



# SANYO Semiconductors

## DATA SHEET

# STK628-130-E

Thick-Film Hybrid IC  
Inverter for IH Cooker  
Inverter Hybrid IC

### Overview

The STK628-130-E is a inverter power hybrid IC for IH cooker containing power devices (IGBT and FRD), pre-driver, and temperature monitor.

### Applications

- Inverter for IH cooker.

### Features

- Built in integrates power devices (IGBT and FRD), pre-driver circuit.
- Built in thermal protection.
- The temperature monitor is enabled through the use of an internal thermistor.
- A single power supply drive is enabled with using of internal bootstrap circuits for upper power supplies.
- Direct input of control signal is possible.
- SIP (the single in-line package).

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# STK628-130-E

## Specifications

**Absolute maximum ratings** at  $T_c = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		400	V
Collector-emitter voltage	$V_{CE}$	+ - -	600	V
Output current	$I_O$	+, -, OUT terminal current	$\pm 60$	A
Output peak current	$I_{op}$	+, -, OUT terminal current $PW=100\mu\text{s}$ , 1pulse	$\pm 90$	A
Pre-driver supply voltage	$V_L$	$V_L - V_{SS}$	0 to 18	V
	$V_{DD}$	$V_{DD} - V_{SS}$	0 to 18	V
Input signal voltage	$V_{IN}$	HIN, LIN, SD terminal	-0.3 to $V_{DD}+0.3$	V
Maximum loss	$P_d$	IGBT, Per 1 pcs	135	W
Junction-to-substrate thermal resistance	$\theta_j\text{-c(T)}$	IGBT, Per 1 pcs	0.9	$^\circ\text{C/W}$
	$\theta_j\text{-c(D)}$	DIODE, Per 1 pcs	1.9	
Junction temperature	$T_j$	IGBT, FRD junction temperature	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$
Operating temperature	$T_C$	H-IC case temperature	-20 to +100	$^\circ\text{C}$
Tightening torque	$MT$	A screw part *1	1.0	$\text{N}\cdot\text{m}$

In the case without the instruction, the voltage standard is  $V_{SS}$  terminal voltage.

\*1 Flatness of the heat-sink should be lower than 0.25mm.

**Electrical Characteristics** at  $T_c=25^\circ\text{C}$ ,  $V_L, V_{DD}=15\text{V}$

Parameters	Symbols	Conditions	min	typ	max	unit
Power output part						
Collector-to-emitter cut-off current	$I_{CE}$	$V_{CE}=600\text{V}$			150	$\mu\text{A}$
Collector-to-emitter saturation voltage	$V_{CE}(\text{sat})$	$I_O=60\text{A}$ , Ch+, Ch-		1.8	2.5	V
Diode forward voltage	$V_F$	$I_O=-40\text{A}$ , Ch+, Ch-		1.6	2.2	V
Control (Pre-driver) part						
Pre-drive power supply consumption electric current	$I_D$	$V_L, V_{DD}=15\text{V}$		0.7	2.0	mA
Input ON voltage	$V_{IH}$	Output ON	9.5			V
Input OFF voltage	$V_{IL}$	Output OFF			6.0	V
Excessive temperature	TSD	The substrate surface		110		$^\circ\text{C}$
Temperature mounting resistance	$R_t$	TH- $V_{SS}$ value	90	100	110	$\text{k}\Omega$
Monitor resistor B-constant	B	25/50 $^\circ\text{C}$		4250		k
Switching time	$t_{on}$	$I_O=50\text{A}$ , Inductive load		0.7		$\mu\text{s}$
	$t_{off}$			0.7		

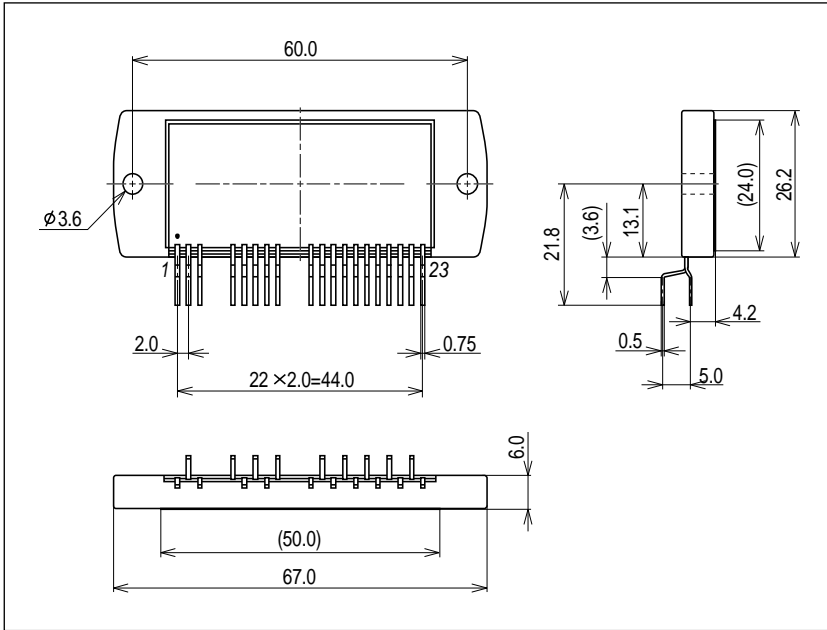
In the case without the instruction, the voltage standard is  $V_{SS}$  terminal voltage.

