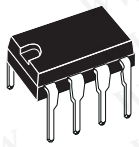
TDE1767, A
TDE1787, A

INTERFACE CIRCUIT (RELAY AND LAMP-DRIVER)

- OPEN GROUND PROTECTION
- HIGH OUTPUT CURRENT
- ADJUSTABLE SHORT-CIRCUIT PROTECTION
- INTERNAL THERMAL PROTECTION WITH EXTERNAL RESET
- LARGE SUPPLY VOLTAGE RANGE
- ALARM OUTPUT
- INPUT VOLTAGE CAN BE HIGHER THAN V_{CC}
- OUTPUT VOLTAGE CAN BE LOWER THAN GROUND (V_{CC} - V_O $\leq V_{CC}$[max])



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ORDERING NUMBERS: TDE 1767DP
TDE1767ADP
TDE1787DP
TDE1787ADP

DESCRIPTION

The TDE1767, A / TDE1787, A are a monolithic amplifiers designed for high current and high voltage applications, specifically to drive lamps, relays, stepping motors.

The devices are assentially blow-out proof. The output is prois protected from short-circuits with the positive supply or drive. In addition thermal shut down is provited to keep the IC from overheathing.

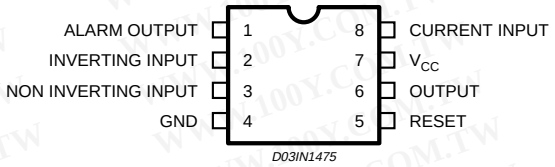
If internal dissipation becomes too high, the driver will shut down to prevent excessive heating. The output stays null after the overheating is off, if the reset input is low. If high the output will alternatively switch-on and off until the overload is removed.

The devices operates over a wide range voltages from standard 15V operational amplifier supplies to the single +6V or +48V used for industrial electric systems. Input voltages can be higher than in the V_{CC}.

An alarm output suitable for driving a LED is provited. This LED, normally on (if referred to ground), will die out or flash during an overload depending on the state of the reset input.

The output is low in open ground conditions.

PIN CONNECTION (top view)



THERMAL DATA

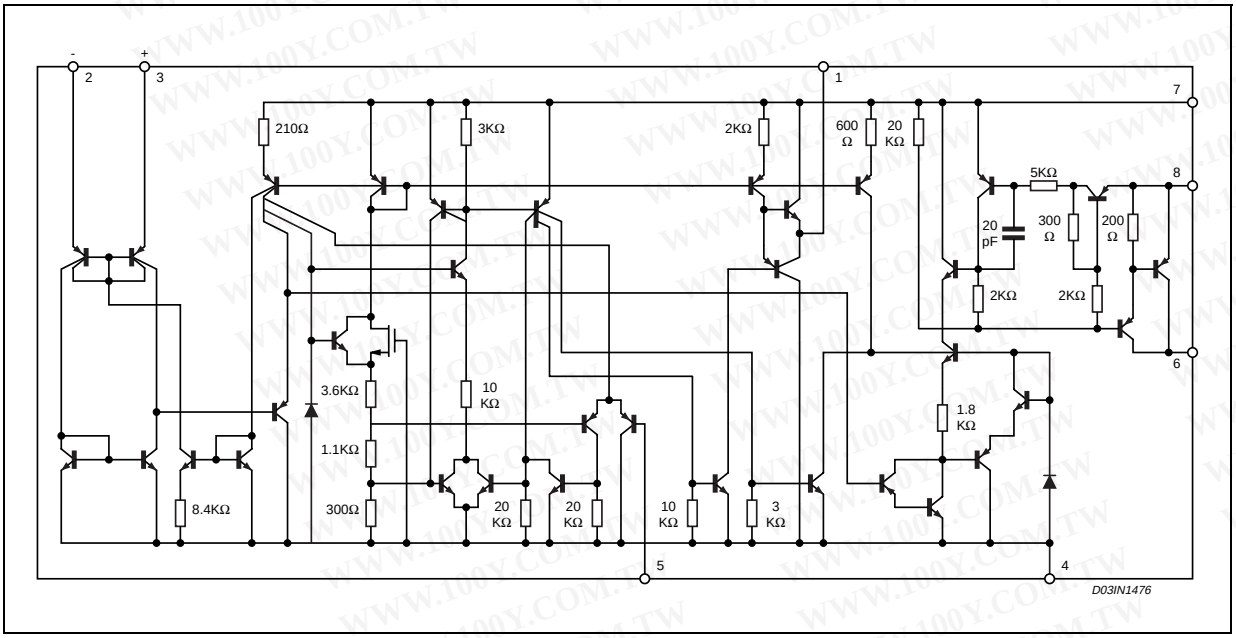
Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}c}$	Thermal Resistance Junction-Case	max 30	°C/W
$R_{th\ j\text{-}a}$	Thermal Resistance Junction-Ambient	max 80	°C/W

