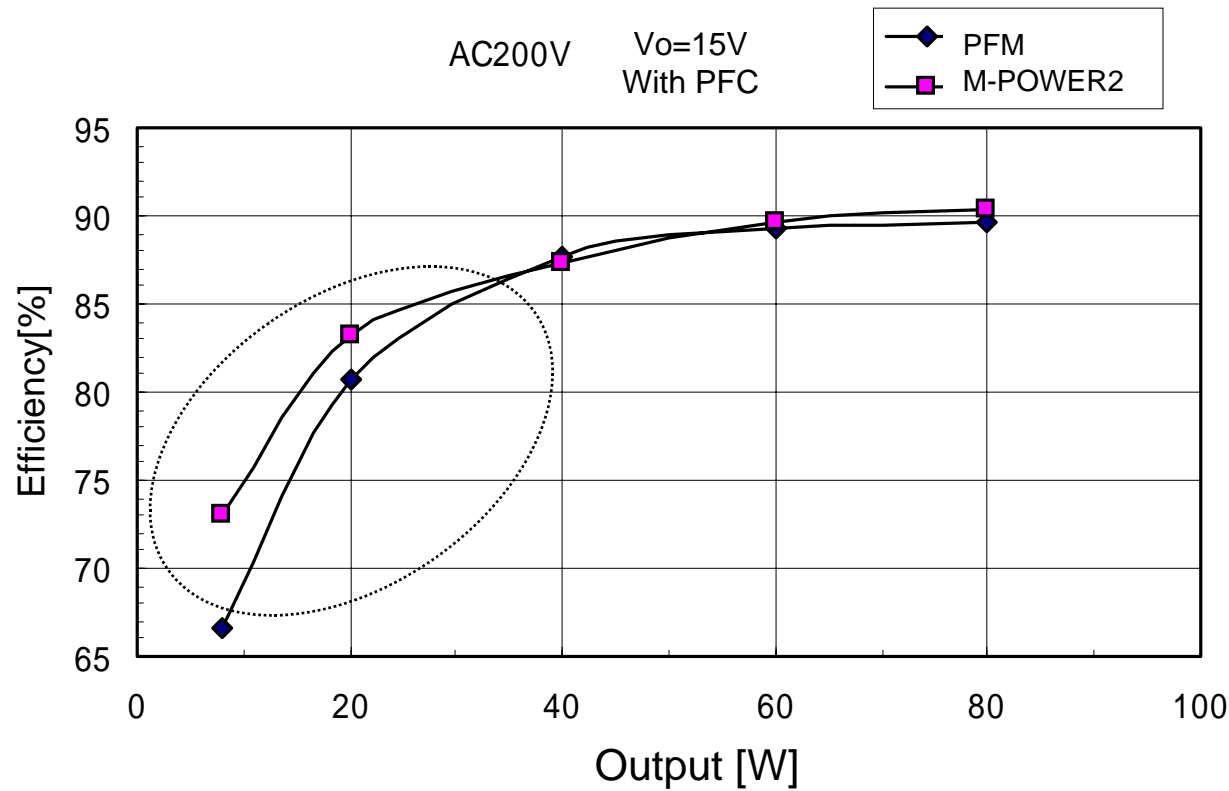
Operation of switching transient



- Features of the Multi-oscillation**
- 1) No arm-short circuit.
 - 2) it is high efficiency at light load too.

Efficiency comparison

PFM V.S. M-POWER2(Multi oscillation)

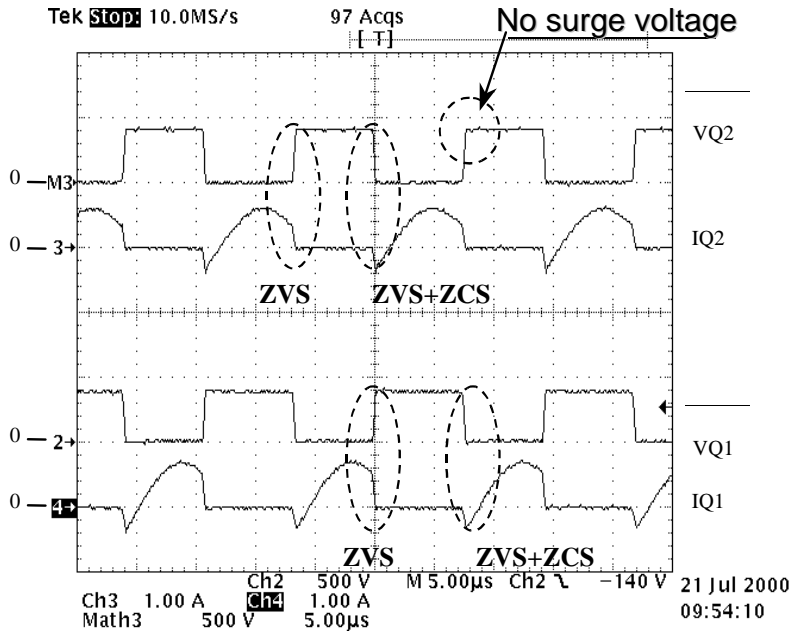


It is high efficiency at light load too.

