

## 1A\* PWM/VFM Step-up/down DC/DC Converter with Synchronous Rectifier

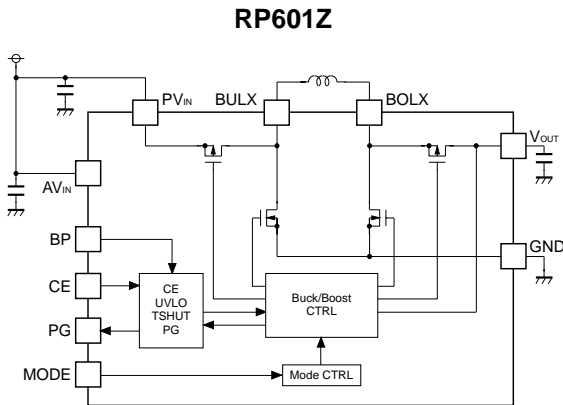
The RP601Z Series are CMOS-based PWM/VFM step-up/down DC/DC converters with synchronous rectifier. The RP601Z automatically switches between step-up mode and step-down mode according to input voltage, output voltage and load current. The power controlling method can be selected from forced PWM control type or PWM/VFM auto switching control type by inputting a signal to the MODE pin. The forced bypass mode (PWM/VFM auto switching control, BP pin = H) is included which suppresses supply current below 5  $\mu$ A. The output voltage is adjustable (50-mV step) using DVS (Dynamic Voltage Scaling) during operation. A 1.95-mm square compact WLCSP-16-P1 package is available.

### FEATURES

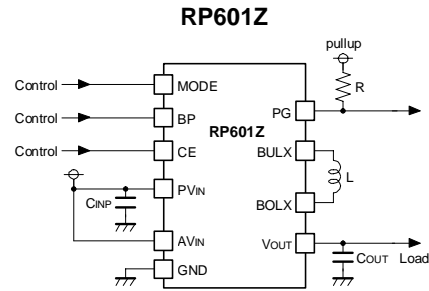
- Supply Current ( $I_{DD}$ ) ..... Typ. 45 $\mu$ A (No switching, VFM)
- Standby Current ( $I_{standby}$ ) ..... Typ. 0.1 $\mu$ A (CE="L")
- Input Voltage Range ( $V_{IN}$ ) ..... 2.3V to 5.5V (Absolute maximum rating: 6.5V)
- Output Voltage Range ( $V_{OUT}$ ) ... 2.75V to 4.2V
- Output Voltage Accuracy .....  $\pm 2\%$  (PWM)
- Temp. coeff. of Output Voltage ..... Typ.  $\pm 50$ ppm/ $^{\circ}$ C
- Output Step Voltage ..... Typ. 50mV (DVS Function)
- Output Voltage setting ..... S-wire
- Output Current ( $I_{OUT}$ ) ..... Typ. 1A\*
- ON Resistance ..... Typ. 80m $\Omega$  (Pch/ Nch,  $V_{IN}$ =3.6V)
- Quiescent Current in Forced Bypass Mode .... Typ. 5 $\mu$ A ( $V_{OUT}$ = $V_{IN}$ , No switching)
- Oscillator Frequency ( $f_{osc}$ ) ..... Typ. 2.4MHz
- UVLO Detect Voltage ( $V_{UVLO1}$ ) ..... Typ. 2.1V
- BULX Current Limit ..... Typ. 4.0A
- Soft Start Time ( $t_{start}$ ) ..... Typ. 350 $\mu$ s ( $V_{OUT}$ =3.3V)
- Thermal Shutdown Circuit ..... Stops at 140 $^{\circ}$ C.
- Power Good Function
- Auto-discharge Function ..... A Version
- MODE Pin ..... "H": forced PWM control, "L": PWM/VFM auto switching control
- Package ..... WLCSP-16-P1

\*) This is an approximate value, because output current depends on conditions and external parts.

### BLOCK DIAGRAM



### TYPICAL APPLICATIONS



L: DFE201610C-1R0M (TOKO) or TFM201610GHM-1R0MTAA (TDK) or DFE252012P-2R2M (TOKO)  
 CINP: JMK107BJ226MA (TAIYO YUDEN)  
 COUT: JMK107BJ226MA (TAIYO YUDEN) x 2pcs

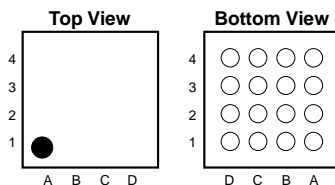
### SELECTION GUIDES

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	WLCSP-16-P1	5,000 pcs	RP601Zxxx*-E2-F

- xxx : Specify the default set output voltage (Default  $V_{SET}$ ) from 2.75 V (275) to 4.20 V (420) in 0.05 V step.
- \* : Specify the auto-discharge option.  
 A : Auto-discharge function included  
 B : Auto-discharge function not included

### PACKAGES (Top View)

#### WLCSP-16-P1



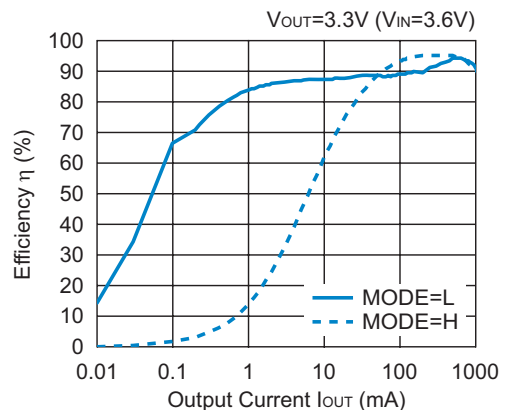
C3,C4	BOLX	A1	MODE
B3,B4	BULX	D3,D4	$V_{OUT}$
D1	PG	A3	$AV_{IN}$
C1	CE	A4	$PV_{IN}$
B1	BP	A2,B2,C2,D2	GND

### APPLICATION

- Portable devices such as smart phones and feature phones phone
- Digital home appliances such as digital cameras and video cameras

### TYPICAL CHARACTERISTIC

#### RP601Z330A Efficiency vs. Output Current



- PDAs such as MP3 players and digital voice recorders



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