Electronic Telephone Line Switch

Features

► 350V breakdown voltage
► 18Ω maximum switch resistance
► Current limiting protection
► Operates at 2.3V input

Applications

► Telephone handsets
► Modems
► Fax machines
► Answering machines
► Remote meter reading
► Telephone interface products

General Description

The Supertex HT18LG and HT19LG are electronic line switch circuits that replace the mechanical hook switch contact or a discrete hook switch in a telephone handset or modem. They switch the positive side of the telephone line using control inputs that are referenced to the negative side of the line. In their off state, they can withstand 350V on the positive input. In their on state, they have a maximum series resistance of 18Ω.

The devices provide current limiting determined by an external resistor. There are three control inputs. The HKS pin turns on the hook switch when connected to the TPG pin. This can be accomplished by using a mechanical switch which closes when the handset is physically off-hook. The LS pin allows a logic signal to turn on the hook switch. The dial pulse, Pin 6, is used to turn the hook switch off for pulse dialing. For the HT18, the dial pulse is active high (DP), whereas for the HT19, it is active low ($\overline{DP}$).

Typical Application Circuit
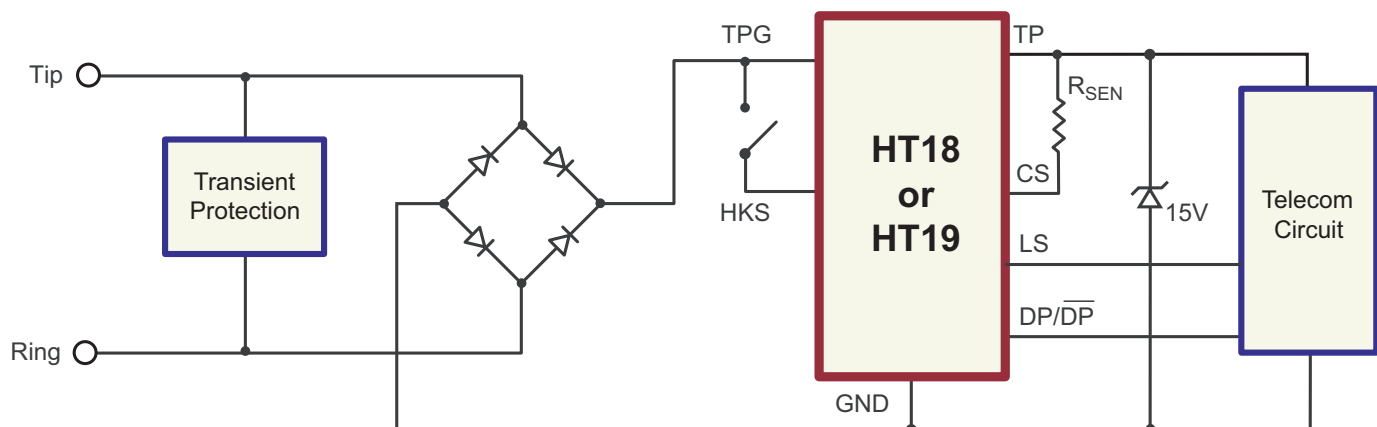
Ordering Information

Device	Package Options	
	8-Lead SOIC (Narrow Body)	
HT18	HT18LG	HT18LG-G
HT19	HT19LG	HT19LG-G

-G indicates package is RoHS compliant ('Green')

Absolute Maximum Ratings

Parameter	Value
V_{TPG}, Input line voltage	+350V
V_{TP}, Output line voltage	+18V
DP/DP continuous input voltage	+10V
Storage temperature	-65°C to +150°C
Junction temperature	+150°C
Soldering temperature[1]	+300°C
Power dissipation	0.8W

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability. All voltages are referenced to device ground.

