

**SANYO Semiconductors****DATA SHEET**

STK760-710A-E

Thick-Film Hybrid IC
Single-phase Rectification
PFC Hybrid IC

Overview

The STK760-710A-E is a power hybrid IC that incorporates active devices including a bridge diode, IGBT, FRD and a driver circuit necessary for configuring a power factor correction (PFC) circuit in the same package.

Applications

- Power rectification for air conditioners and general-purpose inverters as a single-phase rectification active converter.

Features

- Power devices including a bridge diode, IGBT, and FRD necessary for configuring a PFC circuit are integrated in a single package.
- Full switching PFC circuit for single-phase 200V/15A can be configured.
- Significantly increased flexibility in mounting in end products

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SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

STK760-710A-E

Specifications

Absolute maximum ratings at $T_a = 25^\circ\text{C}$, $T_c = 25^\circ\text{C}$ otherwise unless specified.

Parameter		Symbol	Conditions	Ratings	unit
IGBT (TR1+TR2)	Collector-to-emitter voltage	V_{CES}		600	V
	Gate-to-emitter voltage	V_{GES}		± 20	V
	Repetitive peak collector current	I_{CP}	*1	120	A
	Collector current	I_C		43	A
	Allowable power dissipation	P_d		83	W
BD (D1 to D4)	Diode reverse voltage	V_{RM}		600	V
	Peak one cycle surge current	I_{FSM}	*2	220	A
	I^2t value	I^2t		180	A^2s
	Forward Current	I_F		33	A
FRD (D5)	Peak one cycle surge current	I_{FSM}	*1	15	A
	Forward current	I_F		8	A
	Allowable power dissipation	P_d		13	W
FRD (D6)	Peak repetitive reverse voltage	V_{RM}		600	V
	Peak one cycle surge current	I_{FSM}	*2	210	A
	Forward current	I_F		33	A
	Allowable power dissipation	P_d		58	W
Supply voltage (Pin 8)		V_{CC}		20	V
Signal pin input voltage (Pin 9)		V_{IN}		V_{CC}	V
Switching frequency		f_c	Under the operating conditions of the application circuit	25	kHz
Input current (in steady state)		$I_{IN(AC)}$	Under the operating conditions of the application circuit. $T_c=100^\circ\text{C}$, $f_c=20\text{kHz}$	15	Arms
Junction temperature		T_j		150	$^\circ\text{C}$
Operating case temperature		T_c	Center of the resin package on the reverse side	-20 to +100	$^\circ\text{C}$
Storage temperature		T_{stg}		-40 to +125	$^\circ\text{C}$
Tightening torque			Screw installation part *3	1.0	$\text{N}\cdot\text{m}$
Dielectric strength voltage		V_{INS}	Sine wave, 50Hz, AC 1 minute *4	2000	VRMS

*1. Repetitive peak current with the duty ratio of $D=0.1$ and $t_p=1\text{ms}$.

*2. 50Hz sine wave, non-repetitive one cycle peak current.

*3. The flatness of the heat sink to be connected must be 0.15mm or less.

*4. Test conditions: AC 2500V for 1 second.

Electrical Characteristics at $T_c=25^\circ\text{C}$

Parameter	Symbol	Conditions	min	typ	max	unit
IGBT						
Collector-to-emitter cutoff current (TR1+TR2)	I_{CES}	$V_{CE}=600\text{V}$			200	μA
Collector-to-emitter saturation voltage (TR1+TR2)	$V_{CE(sat)}$	$V_{GR}=15\text{V}$, $I_C=20\text{A}$ ($T_c=25^\circ\text{C}$)		1.4	1.9	V
		$V_{GR}=15\text{V}$, $I_C=20\text{A}$ ($T_c=100^\circ\text{C}$)		1.55		V
Gate threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$, $I_C=430\mu\text{A}$	3.75		5.75	μA
Junction-to-case thermal resistance	θ_{j-c}			1.5		$^\circ\text{C/W}$
D1 to D4						
Diode reverse current	I_R	$V_R=600\text{V}$			10	μA
Forward voltage	V_F	$I_F=20\text{A}$ (10ms Pulse)		1.1	1.5	V
Junction-to-case thermal resistance	θ_{j-c}			2.9		$^\circ\text{C/W}$
D5						
Forward voltage	V_F	$I_F=5\text{A}$ (10ms Pulse)		1.2	1.6	V
Junction-to-case thermal resistance	θ_{j-c}			9		$^\circ\text{C/W}$