* Devices bonded on a 40 cm2 glass-epoxy printed circuit 0.15 cm thick with 4 cm2 of copper.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	TDE1767A/TDE1787A	TDE1767/TDE1787	Unit
V_{CC}	Supply Voltage	60	50	V
V_{ID}	Input Differential Voltage	60	50	V
V_I	Input Voltage	- 10 to + 60	- 10 to + 50	V
I_O	Output Current	1.3	1.2	A
$V_{I(reset)}$	Reset Input Voltage	- 0.5 to + 60	- 0.5 to + 50	V
I_{OA}	Alarm Output Current	- 10 to + 20	- 10 to + 20	mA
P_{tot}	Power Dissipation	Internally Limited		mW
T_{oper}	Operating Ambient Temperature Range	- 25 to + 85	- 25 to + 85	°C
T_{stg}	Storage Temperature Range	- 65 to + 150	- 65 to + 150	°C

SCHEMATIC DIAGRAM



EQUIVALENT SCHEMATIC

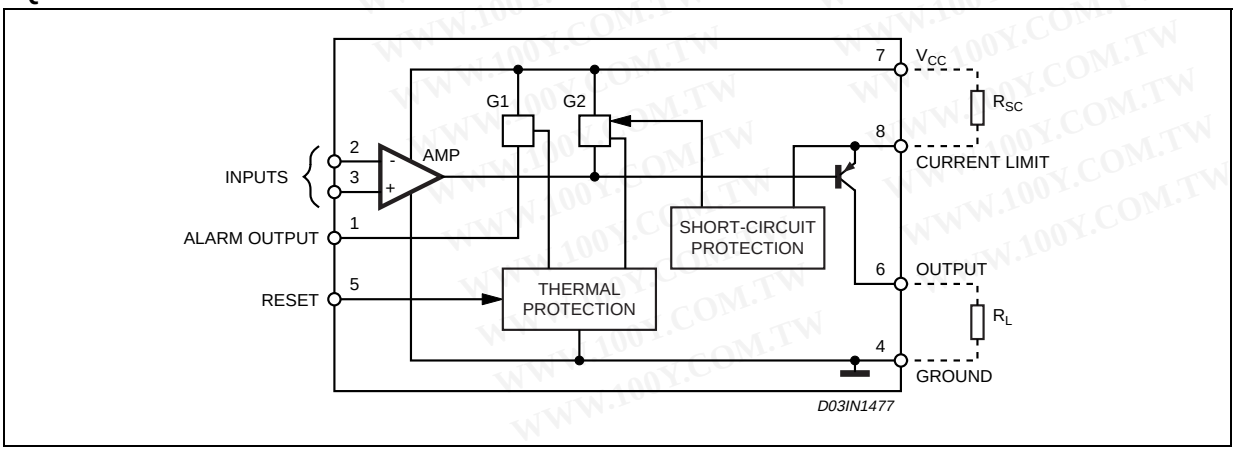
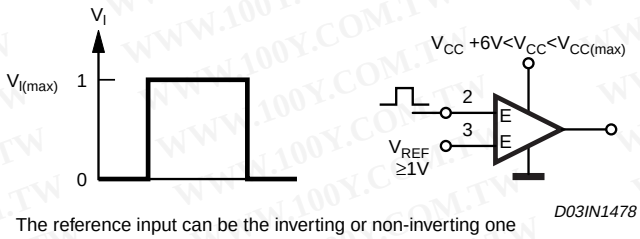


Figure 1.



