



SANYO Semiconductors

DATA SHEET

STK760-712A-E

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

Overview

The STK760-712A-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/20A can be configured.
- Significantly increased flexibility in mounting in end products

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STK760-712A-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 _{CE} S		600	V
	Gate-to-emitter voltage	V _{GE} S		±20	V
	Repetitive peak collector current	I _{CP}	*1	160	A
	Collector current	I _C		66	A
	Allowable power dissipation	P _d		113	W
BD (D1 to D4)	Diode reverse voltage	V _{RM}		600	V
	Peak one cycle surge current	I _{FSM}	*2	220	A
	I ² t value	I ² t	1ms≤t<10ms	180	A ² s
	Forward Current	I _F		35	A
	Allowable power dissipation	P _d		43	W
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	220	A
	Forward current	I _F		35	A
	Allowable power dissipation	P _d		62	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°C, f _c =20kHz		20	Arms
Junction temperature	T _J			150	°C
Operating case temperature	T _c	Center of the resin package on the reverse side		-20 to +100	°C
Storage temperature	T _{stg}			-40 to +125	°C
Tightening torque		Screw installation part *3		1.0	N • 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 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 T_c=25°C

Parameter	Symbol	Conditions	min	typ	max	unit
IGBT						
Collector-to-emitter cutoff current (TR1+TR2)	I _{CE} S	V _{CE} =600V			200	μA
Collector-to-emitter saturation voltage (TR1+TR2)	V _{CE} (sat)	V _{GR} =15V, I _C =40A (T _c =25°C)		1.4	1.9	V
		V _{GR} =15V, I _C =40A (T _c =100°C)		1.5		V
Gate threshold voltage	V _{GE} (th)	V _{CE} =V _{GE} , I _C =430μA	3.75		5.75	μA
Junction-to-case thermal resistance	θ _{j-c}			1.1		°C/W
D1 to D4						
Diode reverse current	I _R	V _R =600V			20	μA
Forward voltage	V _F	I _F =30A (10ms Pulse)		1.15	1.5	V
Junction-to-case thermal resistance	θ _{j-c}			2.9		°C/W
D5						
Forward voltage	V _F	I _F =5A (10ms Pulse)		1.2	1.7	V
Junction-to-case thermal resistance	θ _{j-c}			9		°C/W