### Notes

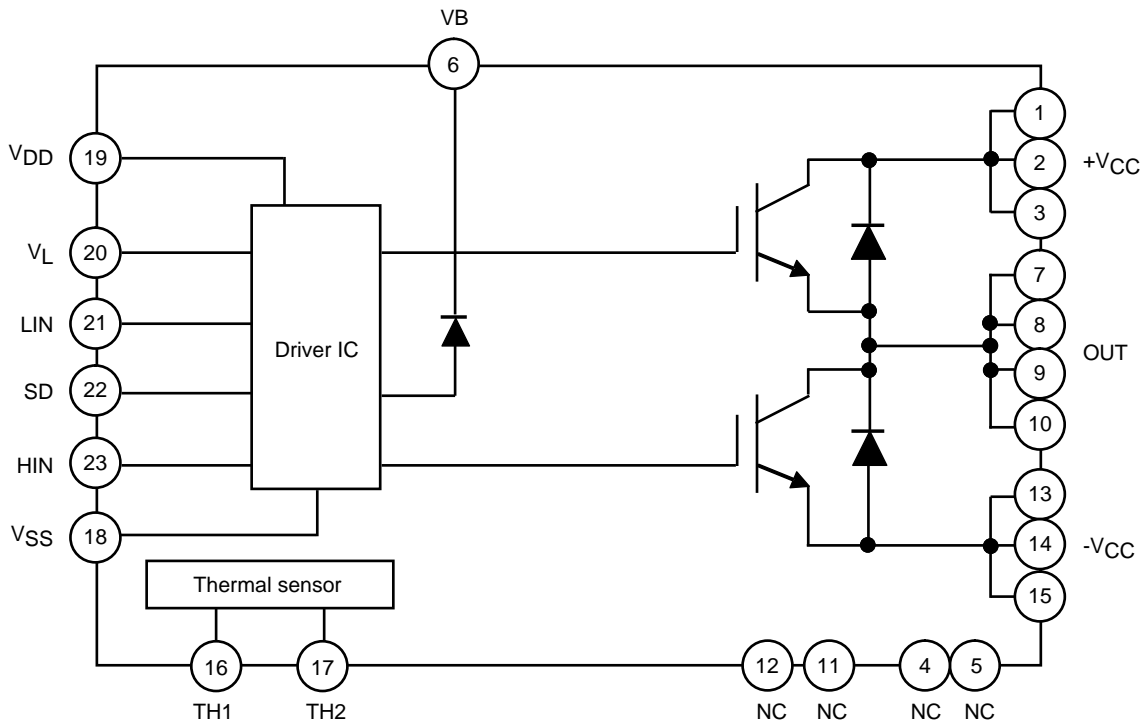
- Input ON voltage indicates a value to turn on output stage IGBT.  
Input OFF voltage indicates a value to turn off output stage IGBT.  
At the time of output ON, set the input signal voltage  $V_{IH}$  (min.) to  $V_{DD}$  (max.).  
At the time of output OFF, set the input signal voltage 0V to  $V_{IL}$  (Max.).
- When assembling the hybrid IC on the heat sink, tightening torque range is 0.8N•m to 1.0N•m.  
Flatness of the heat-sink should be lower than 0.25mm.

Package Dimensions

unit:mm (typ)



Internal Block Diagram



**Test Circuit**

+shows the upper side and - shows the lower side.

Fig.1 ICEO (IGBT/FRD)

ICEO (IGBT/FRD)

	CH+	CH-
M	1	9
N	7	14

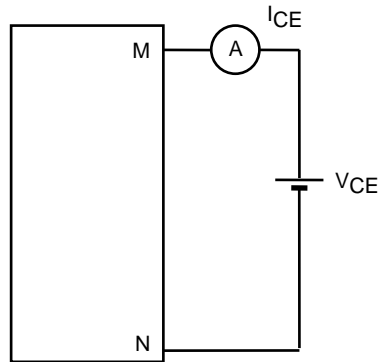


Fig.2  $V_{CE(sat)}$  (Test by the pulse)

