

POWER FACTOR CORRECTOR

■ Description

The TTESEMI TK6562 is a Power Factor Corrector, which can work in wide input voltage range applications (from 85V ~ 265V) with an excellent THD. It has very low start up current (about 20 uA) and a disable function on the ZCD pin, which is designed to keep lower current consumption in stand by mode.

The device is operating in transition mode, and is able to drive a Power MOS or IGBT with a $\pm 400\text{mA}$ current for sourcing and sinking.

■ Features

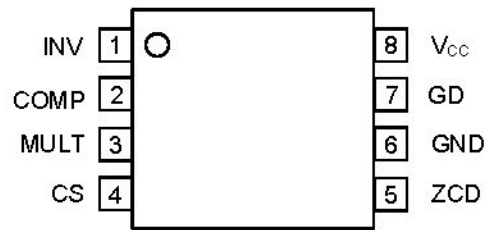
- 1% Precision (@ $T_J = 25^\circ\text{C}$) Internal Reference Voltage
- Output Overvoltage Protection
- Very Low Power Start-Up Current
- Current Sense Filter On Chip
- Disable Function (with ZCD pin)
- Transition Mode Operation
- Gate Driving Current: $\pm 400\text{mA}$
- 15V Gate clampe

■ Applications

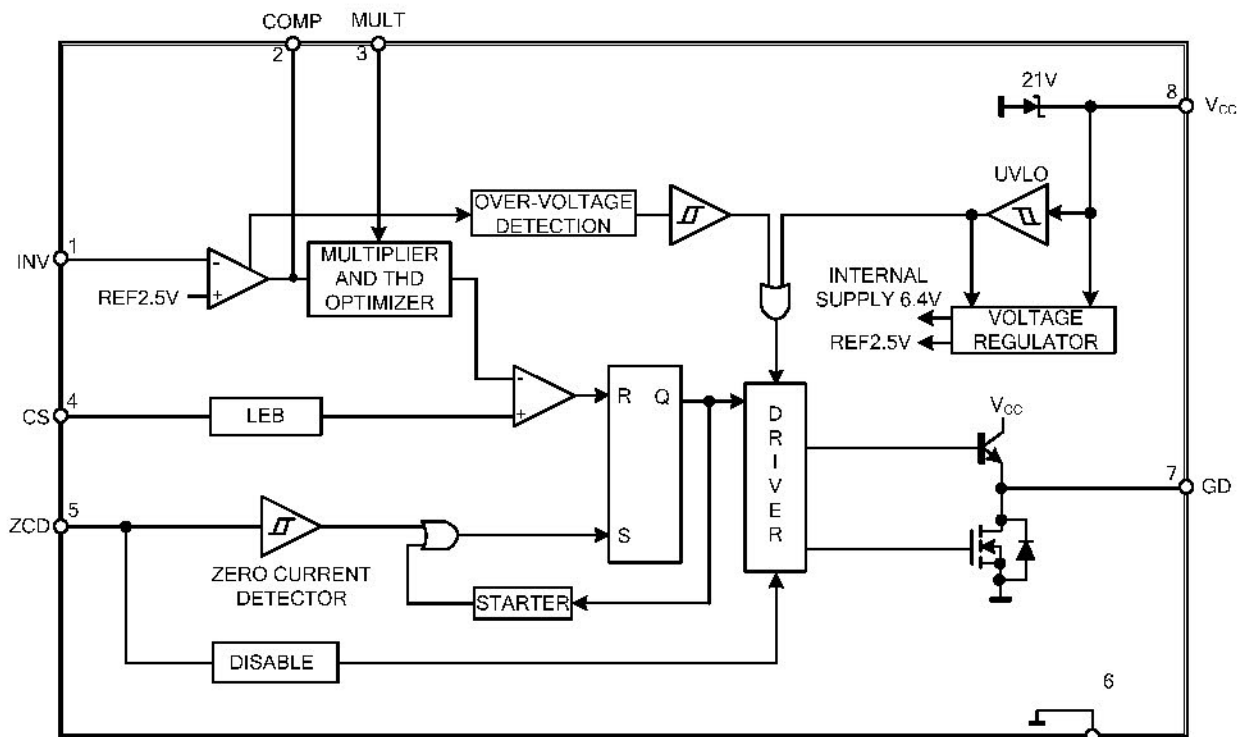
- IEC61000-3-2 compliant SMPS (desktop PC, monitors, Flat TV, games)
- HI-END AC-DC adapter/charger up to 400W
- Electronic ballast
- Entry level server & web server