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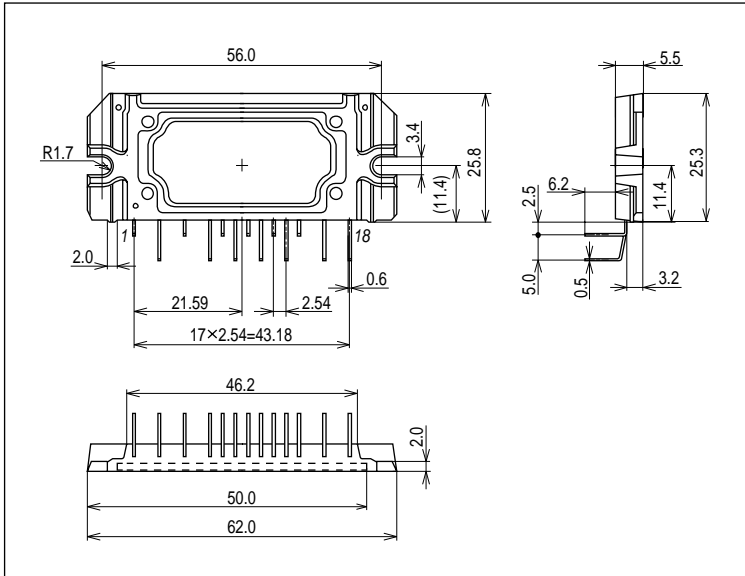
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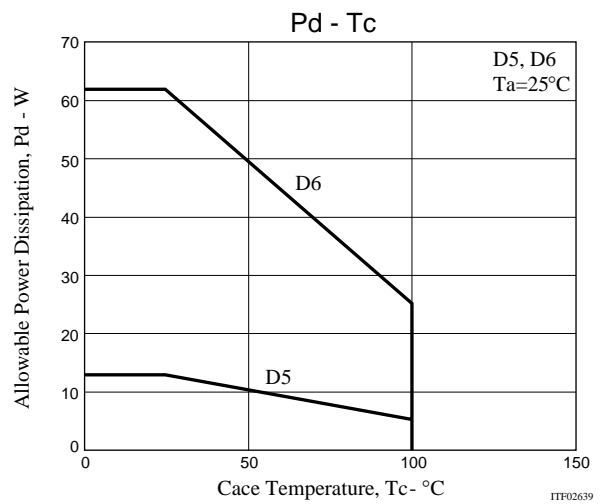
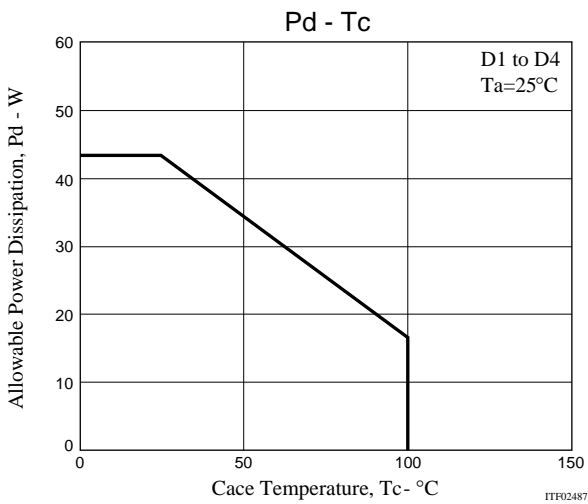
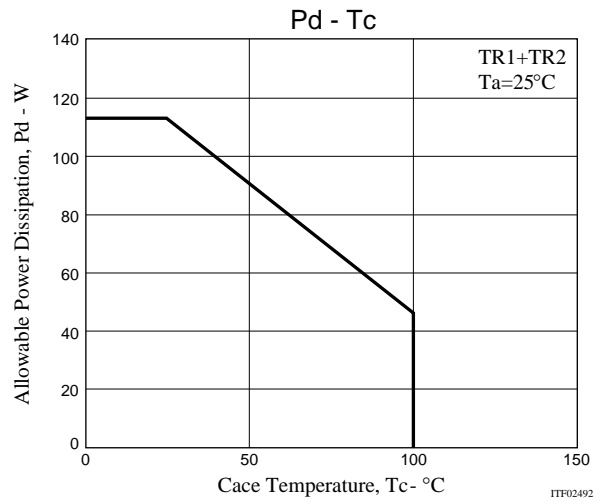
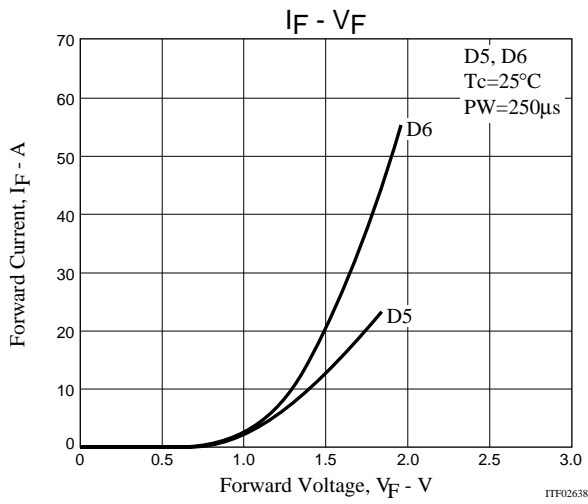
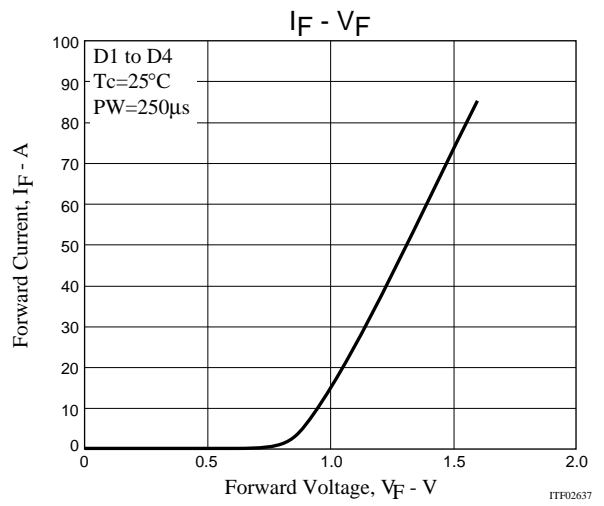
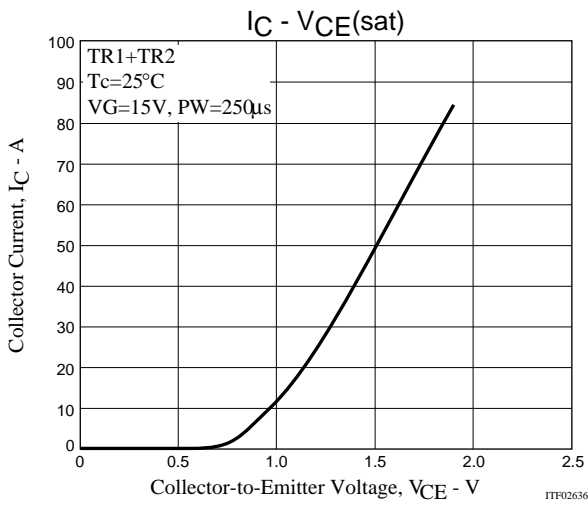
Parameter	Symbol	Conditions	min	typ	max	unit
D6						
Diode reverse current	IR	VR=600V			100	μA
Forward voltage	V _F	I _F =30A (10ms Pulse)		1.65	2.1	V
Junction-to-case thermal resistance	θ _{j-c}			2.0		°C/W
Drive circuit / Output block						
V _{IN(ON)} Threshold voltage	V _{IN(ON)th}	V _{IN} =V _{CC} =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 =30A, V _{CC} =15V, R _{CC} =47Ω		150		ns
	t _{OFF}	R _B =200Ω, Inductive load		500		ns
	t _{rr}	I _F =30A, di/dt=-100A/μs		45		ns