	CH+	CH-
M	1, 2, 3	7, 8, 9, 10
N	7, 8, 9, 10	13, 14, 15
m	23	21

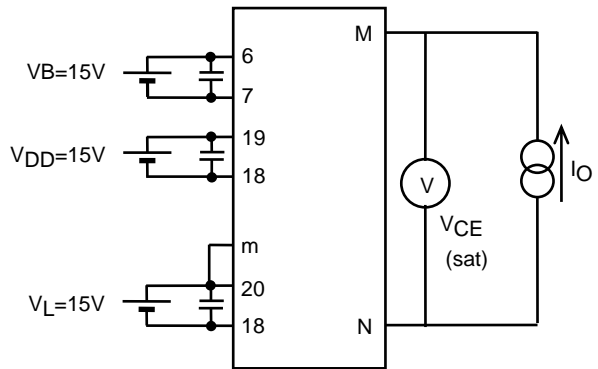
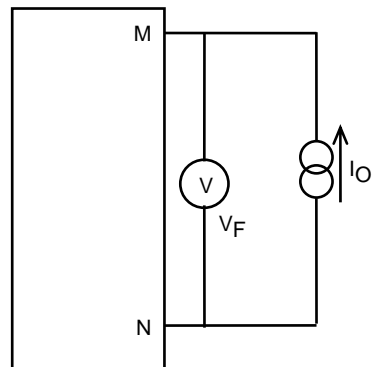


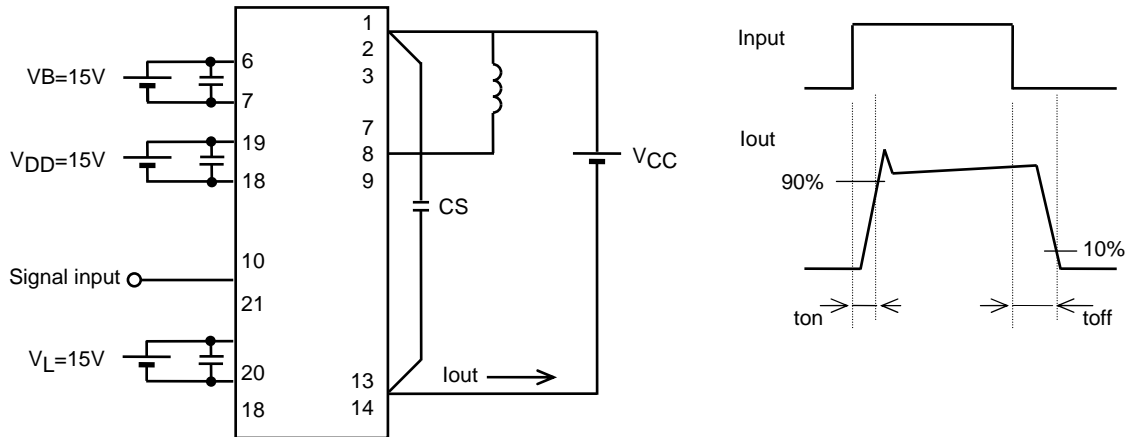
Fig.3  $V_F$  (Test by the pulse)

	CH+	CH-
M	1, 2, 3	7, 8, 9, 10
N	7, 8, 9, 10	13, 14, 15

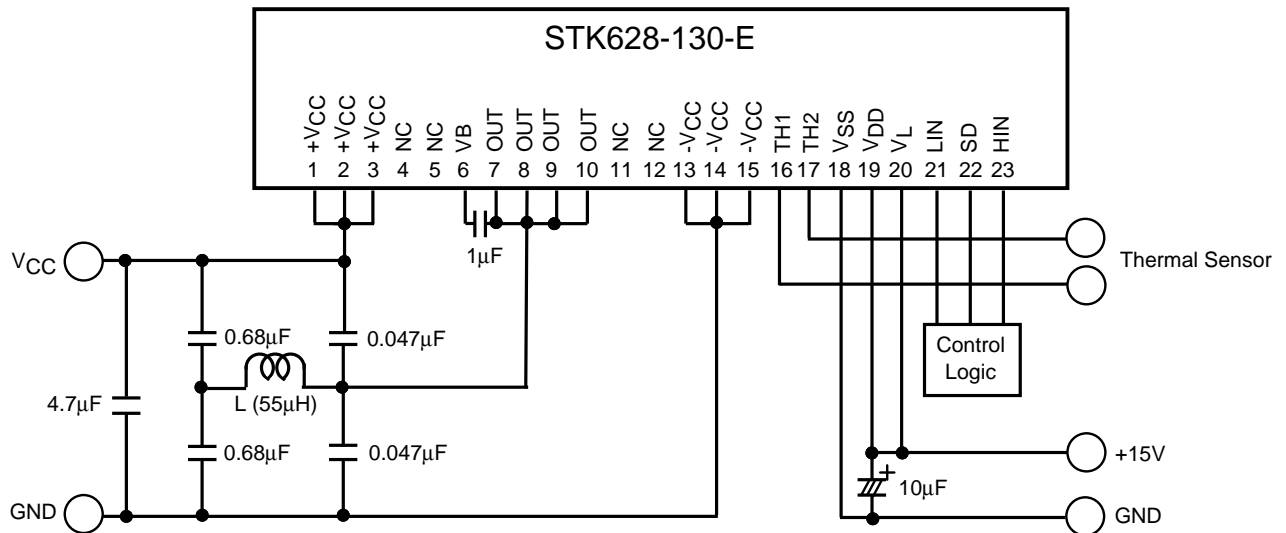


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Fig.4 Switching time (example: ch1-)