The reference input can be the inverting or non-inverting one

ELECTRICAL CHARACTERISTCS (Unless otherwise specified)

TDE1767A: - 25°C ≤ T_{amb} ≤ 85°C, 6V ≤ V_{CC} ≤ 55V, I_o ≤ 500mA, T_j ≤ 150°C

TDE1767: - 25°C ≤ T_{amb} ≤ 85°C, 6V ≤ V_{CC} ≤ 45V, I_o ≤ 500mA, T_j ≤ 150°C

TDE1787A: - 25°C ≤ T_{amb} ≤ 85°C, 6V ≤ V_{CC} ≤ 55V, I_o ≤ 300mA, T_j ≤ 150°C

TDE1787: - 25°C ≤ T_{amb} ≤ 85°C, 6V ≤ V_{CC} ≤ 45V, I_o ≤ 300mA, T_j ≤ 150°C

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{IO}	Input Offset Voltage	(note 1)		2	50	mV
I_{CC}	Power Supply Current	(measured on pin 4)				
		Output High (T_{amb} = 25°C)		5.8	8	mA
		Output High (V_{CC} = V_{CCmax}, (T_j = 150°C)		5	7	mA
		Output Low (V_{CC} = V_{CCmax}, (T_{amb} = 25°C)		1.5	4	mA
I_{IB}	Imput Bias Current			15	100	µA
V_{CM}	Common-mode Input Voltage Range	**TDE1787A, TDE1767A** **TDE1787, TDE1767**	1 1		60 45	V V
V_I	Input Voltage Range	Vref ≥ 1V (figure1, note2) **TDE1787A, TDE1767A** **TDE1787, TDE1767**	 1 1		 60 45	 V V
I_{SC}	Short Circuit Output Current	V_{CC} = 35V, t = 10ms **TDE1767A:** R_{SC} = 0.22Ω **TDE1787A:** R_{SC} = 0.33Ω		 700 380		 mA mA
V_{sense}	Output Limit Sense Voltage	V_O = V_{CC} -2V, t = 10ms	130	150	170	mV
V_{sense}	Output Limit Sense Voltage	V_O = 0V, t = 10ms	120	140	165	mV
$V_{O(sat)}$	Output Saturation Voltage	Output High V_I^+- V_I^- ≥ 50mV; R_{SC} = 0; V_{CC} = 30V **TDE1787A, TDE1767A:** Tj = 25°C **TDE1787, TDE1767:** Tj = 25°C **TDE1787A, TDE1767A:** Tj = 150°C **TDE1787, TDE1767:** Tj = 150°C		 1 1 1.1 1.1	 1.1 1.2 1.2 1.3	 V V V V
I_{OL}	Output Leakage Current	Output Low			100	µA

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_A	Available Alarm Output Current	Output Source Current $V_{AH} = V_{CC}$-2.5V	-4	-5		mA
		Output Sink Current (in thermal shut-down) V_A = 1.4V	5	10		mA
I_{reset}	Reset Input Current			2	40	µA
$V_{th\text{-}reset}$	Reset Threhold			1.4		A
	Output Leakage Current	open ground		10		µA

Note: 1. The offset voltage given is the maximum value of different input voltage reguired to drive the output voltage whitin 2 V of the ground or the supply voltage.
2. Input voltage range is indipendent of the supply voltage.

