



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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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	± 60	A
Output peak current	I_{op}	+, -, OUT terminal current $PW=100\mu\text{s}$, 1pulse	± 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	μA
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		μs
	t_{off}			0.7		

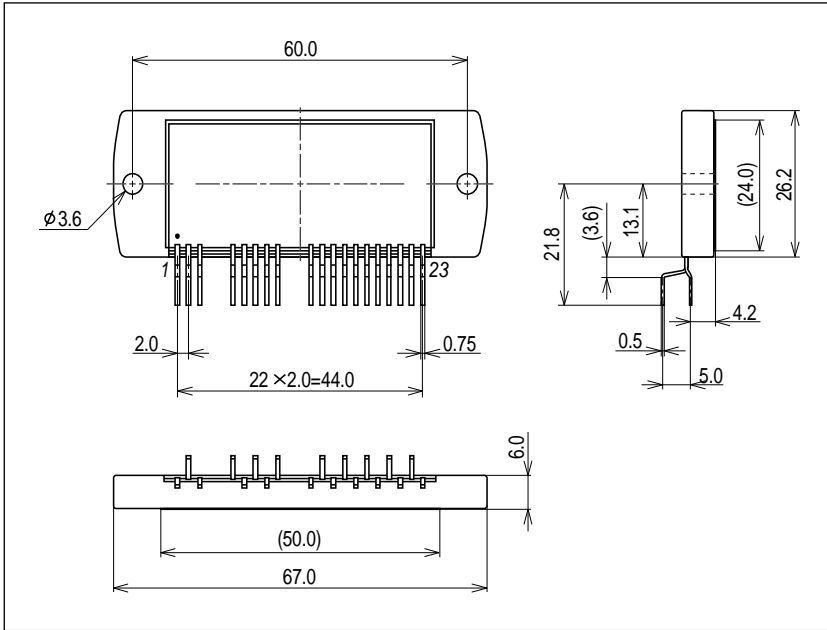
In the case without the instruction, the voltage standard is V_{SS} terminal voltage.

Notes

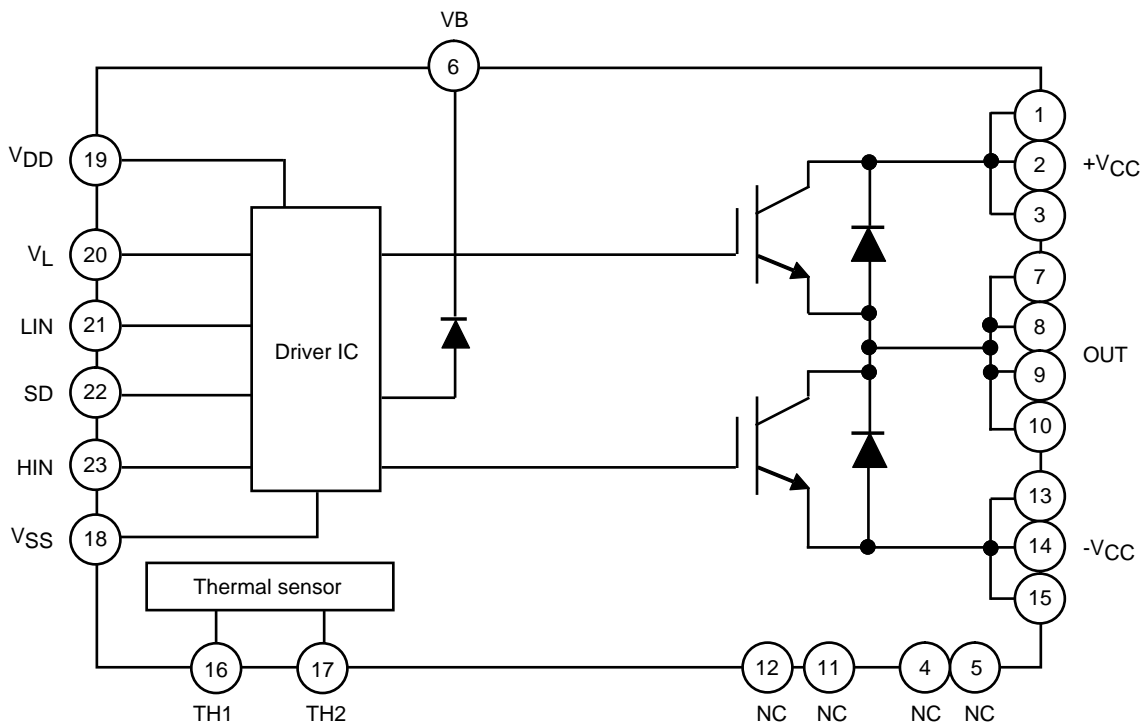
- Input ON voltage indicates a value to turn on output stage IGBT.
Input OFF voltage indicates a value to turn off output stage IGBT.
At the time of output ON, set the input signal voltage V_{IH} (min.) to V_{DD} (max.).
At the time of output OFF, set the input signal voltage 0V to V_{IL} (Max.).
- When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