## Example of The Application Circuit



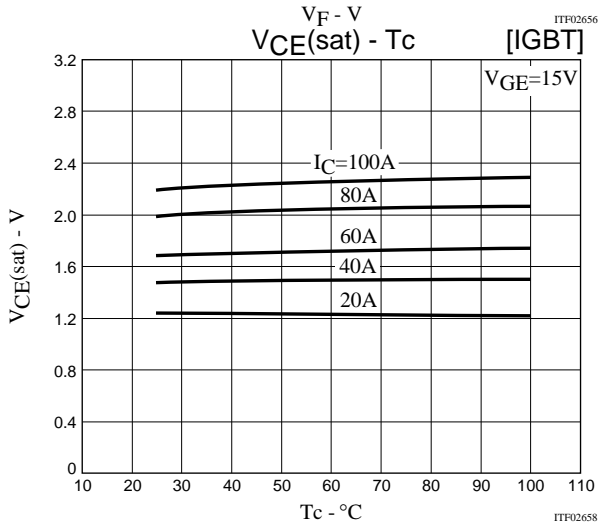
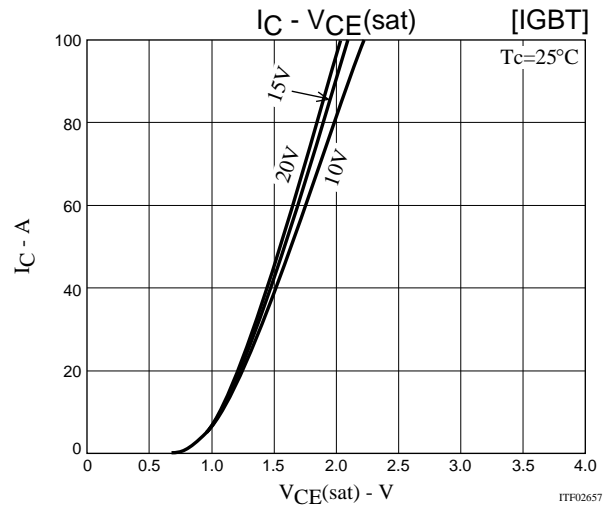
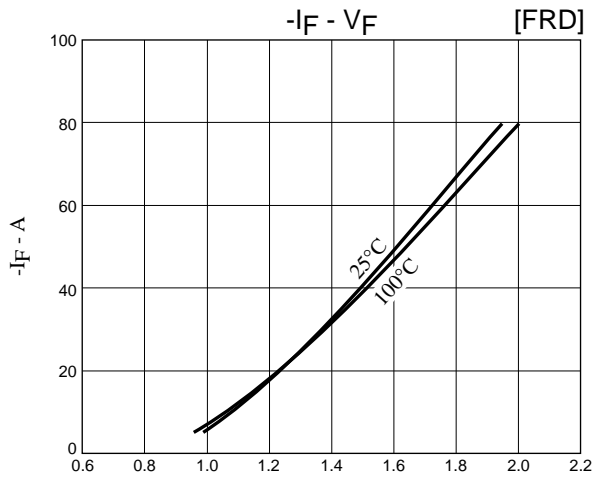
## Recommended Operating Conditions

Parameters	Symbol	Conditions	min	typ	max	unit
Supply voltage	$V_{CC}$	$+V_{CC} - -V_{CC}$		283	330	V
Pre-driver supply voltage	$V_{DD}$	$V_{DD} - V_{SS} *1$	13	15	18	V
Input ON voltage	$V_{IN} (ON)$	HIN, LIN, SD - $V_{SS}$ terminal	11	13	18	V
Input OFF voltage	$V_{IN} (OFF)$				5	
PWM frequency	fPWM			20	60	kHz
Tightening torque	MT	'M3' Type Screw	0.8		1.0	N•m

## Usage Precautions

- This IC has a built-in thermistor between the TH terminal 1 (16pin) and TH terminal 2 (17pin). It allows monitoring of the board temperature using the divided voltage developed with the pull-up resistance RP. The resistance of the RP must be 10kΩ or higher at a pull-up voltage of 5V and 39kΩ or higher at a pull-up voltage of 15V.

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