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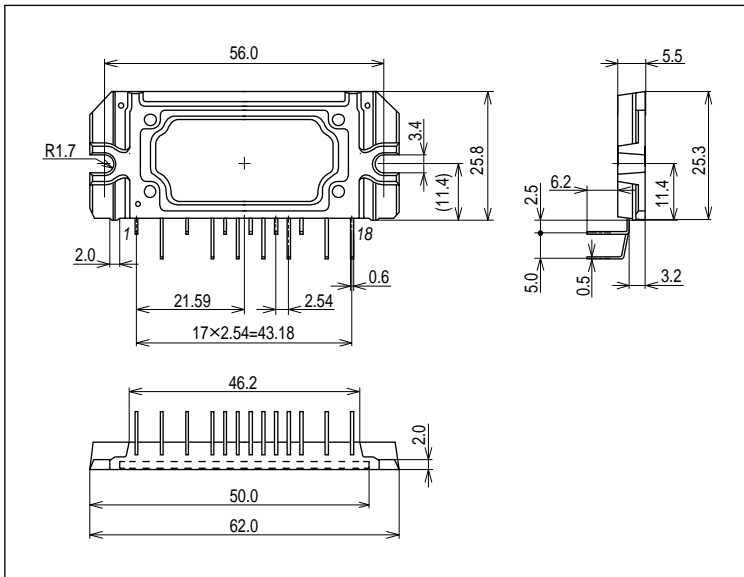
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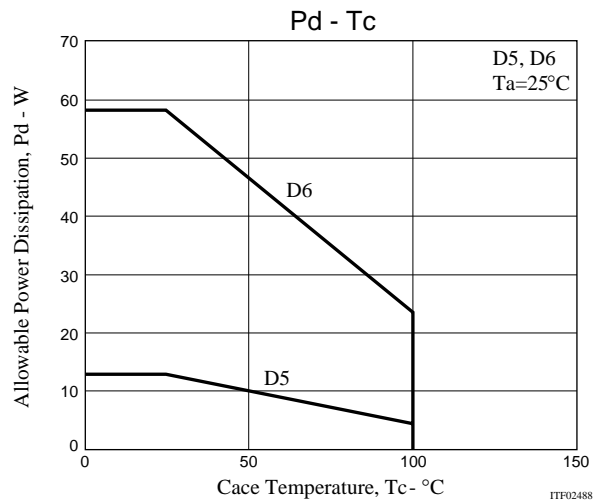
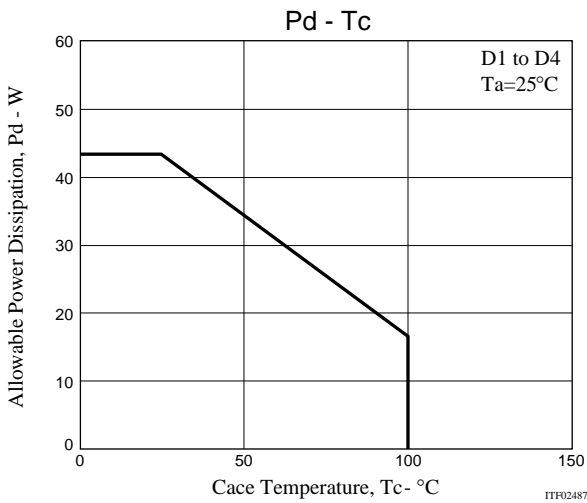
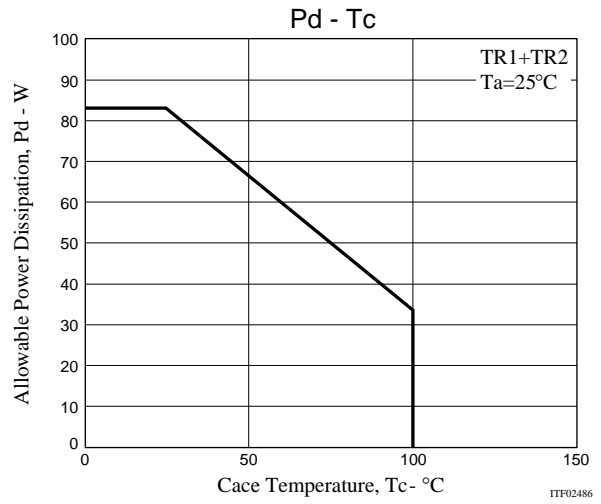
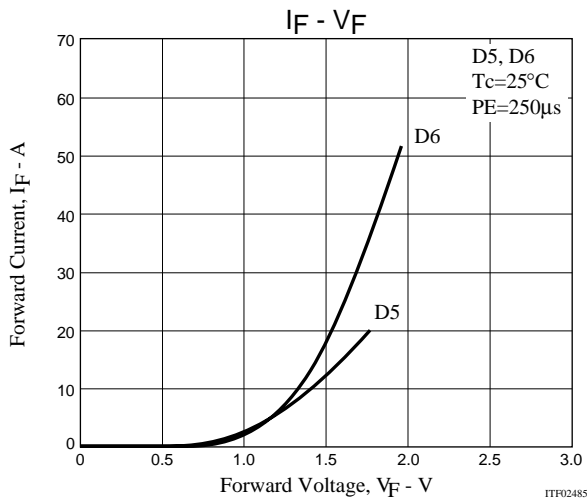
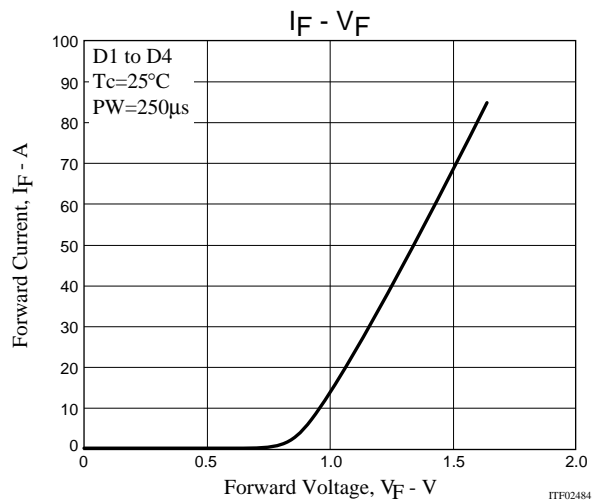
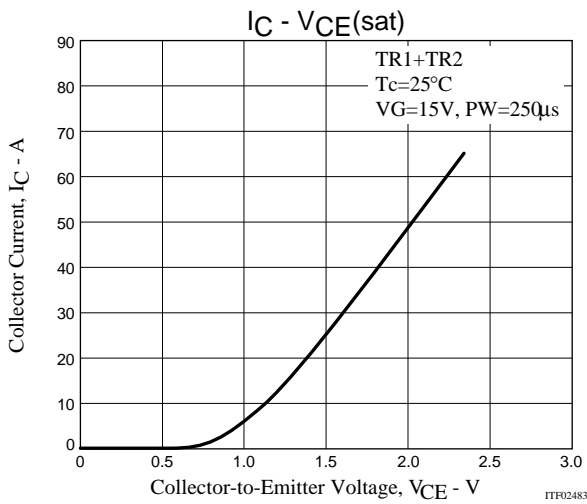
Parameter	Symbol	Conditions	min	typ	max	unit
D6						
Diode reverse current	IR	VR=600V			100	μA
Forward voltage	V _F	I _F =20A (10ms Pulse)		1.7	2.1	V
Junction-to-case thermal resistance	θ _{j-c}			2.15		°C/W
Drive circuit / Output block						
V _{IN(ON)} Threshold voltage	V _{IN(ON)th}	V _{IN} =V _{CC} =V _C , I _C =430μA	4.1		6.3	V
V _{IN} Leak current (Pin 9)	I _{IN(leak)}	V _{IN} =0 to 15V, V _{CC} =15V, V _{CE} =0V			10	μA
Switching time	t _{ON}	I _C =20A, V _{CC} =15V, R _{CC} =22Ω		110		ns
	t _{OFF}	R _B =39Ω, Inductive load		300	1.4	ns
	t _{rr}	I _F =20A, di/dt=-100A/μs		40		ns