■ Ordering Information

Ordering Number	Package	Packing
TK6562ADTR	SO-8	Reel
TK6562AN	DIP-8	Tube

■ PIN CONFIGURATION

■ PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	INV	Inverting input of the error amplifier
2	COMP	Output of the error amplifier
3	MULT	Input of the multiplier stage
4	CS	Input of the current sense stage
5	ZCD	Input of the zero current detection
6	GND	Ground
7	GD	Gate driver output
8	V _{CC}	Voltage supply

■ BLOCK DIAGRAM


■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Analog Inputs & Outputs	INV, COMP MULT	-0.3 ~ 7	V
Current Sense Input	CS	-0.3 ~ 7	V
Iq+Iz ($I_{GD} = 0$)	I_{VCC}	30	mA
Output Totem Pole Peak Current (2ms)	I_{GD}	± 700	mA
Zero Current Detector	ZCD	50 (source)	mA
		-10 (sink)	mA
Power Dissipation @ $T_A=50^{\circ}\text{C}$	SOP-8	1	W
	DIP-8		
Junction Temperature	T_J	125	$^{\circ}\text{C}$
Operating Temperature	T_{OPR}	-40 ~ +85	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-40 ~ +150	$^{\circ}\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS ($V_{CC}=12\text{V}$, $T_A=-25^{\circ}\text{C} \sim 125^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	PIN	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SUPPLY VOLTAGE SECTION							
Operating Range	8	V_{CC}	after turn-on	10.5		22.5	V
Turn-on Threshold	8	$V_{CC(ON)}$		11.7	12.3	13.5	V
Turn-off Threshold	8	$V_{CC(OFF)}$		9.5	10		V
Hysteresis	8	Hys		2.5		2.8	V
SUPPLY CURRENT SECTION							
Start-up Current	8	$I_{START-U}$	$V_{CC(ON)}-1\text{V}$		30	60	μA
Quiescent Current	8	I_q			2.5	3.75	mA
Operating Supply Current	8	I_{CC}	$C_L=1\text{nF @ }70\text{KHz}$		3.5	5	mA
			In OVP condition $V_{BIN1}=2.7\text{V}$			6.8	mA
Quiescent Current	8	I_q	$V_{PIN5} \leq 150\text{mA}, V_{CC} > V_{CC\ off}$			3	mA
	8		$PIN5 \leq 150\text{mV}, V_{CC} < V_{CC\ off}$	3	4	5	μA
Zener Voltage	8	V_Z	$I_{CC}=20\text{mA}$	18	21	24	V
ERROR AMPLIFIER SECTION							
Voltage Feedback Input Threshold	1	INV	$T_A=25^{\circ}\text{C}$	2.465	2.5	2.535	V
			$10.3\text{V} < V_{CC} < 18\text{V}$	2.44		2.56	V
Line Regulation			$V_{CC}=10.3 \sim 18\text{V}$		2	5	mV
Input Bias Current	1	I_{INV}			-0.1	-1	μA
Voltage Gain		G_V	Open loop	60	80		dB
Gain Bandwidth		G_B			0.8		MHz
Source Current	2	COMP	$V_{COMP}=4\text{V}, V_{INV}=2.4\text{V}$	-2	-		mA
Sink Current			$V_{COMP}=4\text{V}, V_{INV}=2.6\text{V}$	2	4.5		mA
Upper Clamp Voltage	2	COMP	$I_{SOURCE}=0.5\text{mA}$		5	5.5	V
Lower Clamp Voltage			$I_{SINK}=0.5\text{mA}$	2.25	2.4		V
MULTIPLIER SECTION							
Linear Operating Voltage	3	V_{MULT}		0~2.5	0~3.5		V
Output Max. Slope		$\frac{\Delta V_{CS}}{\Delta V_{MULT}}$	$V_{MULT}=\text{from }0\text{V} \sim 0.5\text{V}$	1.65	1.9		
			$V_{COMP}=\text{Upper Clamp Voltage}$				
Gain		K	$V_{MULT}=1\text{V}, V_{COMP}=4\text{V}$	0.5	0		1/V