Switching waveforms

Ultra Low Noise

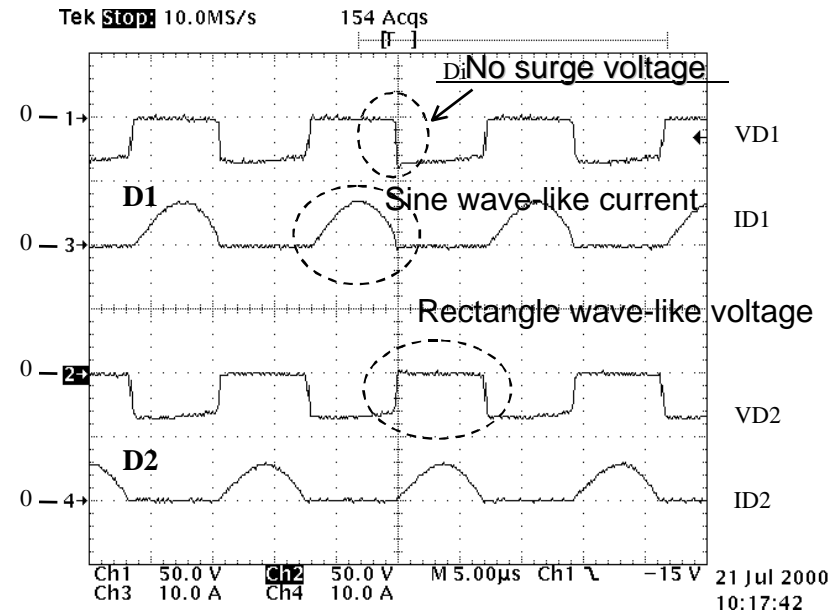
MOSFETs(Q1,Q2)



Turn-on : ZVS+ZCS
 Turn-off : ZVS
 No surge voltage at Turn-off

VQ1 : 500V /DIV
 IQ1 : 1A /DIV
 VQ2 : 500V /DIV
 IQ2 : 1A /DIV
 5us/DIV

Condition: Ed=400V, Po=65W, Vo=16V Diodes(Secondary side)