Figure 2. Peak Short-circuit vs Limiting Resistor

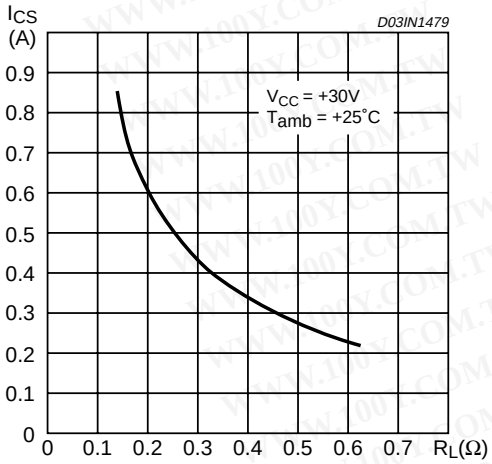


Figure 3. Available Output Current vs Limiting Resistor

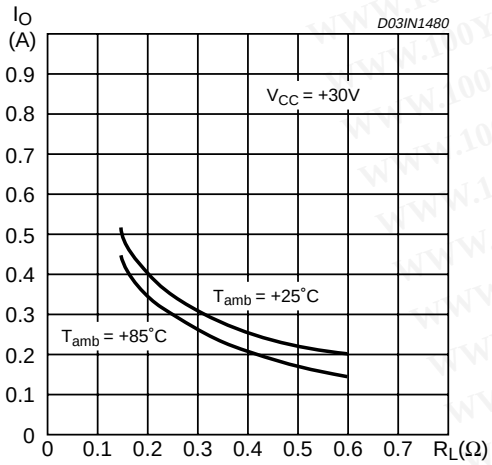


Figure 4. Power Supply Current (pin 4)

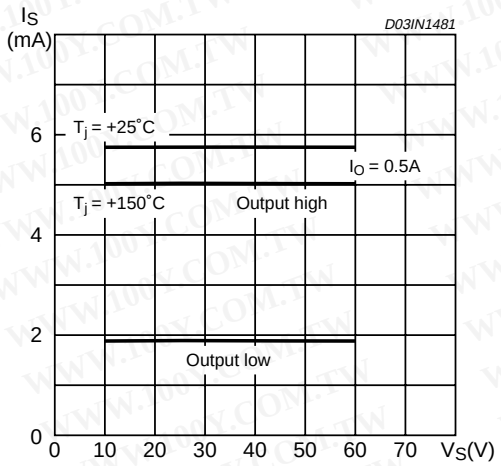


Figure 5. Output Saturation Voltage vs Output Current

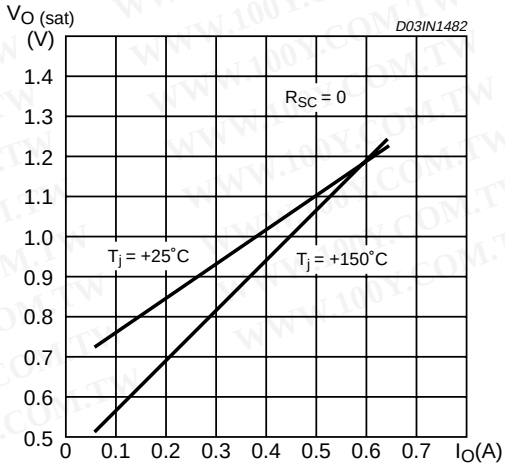


Figure 6. Output Transistor Safe Operating Area (pulsed))

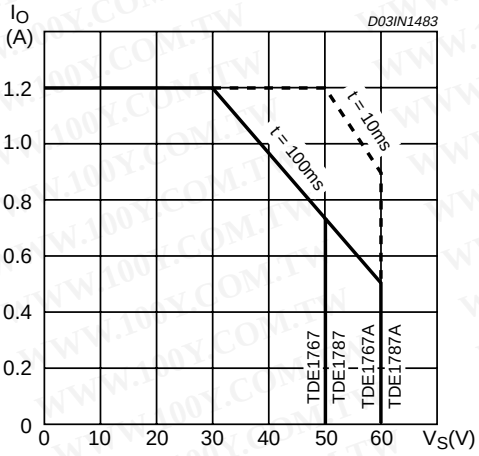


Figure 7. Normal Operating Area (short circuit protected)