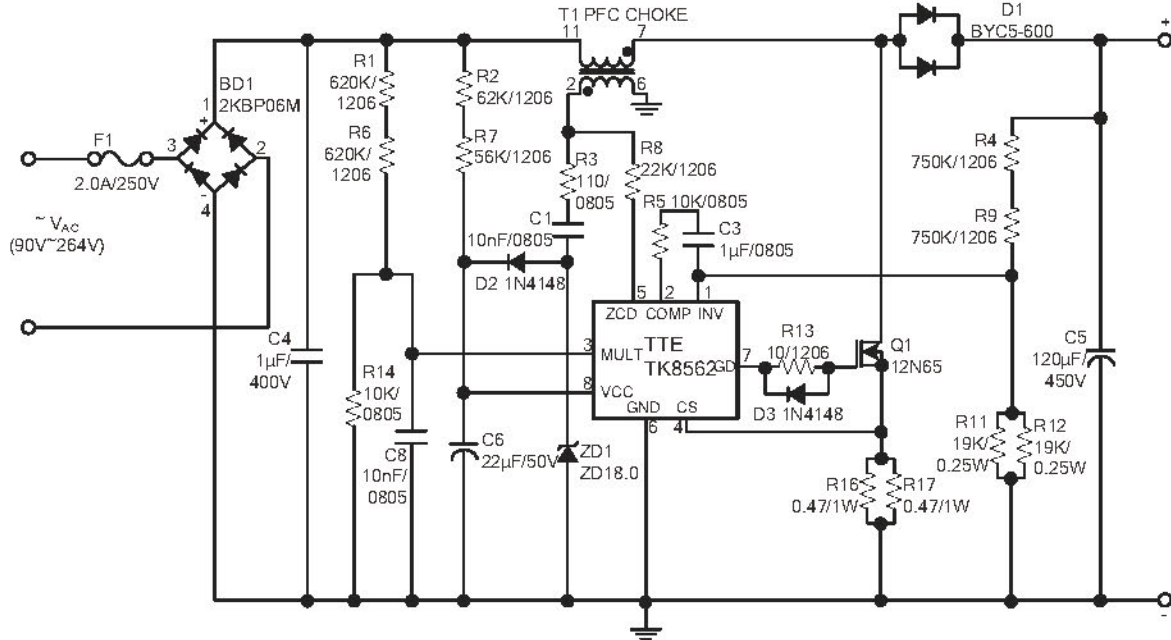
■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	PIN	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
CURRENT SENSE COMPARATOR							
Current Sense Reference Clamp	4	V_{CS}	$V_{MULT}=2.5V$ V_{COMP} =Upper Clamp Voltage	1.6	1	1.8	V
Input Bias Current	4	I_{CS}	$V_{OS}=0$		-0.05	-1	μA
Delay to Output	4	$t_{D(H-L)}$			200	450	ns
ZERO CURRENT DETECTOR							
Input Threshold Voltage Rising Edge	5	V_{ZCD}	(Note)		2.7		V
Hysteresis			(Note)	0.4	0	0.8	V
Upper Clamp Voltage	5	V_{ZCD}	$I_{ZCD}=20\mu A$	5.0	5.5	6.3	V
Upper Clamp Voltage	5	V_{ZCD}	$I_{ZCD}=2.5mA$		5.6	6.5	V
Lower Clamp Voltage	5	V_{ZCD}	$I_{ZCD}=-2.5mA$		0.0	0.3	V
Sink Bias Current	5	I_{ZCD}	$1V \leq V_{ZCD} \leq 4.5V$		2		μA
Source Current Capability	5	I_{ZCD}		-3		-10	mA
Sink Current Capability	5	I_{ZCD}		3		10	mA
Disable threshold	5	V_{DIS}		100	200	300	mV
Restart Current After Disable	5	I_{ZCD}	$V_{ZCD} < V_{DIS}, V_{CC} > V_{CCOFF}$	-20	-50		μA
OUTPUT SECTION							
Dropout Voltage	7	V_{GD}	$I_{GD(SOURCE)}=200mA$		1.2	2	V
			$I_{GD(SOURCE)}=20mA$		0.8	1.2	V
			$I_{GD(SINK)}=200mA$		1.2	1.9	V
Output Voltage Rise Time	7	t_R	$C_L=1nF$		40	100	ns
Output Voltage Fall Time	7	t_F	$C_L=1nF$		40	100	ns
IGD Sink Current	7	$I_{GD(OFF)}$	$V_{CC}=3.5V, V_{GD}=1V$	1	40		mA
OUTPUT OVERVOLTAGE SECTION							
OVP Triggering Current	2	I_{OVP}		30	40	50	μA
Static OVP Threshold				2.25	2.4	2.55	V
RESTART TIMER							
Start Timer		t_{START}		70	190	300	μs