Package Dimensions

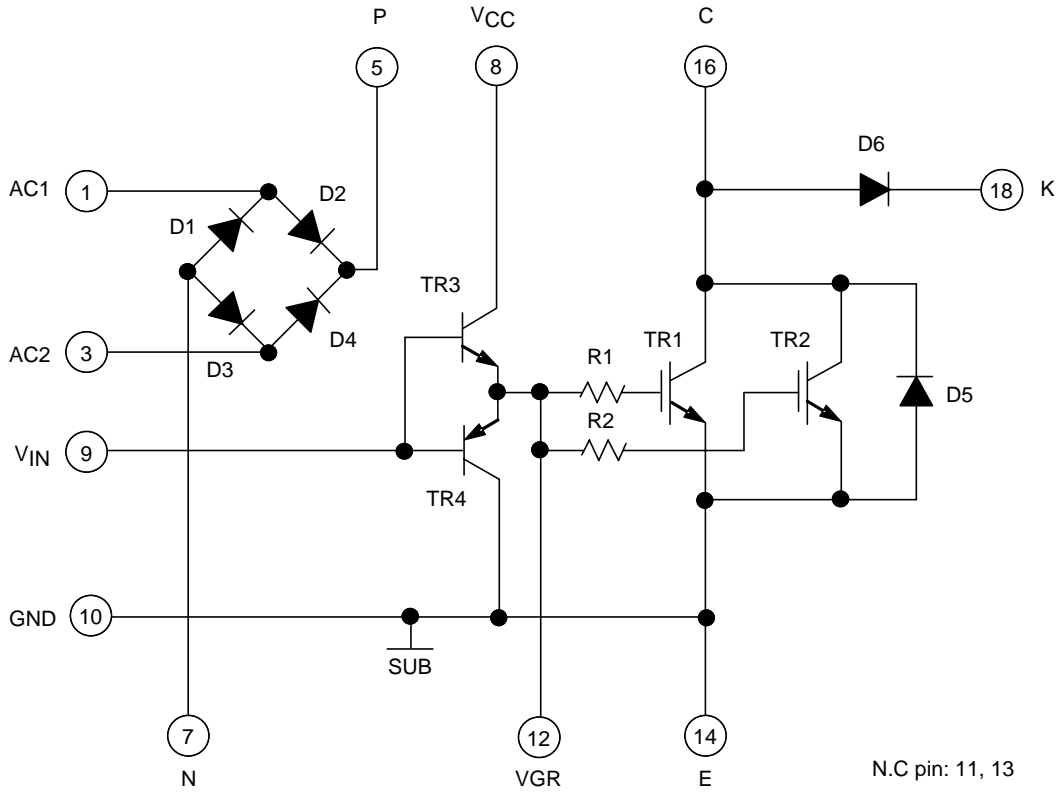
unit:mm (typ)