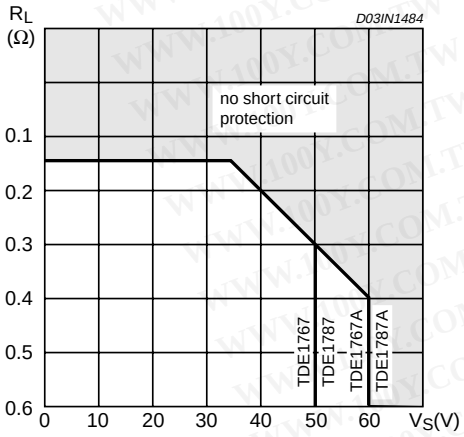


Figure 8. Current Sinking

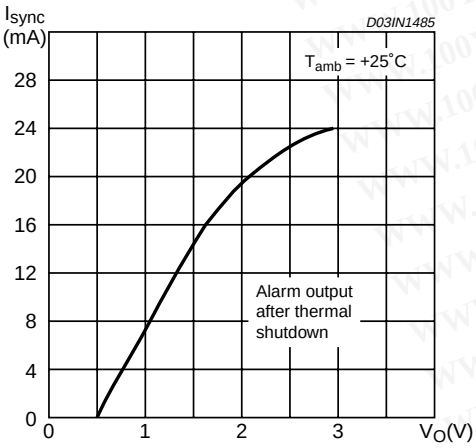


Figure 9. Current Sourcing

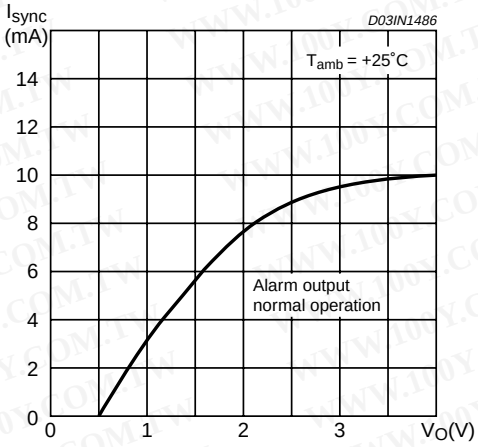


Figure 10. Response Time

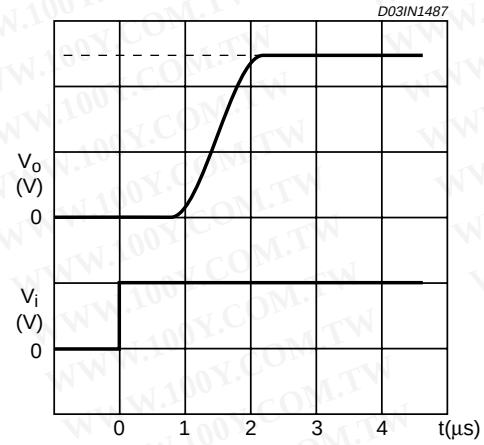


Figure 11. Response Time

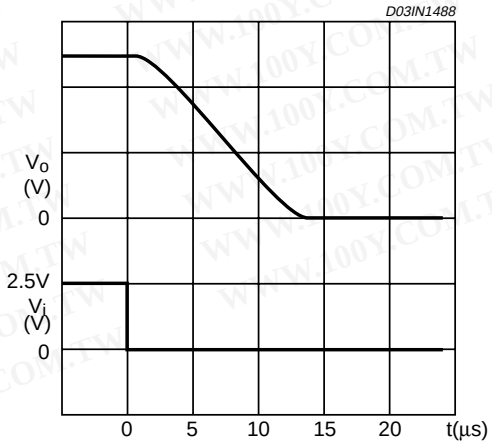
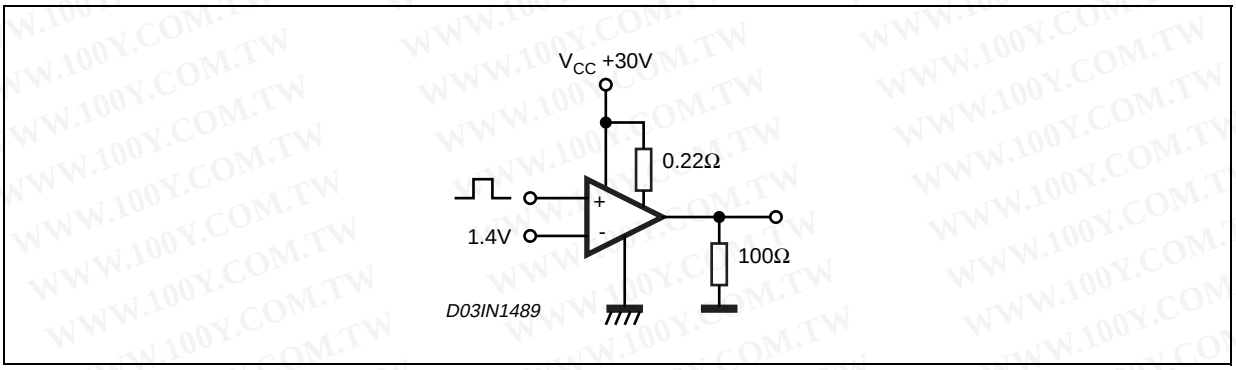


