Ordering number : EN*A1053A

Preliminary

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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Specifications

Absolute maximum ratings at Ta = 25°C, Tc = 25°C otherwise unless specified.

Parameter		Symbol	Conditions	Ratings	unit
IGBT (TR1+TR2)	Collector-to-emitter voltage	VCES		600	V
	Gate-to-emitter voltage	VGES		±20	V
	Repetitive peak collector current	ICP	*1	120	A
	Collector current	I_C		43	A
	Allowable power dissipation	Pd		83	W
BD (D1 to D4)	Diode reverse voltage	VRM		600	V
	Peak one cycle surge current	IFSM	*2	220	A
	I^2t value	I^2t		180	A^2s
	Forward Current	I_F		33	A
FRD (D5)	Peak one cycle surge current	IFSM	*1	15	A
	Forward current	I_F		8	A
	Allowable power dissipation	Pd		13	W
FRD (D6)	Peak repetitive reverse voltage	VRM		600	V
	Peak one cycle surge current	IFSM	*2	210	A
	Forward current	I_F		33	A
	Allowable power dissipation	Pd		58	W
Supply voltage (Pin 8)		V_{CC}		20	V
Signal pin input voltage (Pin 9)		V_{IN}		V_{CC}	V
Switching frequency		fc	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. Tc=100°C, fc=20kHz	15	Arms
Junction temperature		Tj		150	°C
Operating case temperature		Tc	Center of the resin package on the reverse side	-20 to +100	°C
Storage temperature		Tstg		-40 to +125	°C
Tightening torque			Screw installation part *3	1.0	N • m
Dielectric strength voltage		VINS	Sine wave, 50Hz, AC 1 minute *4	2000	VRMS

*1. Repetitive peak current with the duty ratio of D=0.1 and tp=1ms.
*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 Tc=25°C

Parameter	Symbol	Conditions	min	typ	max	unit
IGBT						
Collector-to-emitter cutoff current (TR1+TR2)	ICES	V_{CE}=600V			200	μA
Collector-to-emitter saturation voltage (TR1+TR2)	V_{CE}(sat)	VGR=15V, I_C=20A (Tc=25°C)		1.4	1.9	V
		VGR=15V, I_C=20A (Tc=100°C)		1.55		V
Gate threshold voltage	VGE(th)	V_{CE}=VGE, I_C=430μA	3.75		5.75	μA
Junction-to-case thermal resistance	θj-c			1.5		°C/W
D1 to D4						
Diode reverse current	I_R	VR=600V			10	μA
Forward voltage	V_F	I_F=20A (10ms Pulse)		1.1	1.5	V
Junction-to-case thermal resistance	θj-c			2.9		°C/W
D5						
Forward voltage	V_F	I_F=5A (10ms Pulse)		1.2	1.6	V
Junction-to-case thermal resistance	θj-c			9		°C/W

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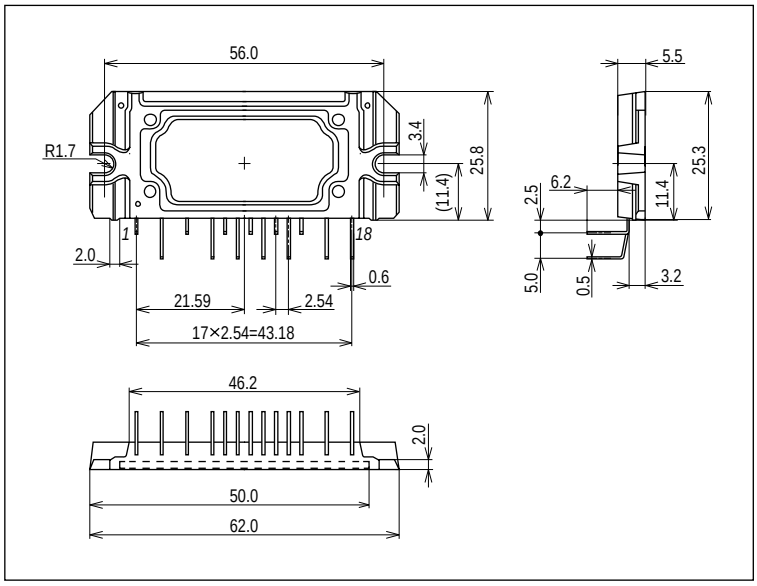
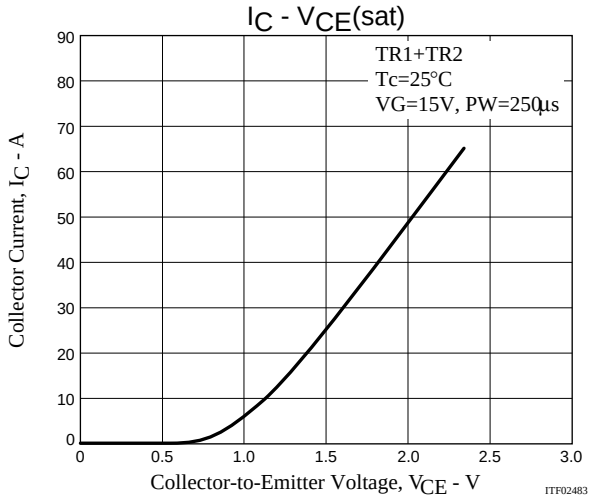
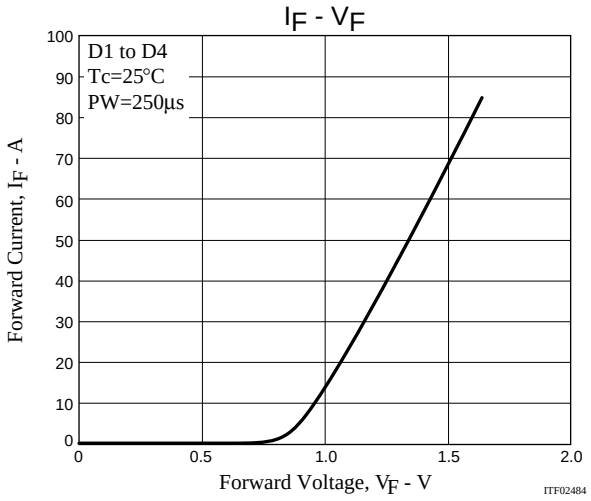
Parameter	Symbol	Conditions	min	typ	max	unit
D6						
Diode reverse current	IR	VR=600V			100	μA
Forward voltage	V_F	I_F=20A (10ms Pulse)		1.7	2.1	V
Junction-to-case thermal resistance	θj-c			2.15		°C/W
Drive circuit / Output block						
V_{IN}(ON) Threshold voltage	V_{IN}(ON)th	V_{IN}=V_{CC}=V_C, I_C=430μA	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 R_B=39Ω, Inductive load		110		ns
	t_{OFF}			300	1.4	ns
	t_{rr}	I_F=20A, di/dt=-100A/μs		40		ns