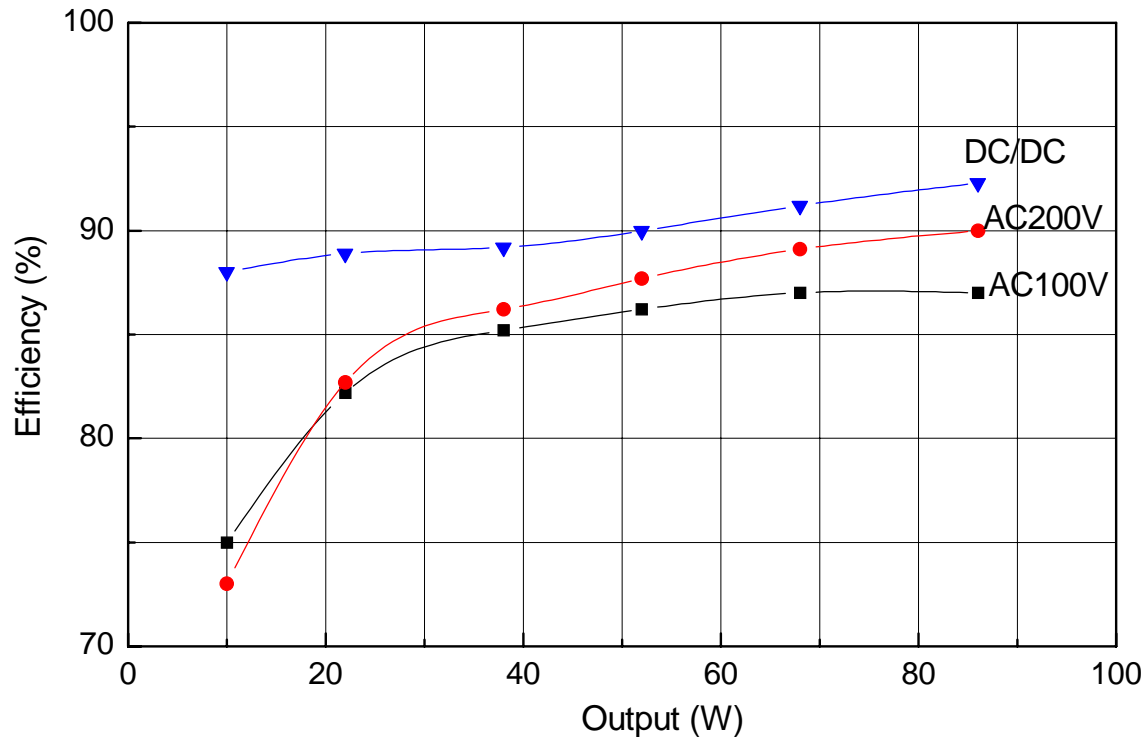
No surge voltage at reverse recovery

VD1:50V /DIV
 ID1:10A /DIV
 VD2:50V /DIV
 ID2:10A /DIV
 5us/DIV

Reduction in the noise suppression parts is possible.

Characteristic

High efficiency



DC/DC : 92.3%
(DC input:400V,output:16V)

PFC+DC/DC:87.0%
(AC100V),89.5%(AC200V)

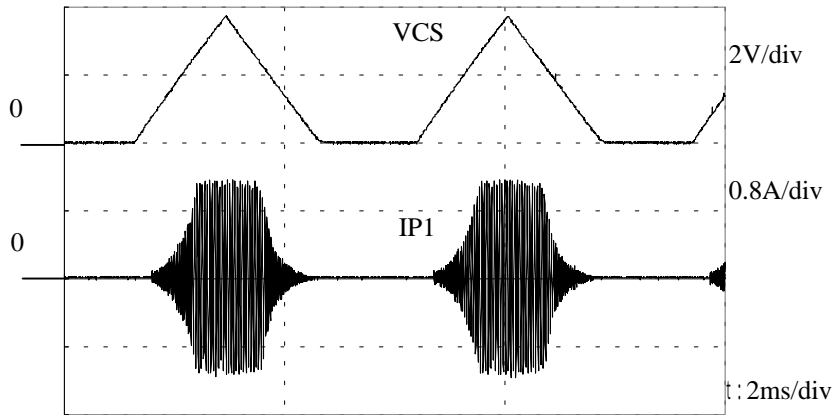
Efficiency - Load characteristic at normal mode

Down size your SMPS

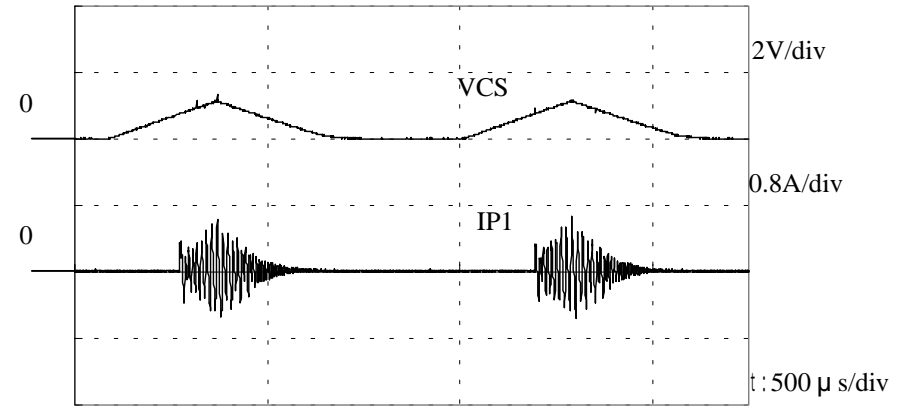
Performance

Power saving operation

‘Soft-start and soft-end switching of M-POWER2 reduce transformer noise.