Figure 12. Test Circuit



TYPICAL APPLICATION

Figure 13. Open Load Detection.4

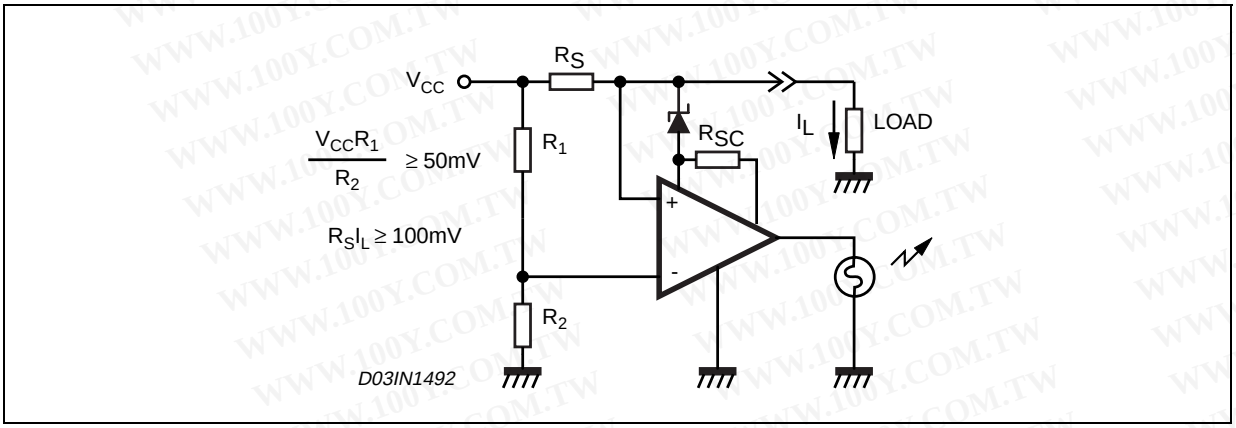


Figure 14. Driving Lamps, Relays, Etc...

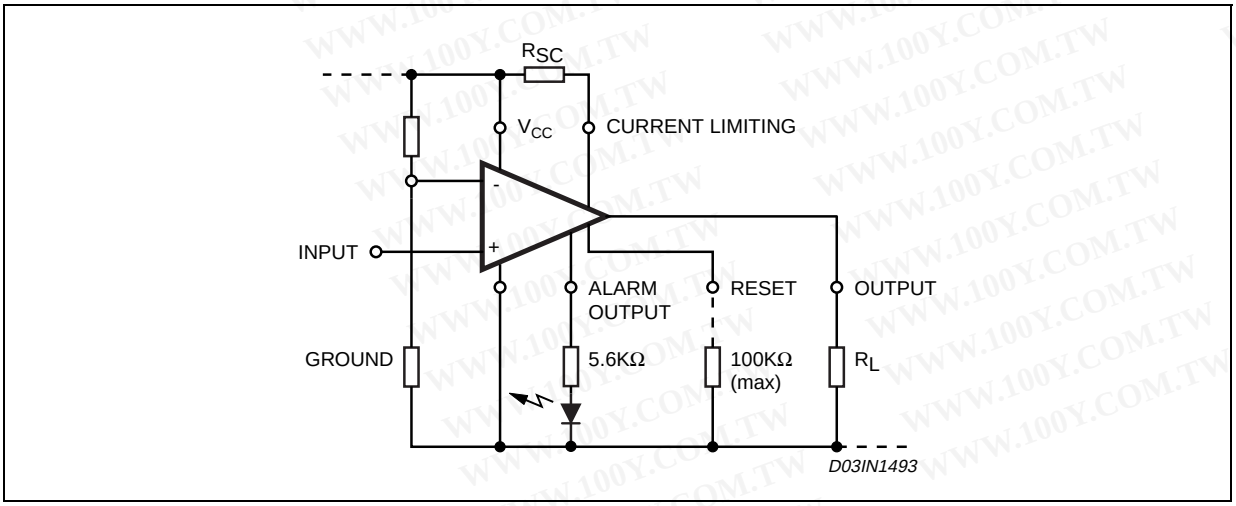


Figure 15. Common Reset.