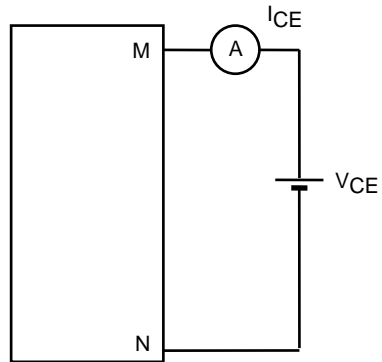


Fig.2 $V_{CE(sat)}$ (Test by the pulse)

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

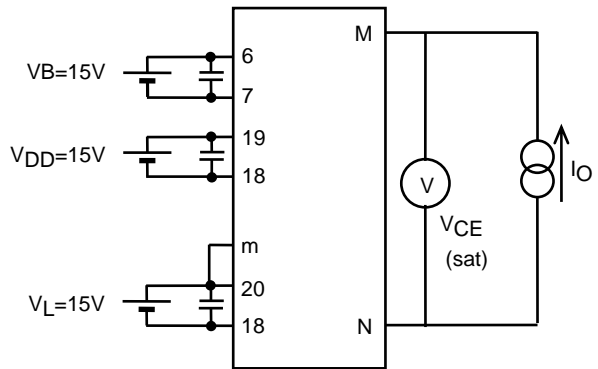
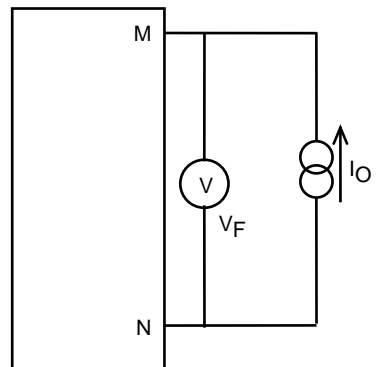


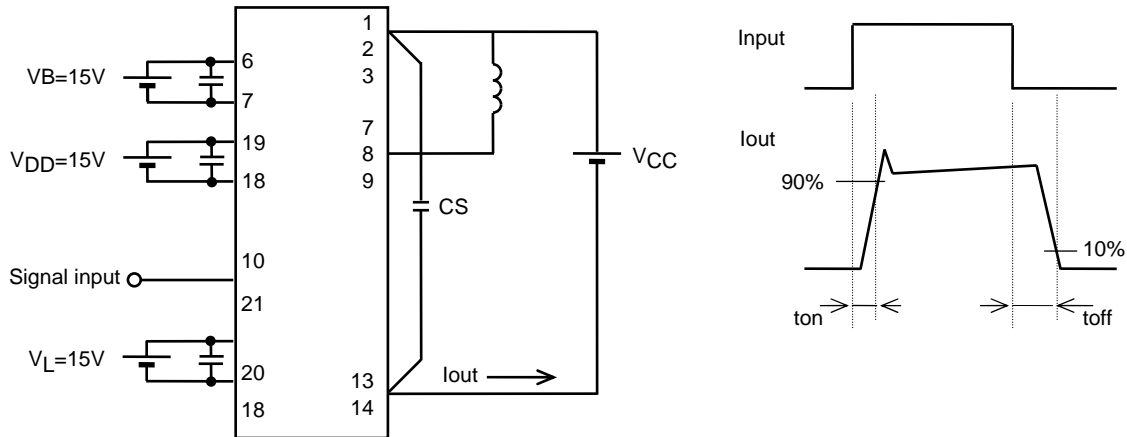
Fig.3 V_F (Test by the pulse)