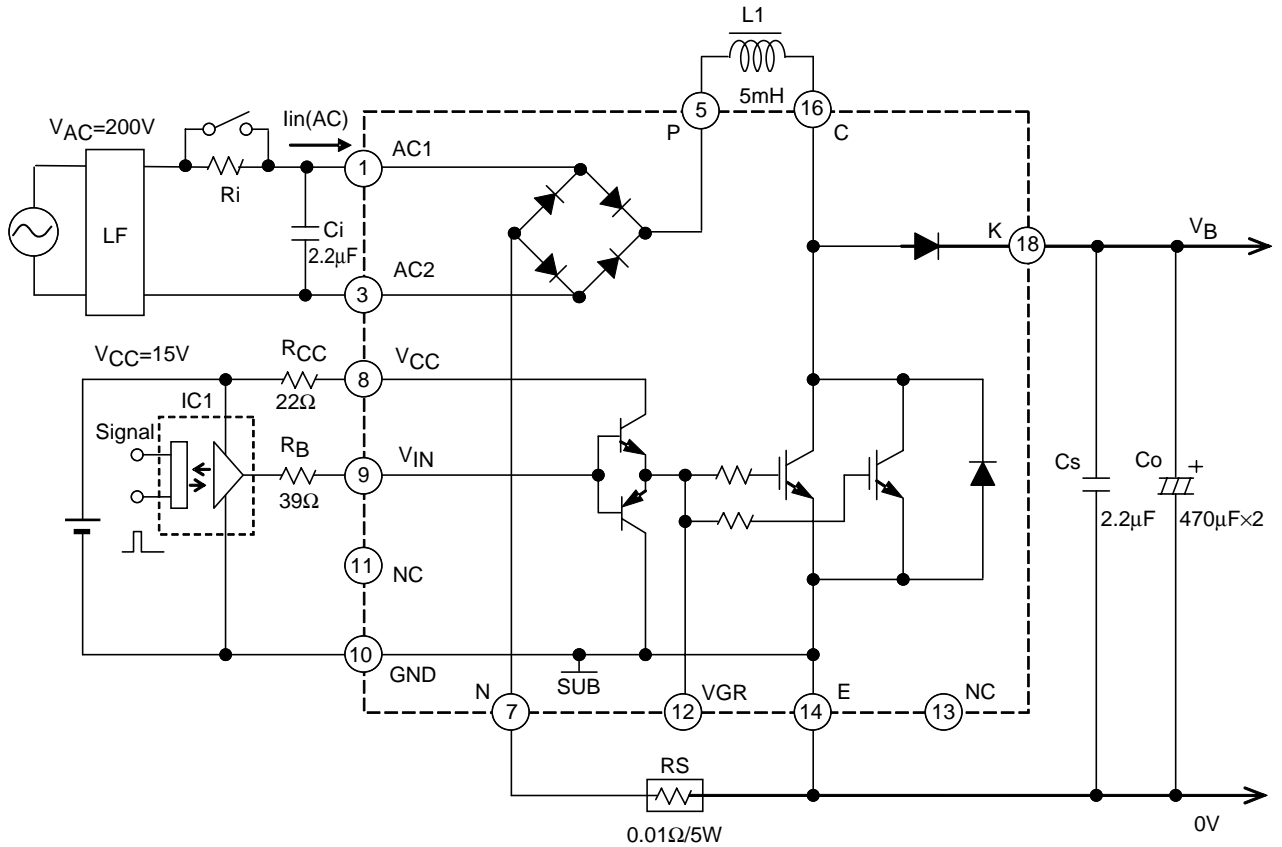
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Equivalent Circuit Diagram



Sample Application Circuit



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