Package Dimensions

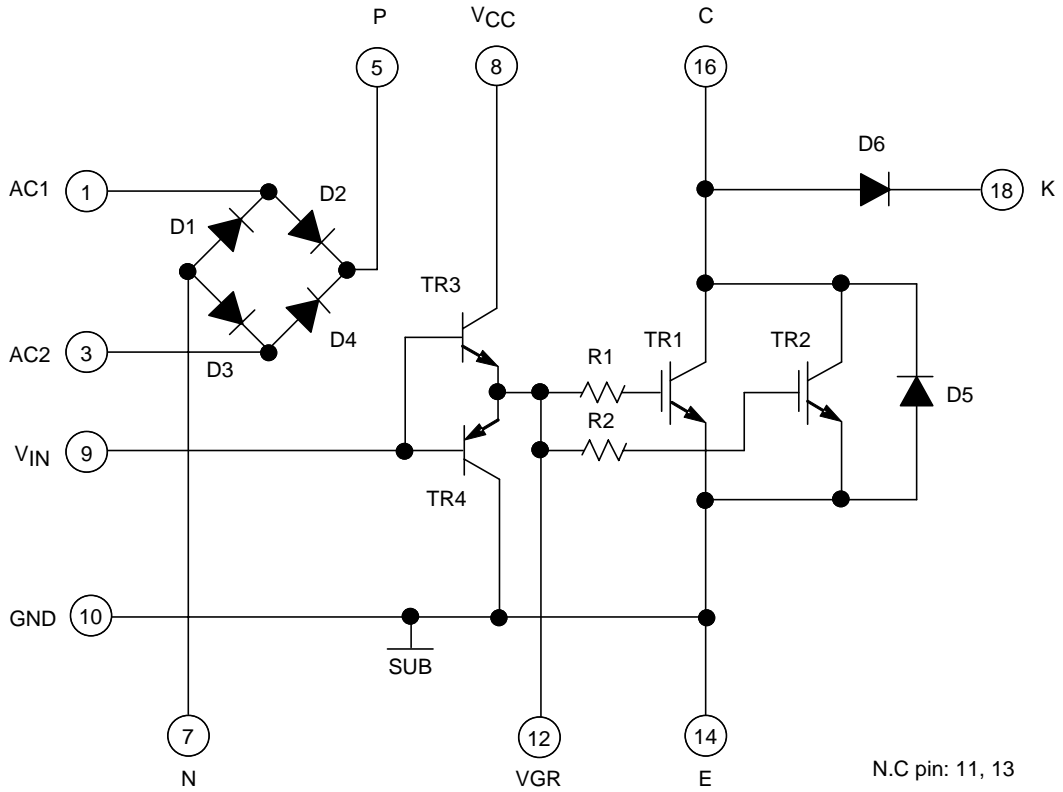
unit:mm (typ)