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

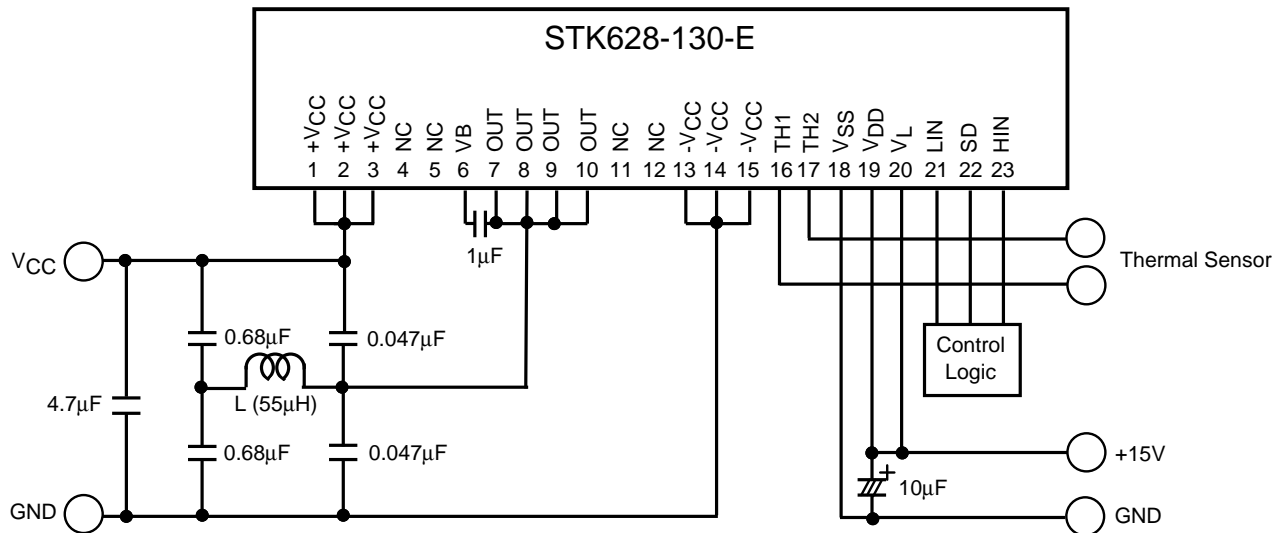


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Fig.4 Switching time (example: ch1-)



Example of The Application Circuit



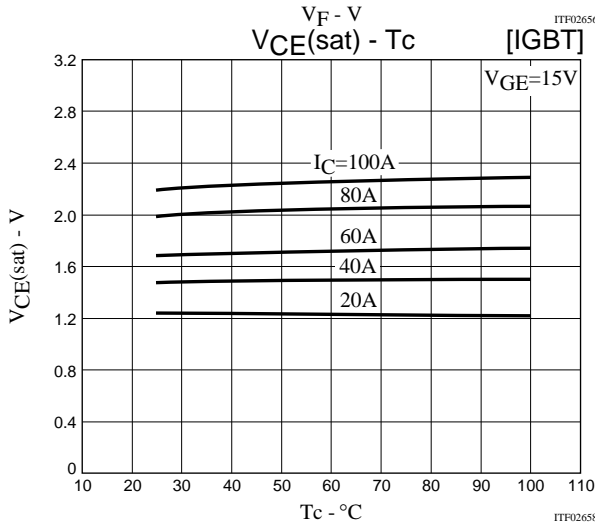
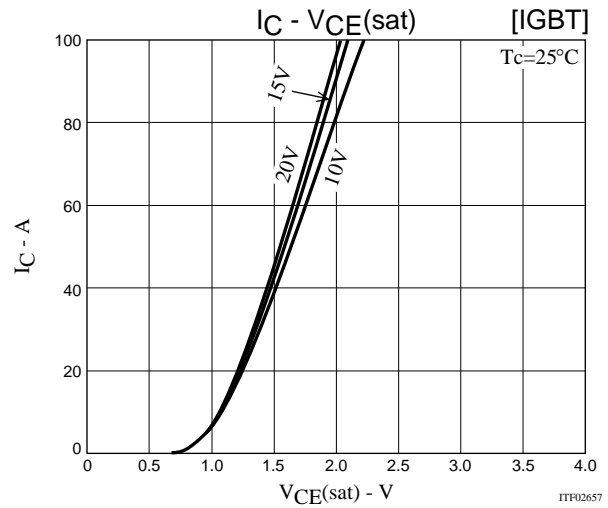
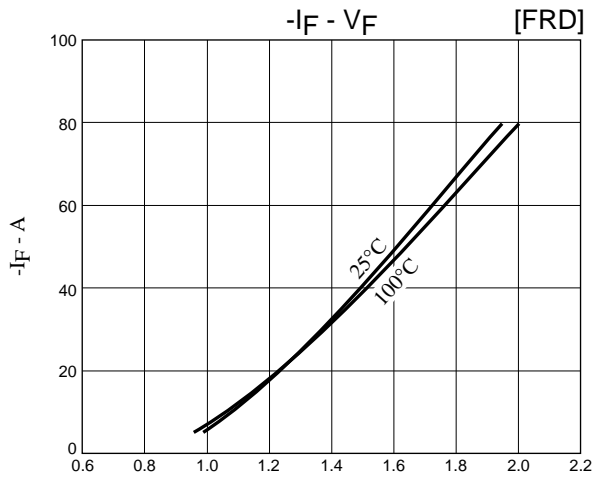
Recommended Operating Conditions

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 R_P . The resistance of the R_P must be 10k Ω or higher at a pull-up voltage of 5V and 39k Ω or higher at a pull-up voltage of 15V.

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