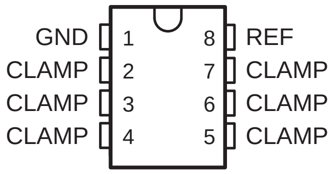
- **Protects Against Latch-Up**
- **25-mA Current Sink in Active State**
- **Less Than 1-mW Dissipation in Standby Condition**
- **Ideal for Applications in Environments Where Large Transient Spikes Occur**
- **Stable Operation for All Values of Capacitive Load**
- **No Output Overshoot**

D OR P PACKAGE
(TOP VIEW)



description

The TL7726 consists of six identical clamping circuits that monitor an input voltage with respect to a reference value, REF. For an input voltage (V_I) in the range of GND to < REF, the clamping circuits present a very high impedance to ground, drawing current of less than 10 µA. The clamping circuits are active for V_I < GND or V_I > REF when they have a very low impedance and can sink up to 25 mA.

These characteristics make the TL7726 ideal as protection devices for CMOS semiconductor devices in environments where there are large positive or negative transients to protect analog-to-digital converters in automotive or industrial systems. The use of clamping circuits provides a safeguard against potential latch-up.

The TL7726C is characterized for operation over the temperature range of 0°C to 70°C. The TL7726I is characterized for operation over the temperature range of –40°C to 85°C. The TL7726Q is characterized for operation over the temperature range of –40°C to 125°C.

AVAILABLE OPTIONS

T_A	SOIC (D)	PLASTIC DIP (P)
0°C to 70°C	TL7726CD	TL7726CP
–40°C to 85°C	TL7726ID	TL7726IP
–40°C to 125°C	TL7726QD	TL7726QP

The D package is available taped and reeled. Add the suffix R to the device type (i.e., TL7726CDR).

absolute maximum ratings over operating free-air temperature (unless otherwise noted)†

Reference voltage, V_{ref} . . . . 6 V
Clamping current, I_{IK} . . . . ±50 mA
Junction temperature, T_J . . . . 150°C
Package thermal impedance, θ_{JA} (see Notes 1 and 2): D package . . . . 97°C/W
P package . . . . 127°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . 260°C
Storage temperature range, T_{stg} . . . . –65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. Maximum power dissipation is a function of T_J(max), θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) - T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can impact reliability.
2. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions

		MIN	MAX	UNIT
Reference voltage, V_{ref}		4.5	5.5	V
Input clamping current, I_{IK}	$V_I \geq V_{ref}$		25	mA
	$V_I \leq$ GND	–25		
Operating free-air temperature range, T_A	TL7726C	0	70	°C
	TL7726I	–40	85	
	TL7726Q	–40	125	

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP‡	MAX	UNIT
V_{IK+}	Positive clamp voltage	I_I = 20 mA	V_{ref}		$V_{ref}+200$	mV
V_{IK-}	Negative clamp voltage	I_I = 20 mA	–200		0	mV
I_Z	Reference current	V_{ref} = 5 V		25	60	µA
I_I	Input current	$V_{ref} - 50\text{ mV} \leq V_I \leq V_{ref}$			10	µA
		GND $\leq V_I \leq$ 50 mV	–10			
		$50\text{ mV} \leq V_I \leq V_{ref} - 50\text{ mV}$	–1		1	

‡ All typical values are at T_A = 25°C.

switching characteristics specified at T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
t_s	Settling time	$V_{I(system)}$ = ±13 V, R_I = 600 Ω, t_t < 1 µs, Measured at 10% to 90%, See Figure 1		30	µs

