SPI-6631M

■Features

- Power supply voltages, V_{BB}: 13 V to 33 V
- Signal power supply configuration
- Output current Iout: 3 A (max)... repetitive current (normal-operation current)
- Built-in current recirculation diode
- Built-in UVLO, TSD and OCP protection
- Built-in dead time function that prevents through current upon phase switching
- Built-in error sense flag output
- HSOP16-pin package

■Absolute Maximum Ratings

| Parameter	Symbol	Ratings	Unit	Conditions
Main Supply Voltage	V_{BB}	35	V	
MOSFET Output Breakdown Voltage	V_{DSS}	35	V	DutyCycle=100%*
Output Current	Iout	±3	A	
Input Voltage	VIN	−0.3 to 6.5	V	
S Terminal Voltage	Vsen	−2 to 2	V	
Alarm Terminal Voltage	Valarm	6.5	V	
Alarm Input Current	Ialarm	1	mA	
Power Dissipation	P_D	2.6	W	When using a Sanken evaluation board
Junction Temperature	Tj	150	°C	
Storage Temperature	Tstg	−30 to 150	°C	
Operating Ambient Temperature	Ta	−20 to 85	°C	

*: Output current value may be limited, depending on the duty ratio, ambient temperature, and heating conditions. Do not exceed the rated current or maximum junction temperature (Tj = 150°C).

■Electrical Characteristics

(Ta=25°C, V_{BB}=24V, unless otherwise specified)

Parameter	Symbol	Ratings min.	Ratings typ.	Ratings max.	Unit	Conditions
Main Supply Voltage	V_{BB}	13	–	33	V	In operation
Main Supply Current	I_{BB}	–	–	23	mA	
Maximum Clock Pulse Width	t_w	–	–	3	μs	
Input Voltage	V_{IL}	–	–	0.8	V	
Input Voltage	V_{IH}	2.0	–	–	V	
Input Current	I_{IL}	–	±8	–	μA	$V_{IN(0)}$, VIN=0.8V
Input Current	I_{IH}	–	±20	–	μA	$V_{IN(1)}$, VIN=2.0V
Crossover Dead Time	T_{delay}	100	500	1200	ns	
VB Terminal Breakdown Voltage	V_B	–	V_{BB}+5	–	V	Breakdown voltage between VB and GND
VB-OUT Breakdown Voltage	V_{B-OUT}	–	5	–	V	
VB Terminal Current	I_B	–	–	3	mA	VB-OUT=5V
Output Leakage Current	I_{DSS}	–	–	800	μA	V_{OUT}=V_{BB}=35V
Output Leakage Current		−800	–	–	μA	V_{OUT}=0V
MOSFET ON Resistance	$R_{DS(ON)}$	–	0.4	0.7	Ω	IOUT=-1A, Between VBB and OUT IOUT=1A, Between OUT and S
MOSFET Diode Forward Voltage	V_{SD}	–	–	2.2	V	ISD=1A
Overcurrent Sense Current	I_{OCP}	7	–	–	A	Short between Out and Out
Overcurrent Protection Blank Time	tblank	0.7	1.2	4	μs	
Overcurrent Protection Delay Time	tocp	0.5	1	2.2	ms	
Thermal Protection Operation Temperature	T_J	–	170	–	°C	
Thermal Protection Hysteresis	ΔT_J	–	15	–	°C	
Low Voltage Protection Operation Voltage	UVLO	4.0	4.5	5.0	V	V_{BB} voltage
Low Voltage Protection Hysteresis	ΔUVLO	0.4	0.45	0.5	V	
Alarm Output Voltage	V_{Alarm}	–	–	0.5	V	I=1mA