Note 1. *Distance of 1.6mm from case for 10 seconds.*

Pin Configuration

SO-8
(Top View)
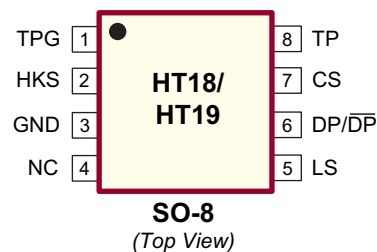
Note 1.   For HT18, Pin 6 is DP
For HT19, Pin 6 is $\overline{DP}$

Electrical Characteristics *(T_J=25°C unless otherwise specified)*

Symbol	Parameter	Min	Typ	Max	Units	Conditions
V_{TPG}	High voltage positive supply	-	-	350	V	I_{TPG} = 500µA, HKS, LS, DP/$\overline{DP}$ = open circuit
I_{TPQ}	Input leakage current	-	-	2.0	µA	V_{TPG} = 100V, HKS, LS, DP/$\overline{DP}$ = open circuit
		-	-	200		V_{TPG} = 290V, HKS, LS, DP/$\overline{DP}$ = open circuit
R_{SW}	TPG to TP switch resistance	-	-	18	Ω	V_{TPG} = 17V, I_{TPG} = 180mA, SW = On
		-	-	18		V_{TPG} = 3.0V, I_{TPG} = 20mA, SW = On
		-	-	30		V_{TPG} = 2.3V, I_{TPG} = 5mA, SW = On
I_{TPG} - I_{TP}	Bias current	-	-	75	µA	V_{TPG} = 5.0V, SW = On
		-	-	100		V_{TPG} = 10V, SW = On
I_{LIM}	I_{TPG} current limiting	188	250	330	mA	R_{EXT} = 200Ω ± 1%
I_{HKS}	HKS input current	-	-	200	µA	V_{HKS} = 40V -70V
I_{LS}, I_{DP}	LS and DP logic input current	-	-	30	µA	V_{LS} = 3.0V, V_{DP} = 3.0V
$I_{\overline{DP}}$	$\overline{DP}$ output current	-	-	-30	µA	$V_{\overline{DP}}$ = 0V

Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
$V_{IL(HKS)}$	HKS input low	0	-	0.2	V	V_{TPG} = 3.0V to 70V
$V_{IH(HKS)}$	HKS input high	2.0	-	V_{TPG}	V	V_{TPG} = 3.0V to 70V
$V_{IL(LS)}$, $V_{IL(DP)}$	Input logic low for DP/$\overline{DP}$ and LS	0	-	0.2	V	V_{TPG} = 3.0V to 70V
$V_{IH(LS)}$, $V_{IH(DP)}$	Input logic high for DP/$\overline{DP}$ and LS	1.5	-	10	V	V_{TPG} = 3.0V to 70V
T_{ON}	Turn on time	-	-	1.0	ms	V_{TPG} = 4.5V
T_{OFF}	Turn off time	-	-	1.0	ms	V_{TPG} = 4.5V

Logic Truth Table

HKS	LS1	DP	$\overline{DP}$	Switch State
H	L or Z	L or Z	H or Z	ON
H	H	L or Z	H or Z	ON
L or Z	L or Z	L or Z	H or Z	OFF
L or Z	H	L or Z	H or Z	ON
X	X	H	L	OFF

Z = high impedance, open circuit
X = don't care
L = logic level low
H = logic level high