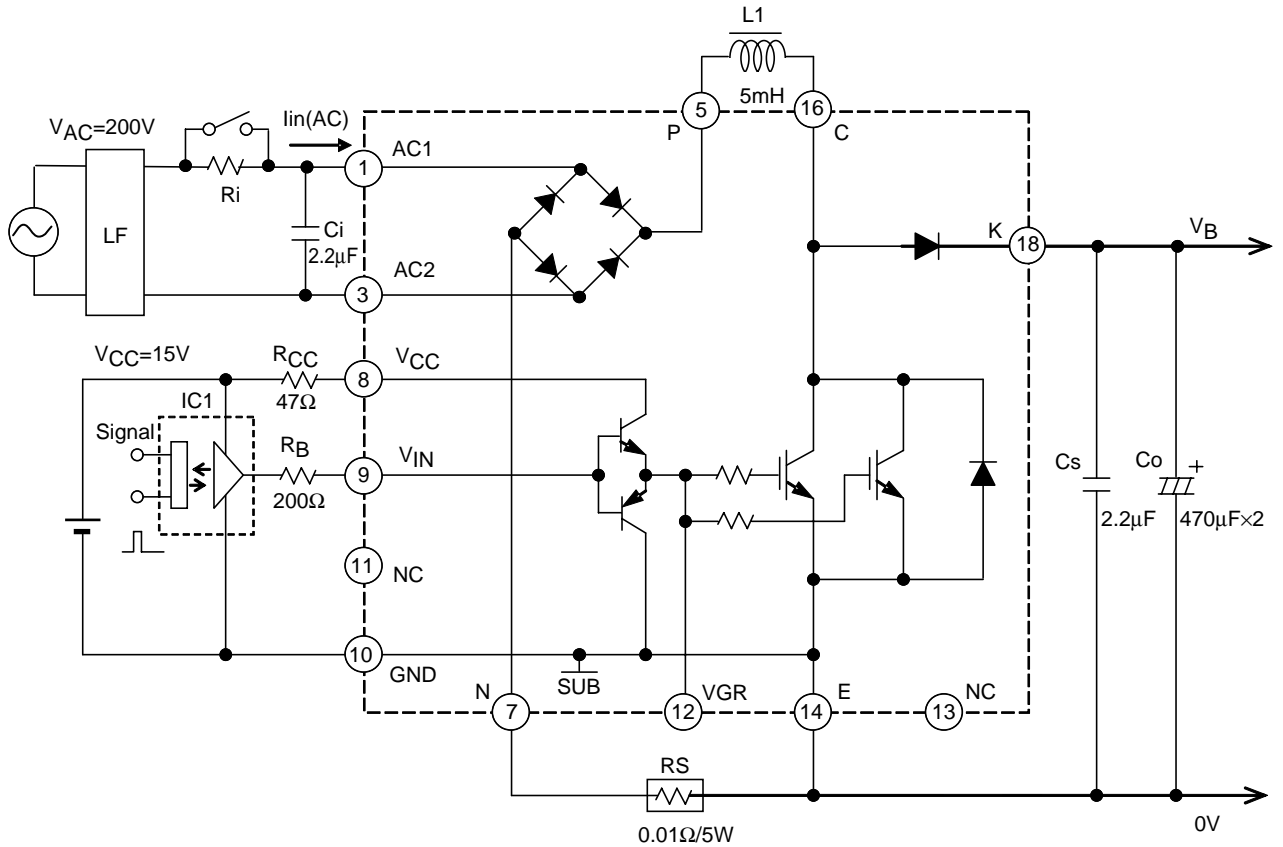
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Equivalent Circuit Diagram



Sample Application Circuit



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