■Internal Block Diagram
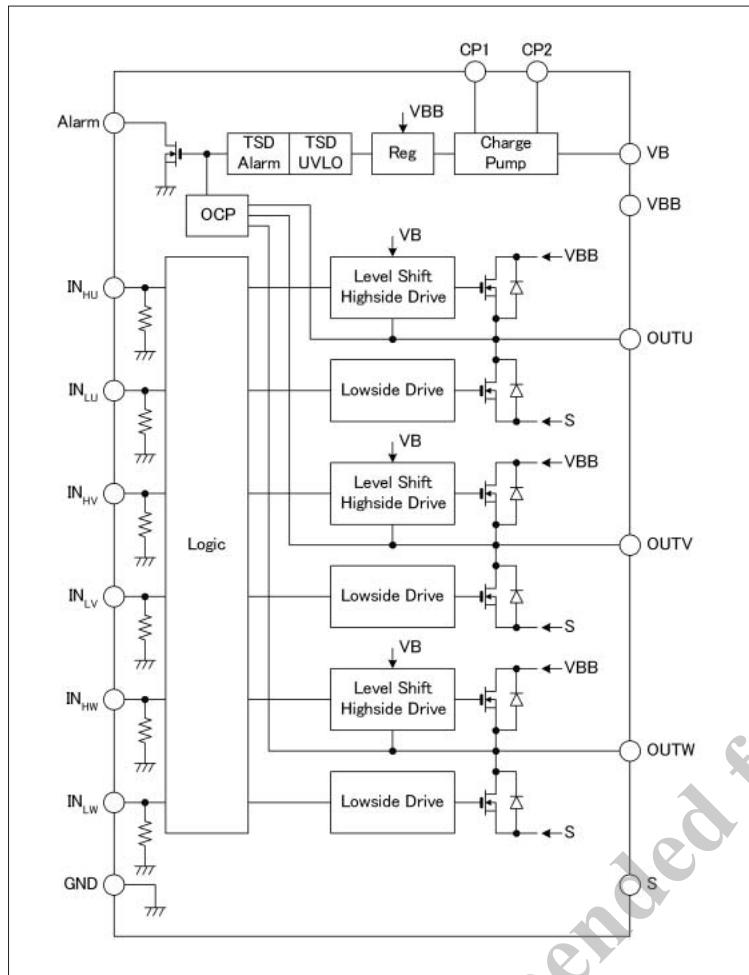
■Pin Assignment

Pin No.	Symbol	Function
1	CP2	Capacitor terminal for charge pump 2
2	CP1	Capacitor terminal for charge pump 1
3	OUTU	DMOSFET phase U output
4	S	Sense terminal (lower arm source output)
5	OUTV	DMOSFET phase V output
6	OUTW	DMOSFET phase W output
7	Alarm	Alarm output
8	GND	Ground
9	IN_{LW}	Phase W lower arm input
10	IN_{HW}	Phase W upper arm input
11	IN_{LV}	Phase V lower arm input
12	IN_{HV}	Phase V upper arm input
13	VBB	Driver supply terminal
14	IN_{LU}	Phase U lower arm input
15	IN_{HU}	Phase U upper arm input
16	VB	Capacitor terminal for charging up charge pump

■External Dimensions (HSOP16)

(Unit : mm)

12.20 ± 0.20
(Gate remains: Not included in dimensions)

7.70

16   9

4.30

7.50 ± 0.20

1   8

1.27 $0.4^{+0.15}_{-0.05}$

10.50 ± 0.30

$0.25^{+0.15}_{-0.05}$

2.75MAX

12.00 ± 0.05
(Cavity)

2.50 ± 0.05
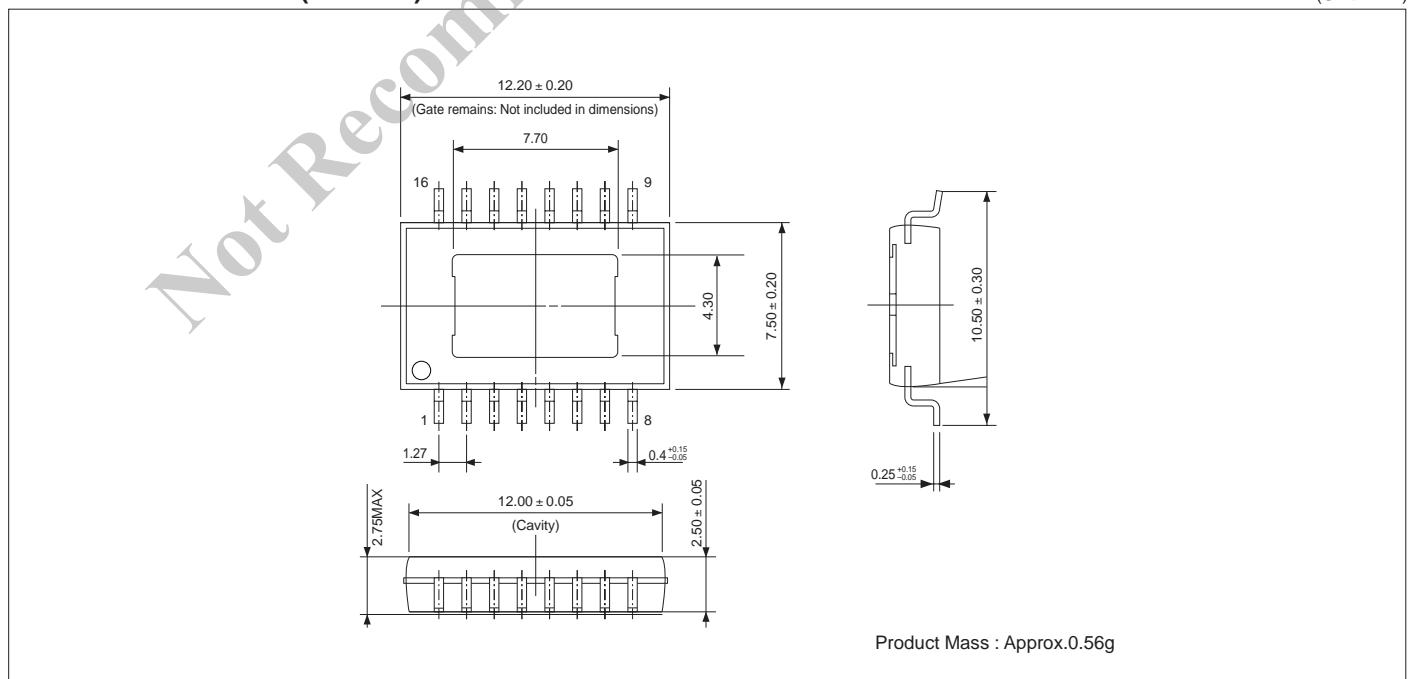
Product Mass : Approx.0.56g