PARAMETER MEASUREMENT INFORMATION

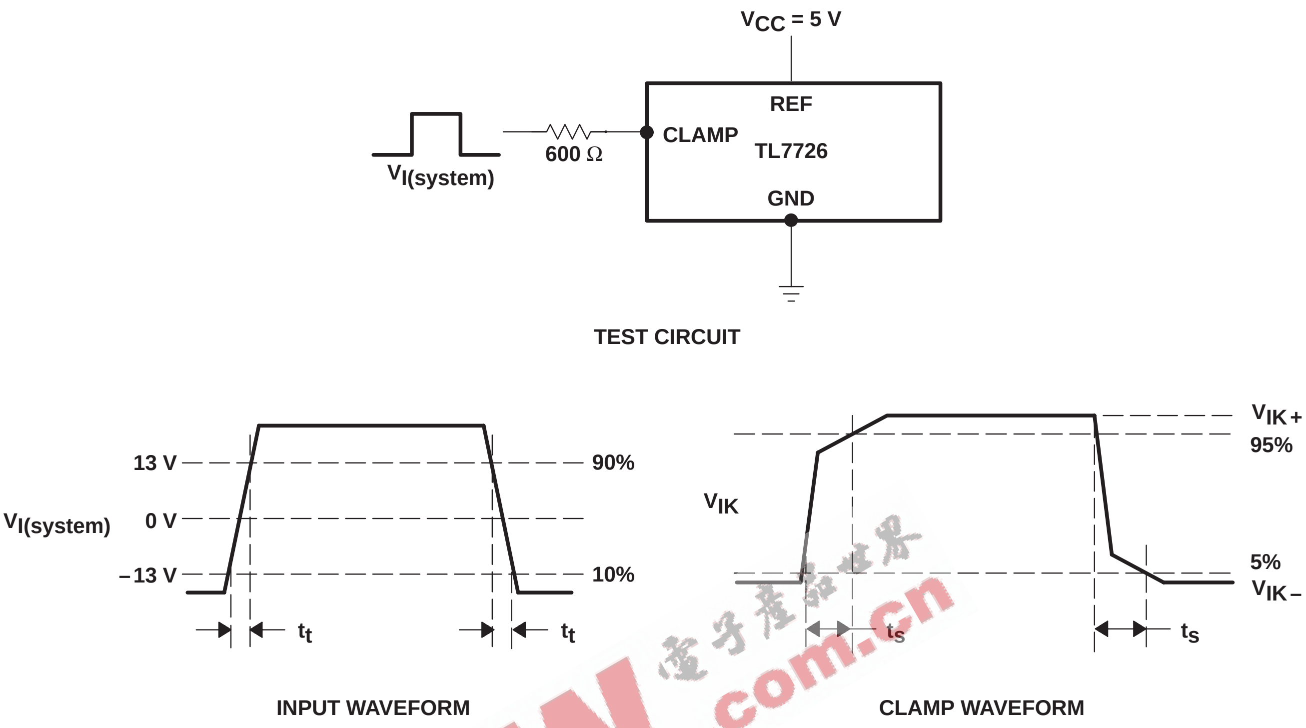


Figure 1. Switching Characteristics

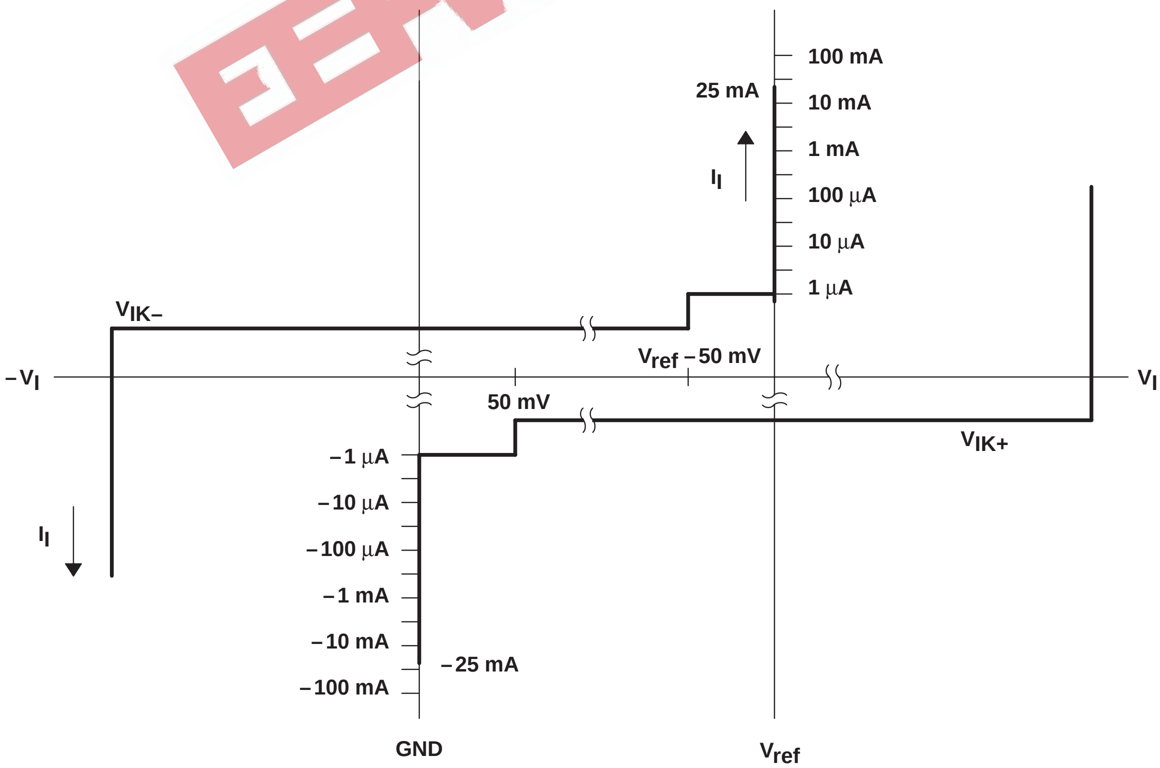
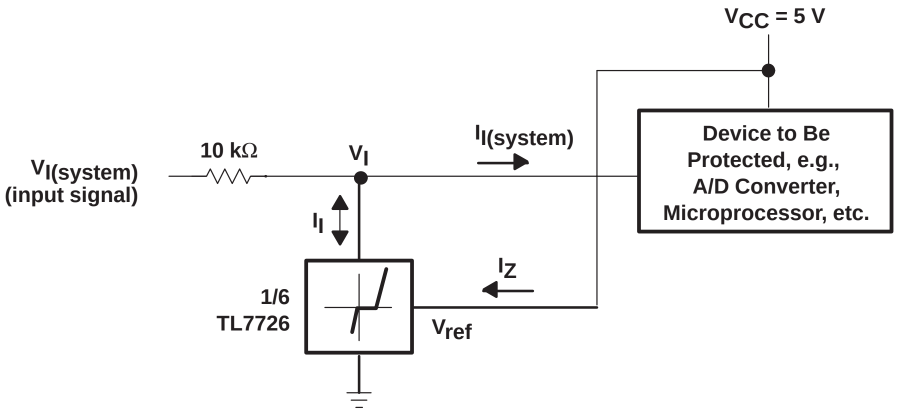


Figure 2. Tolerance Band for Clamping Circuit

APPLICATION INFORMATION



Example: If $I_I >> I_{I(system)}$, i.e., $V_{I(system)} > V_{ref}$ + 200 mV

where:

$I_{I(system)}$ = Input current to the device being protected

$V_{I(system)}$ = Input voltage to the device being protected

then the maximum input voltage

$V_{I(system)}max$ = $V_{ref} + I_I max(10k\Omega)$

= 5 V + 25 mA(10kΩ)

= 5 V + 250 V

= 255 V

Figure 3. Typical Application

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