Note: Parameter guaranteed by design, not tested in production.

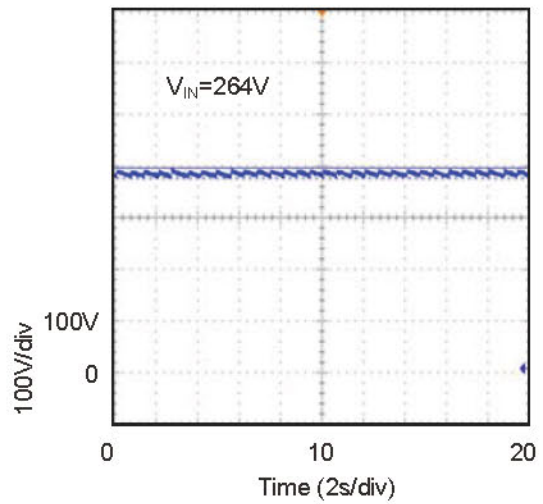
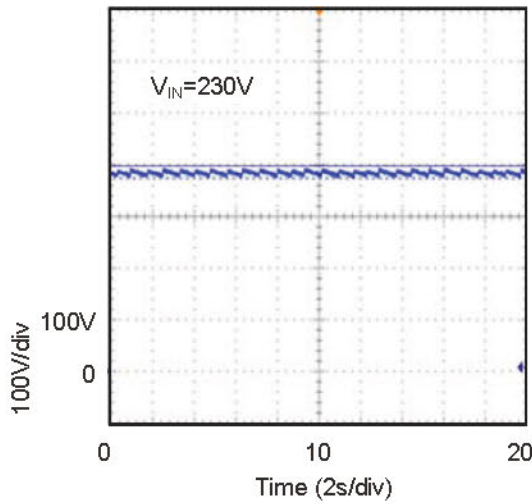
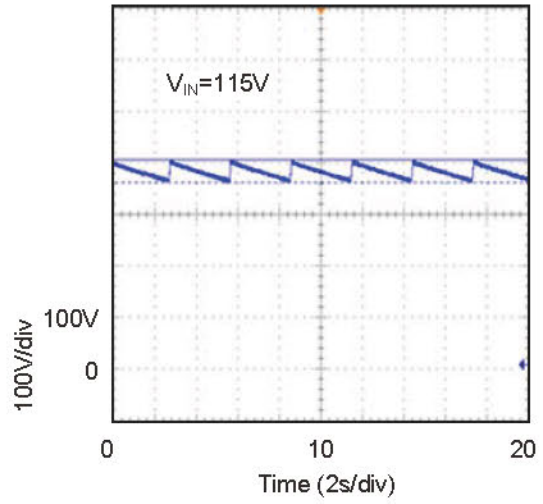
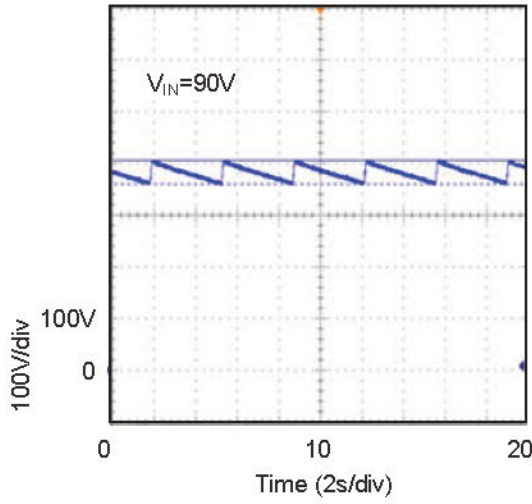
■ **TYPICAL APPLICATION CIRCUIT**