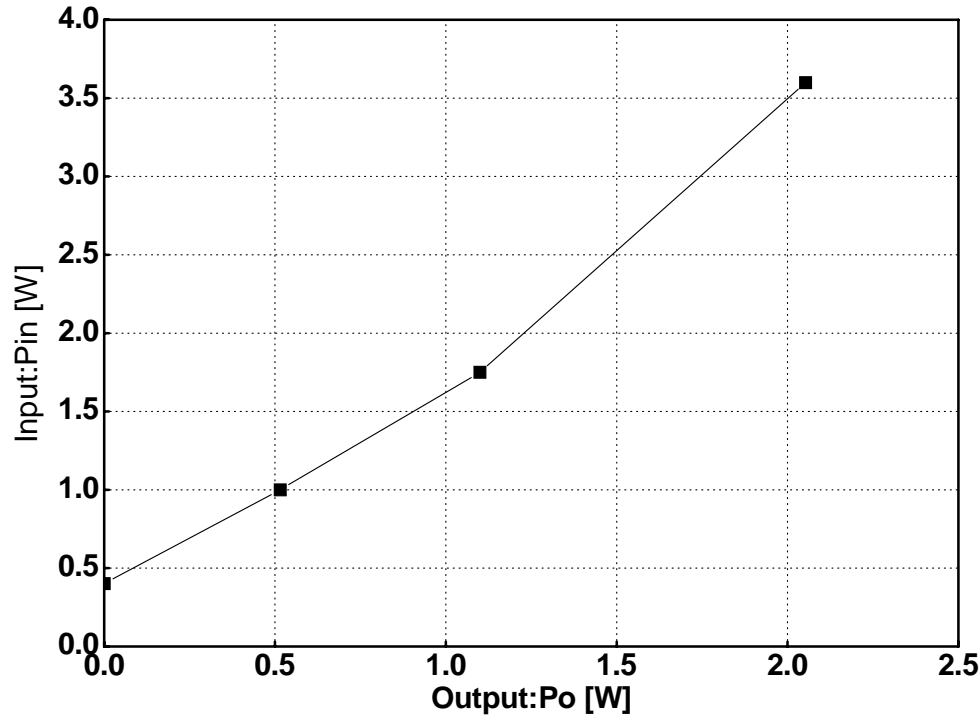
Condition:AC100V,Pout=0.5W



Condition:AC240V,Pout=0.5W

Characteristic

Power saving operation



$P_{in} < 0.4W$ at $P_{out} = 0.0W$
 $P_{in} < 1.0W$ at $P_{out} = 0.5W$
 $P_{in} < 4.0W$ at $P_{out} = 2.0W$

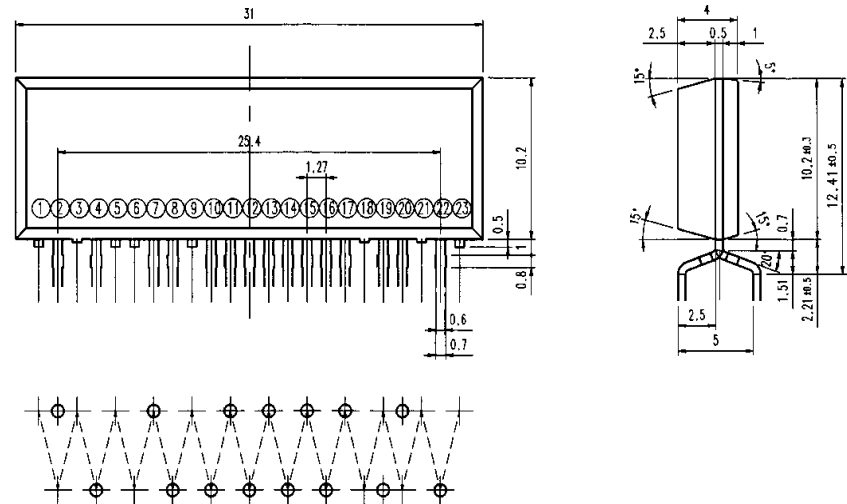
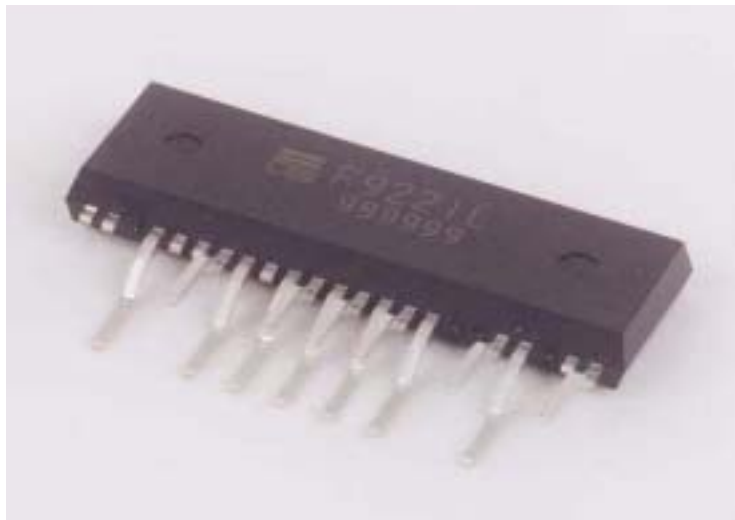
Input power – output power characteristic at standby mode

No sub power supply required for stand-by

M-POWER2

Type name	Main-MOSFET		Sub-MOSFET		Control IC		Sample
	V _{DS}	R _{DS(ON)}	V _{DS}	R _{DS(ON)}	V _{CC(ON)}	T _{j(OH)}	
F9221L	500V	0.9	500V	0.9	16.5V	125 ~ 150	M/P
F9222L	500V	0.6	500V	0.6	16.5V	125 ~ 150	02/09

External view of M-POWER2



PKG : H:10.2mm × W:31.0mm × T:3.5mm

Unit:mm