Block Diagram
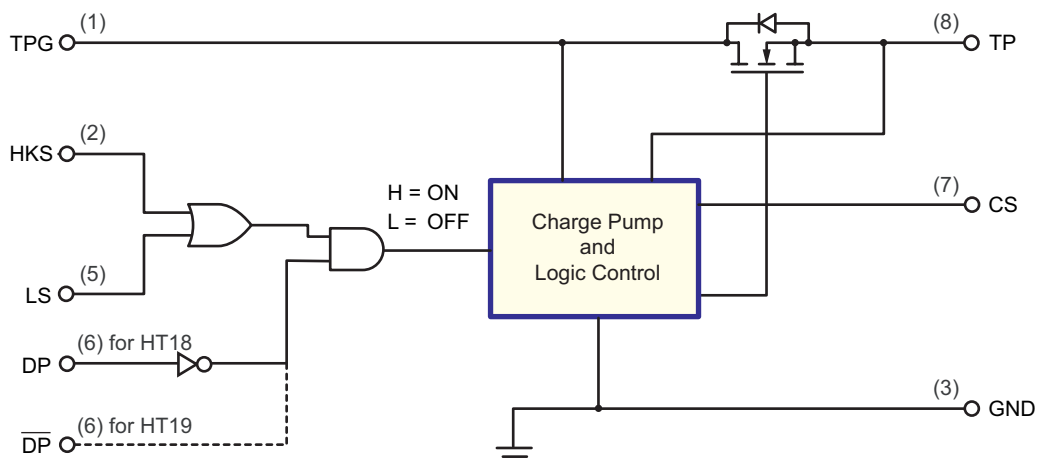
Pin Description

Pin	Name	Description
1	TPG	Positive input side of a telephone line, typically Tip side.
2	HKS	Hookswitch input. Connect HKS to TPG to turn on the hook switch. Internally pulled low with a high value resistor.
3	GND	Device ground. Negative side of a telephone line, typically Ring side.
4	NC	No Connect. Open Circuit. No internal connections to the device.
5	LS	Line switch input. Input logic high turns on the hook switch. Internally pulled low with a high value resistor.
6	DP	For HT18. Dial pulse input. Input logic high turns off the hook switch. Used for pulse dialing. Internally pulled low with a high value resistor.
6	$\overline{DP}$	For HT19. Dial pulse input. Input logic low turns off the hook switch. Used for pulse dialing. Internally pulled high with a high value resistor.
7	CS	Current sense input. An external resistor connected between CS and TP sets the current limit.
8	TP	Positive output side of a telephone line. Zener protection to prevent this output from rising above 18V is required.

8-Lead SOIC (Narrow Body) LG Package Outline

Top View

Side View

End View
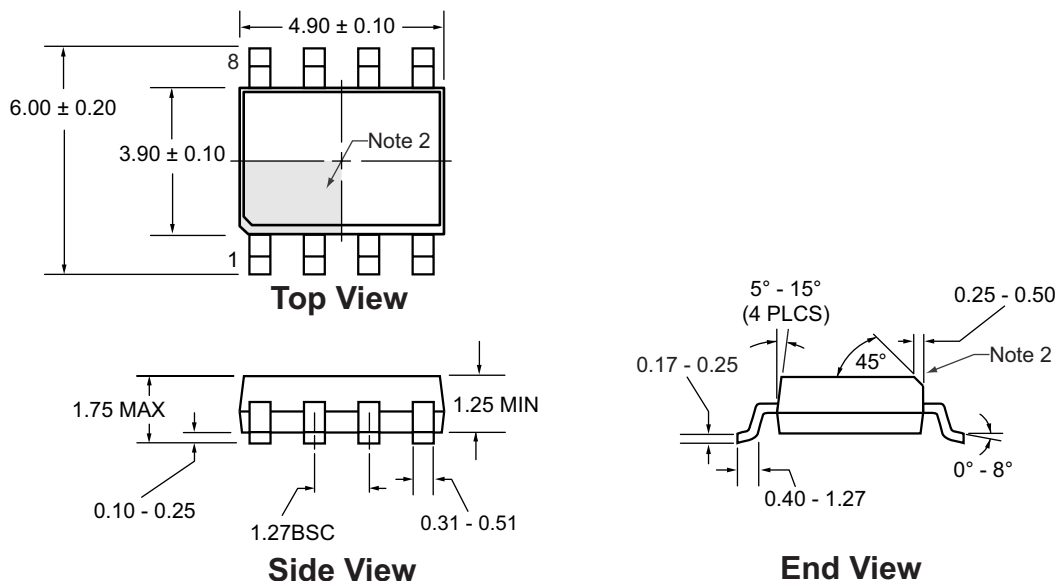
Notes:
1. All dimensions in millimeters. Angles in degrees.
2. If the corner is not chamfered, then a Pin 1 identifier must be located within the area indicated.

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to http://www.supertex.com/packaging.html.)

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