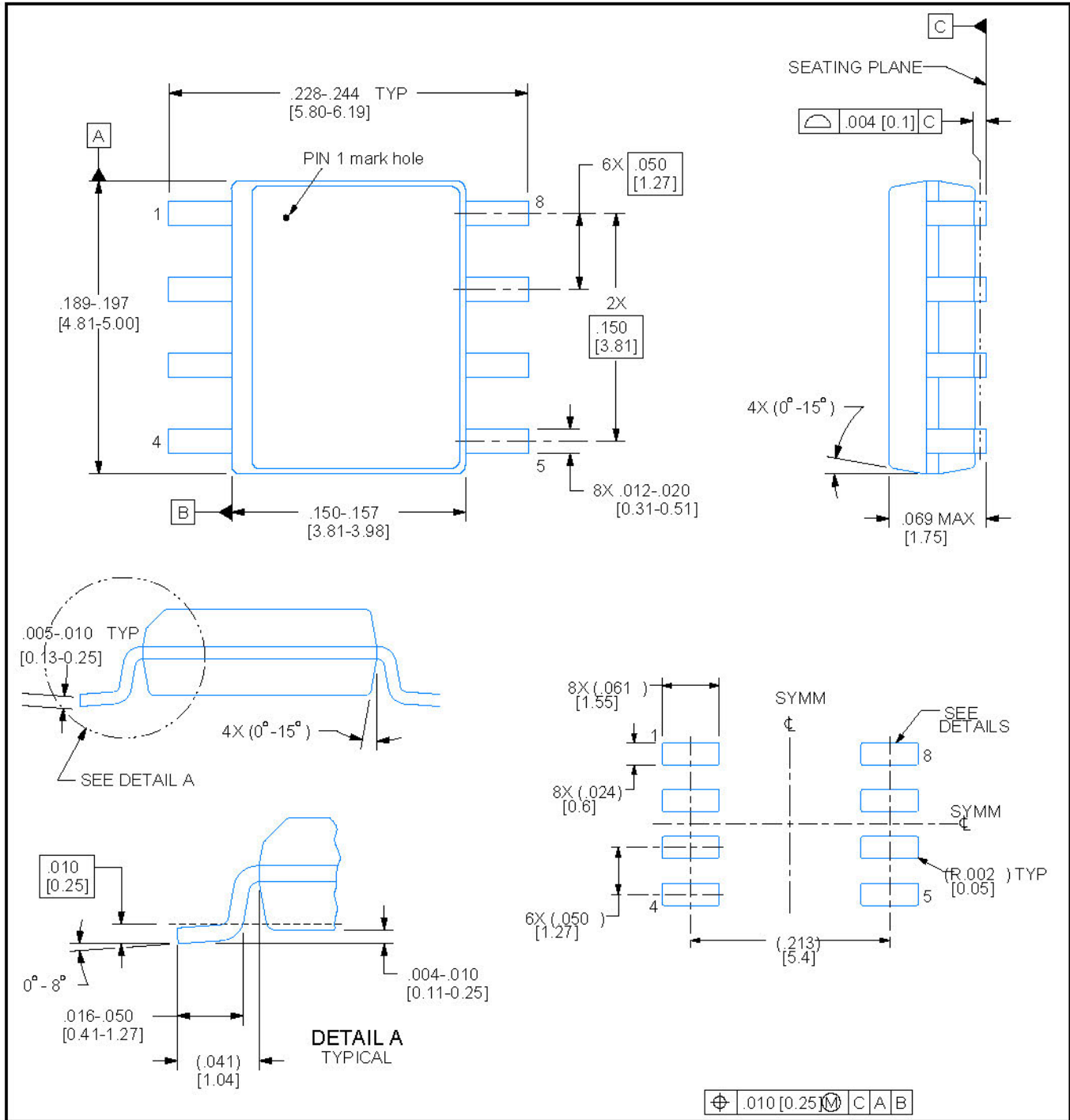
150W, Wide-range mains



■ TYPICAL CHARACTERISTICS

Output ripple at 0.5W



PACKAGE OUTLINE SOIC - 8,1.75 mm max height


NOTES: Linear dimensions are in inches [millimeters]. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 [0.15] per side.