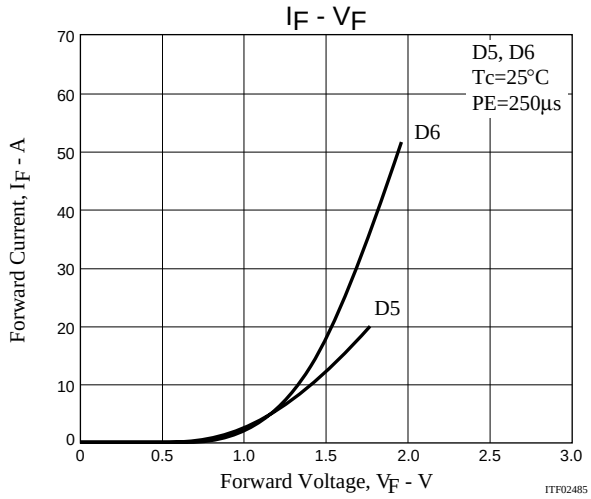
Package Dimensions

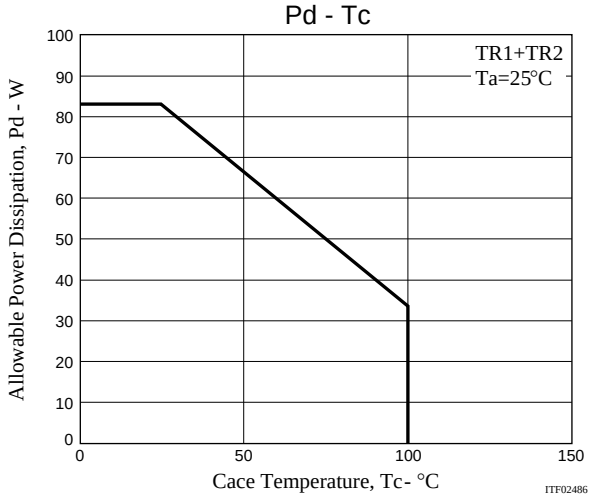
unit:mm (typ)

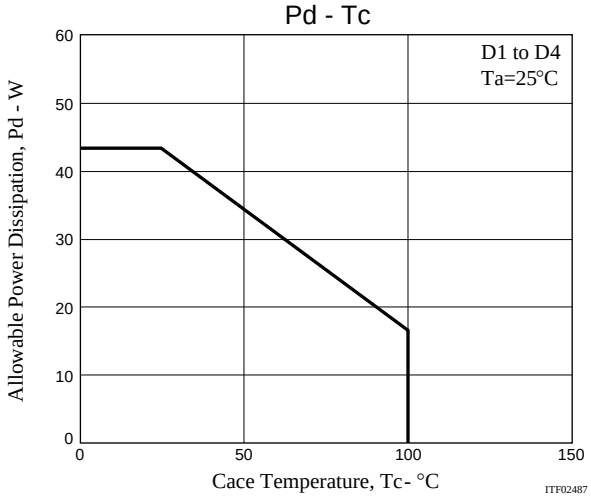


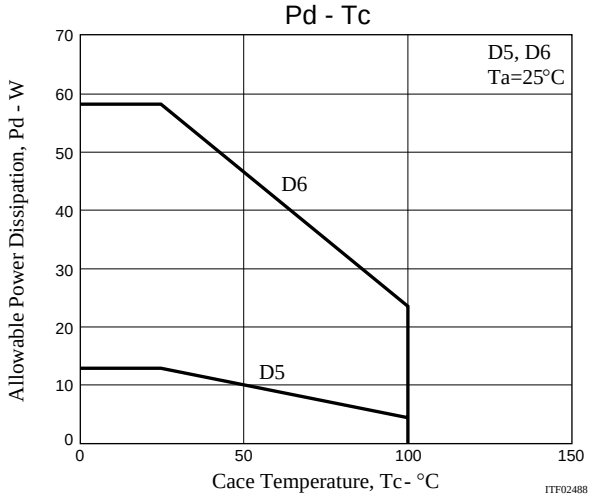

IC - VCE(sat)
TR1+TR2
Tc=25°C
VG=15V, PW=250µs
Collector Current, IC - A
Collector-to-Emitter Voltage, VCE - V
ITF02483


IF - VF
D1 to D4
Tc=25°C
PW=250µs
Forward Current, IF - A
Forward Voltage, VF - V
ITF02484

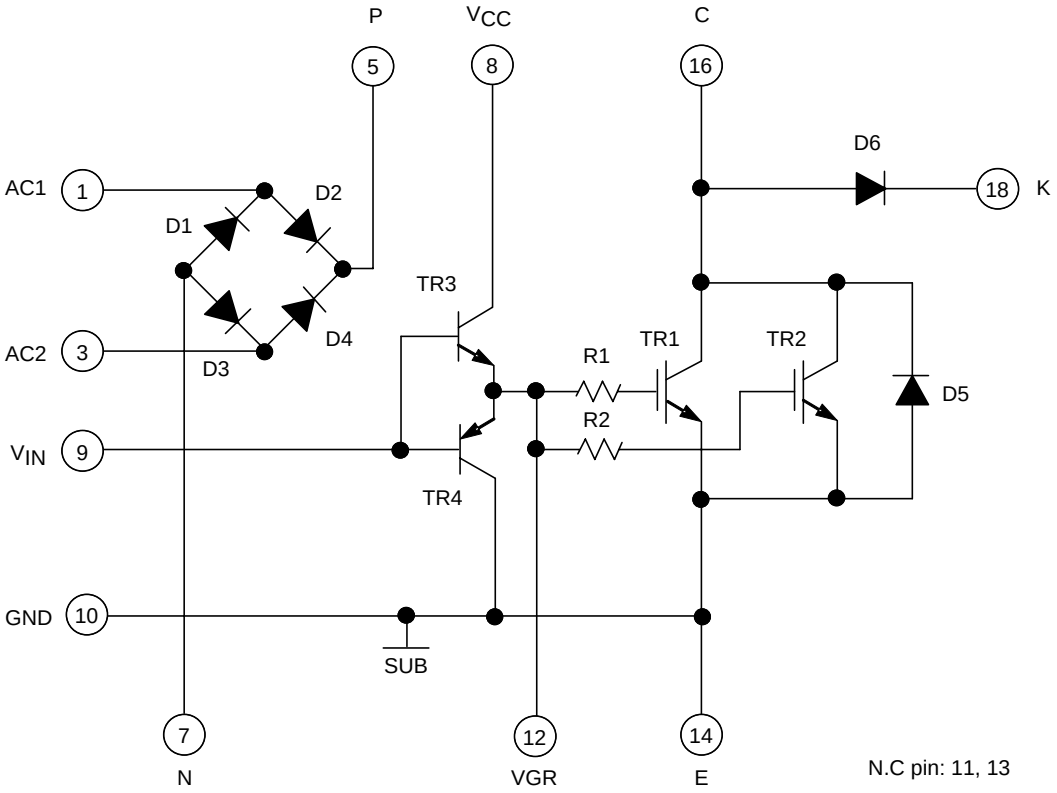

IF - VF
D5, D6
Tc=25°C
PE=250µs
D6
D5
Forward Current, IF - A
Forward Voltage, VF - V
ITF02485


Pd - Tc
TR1+TR2
Ta=25°C
Allowable Power Dissipation, Pd - W
Cace Temperature, Tc- °C
ITF02486


Pd - Tc
D1 to D4
Ta=25°C
Allowable Power Dissipation, Pd - W
Cace Temperature, Tc- °C
ITF02487


Pd - Tc
D5, D6
Ta=25°C
D6
D5
Allowable Power Dissipation, Pd - W
Cace Temperature, Tc- °C
ITF02488

Equivalent Circuit Diagram



Sample Application Circuit