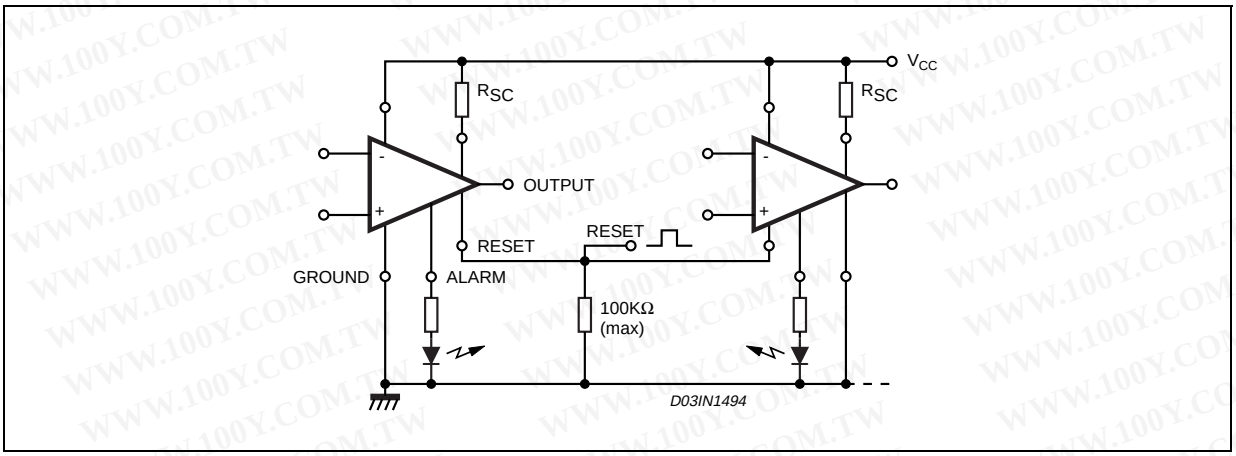
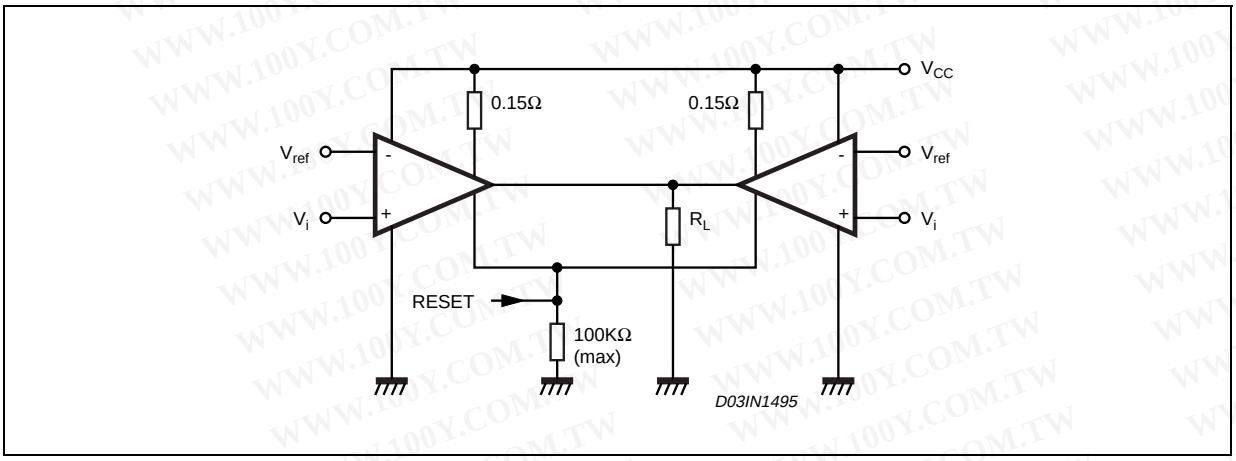


Figure 16. Parallel Driving of Loads Up to 1 A.



USING ALARM OUTPUT

Figure 17. Parallel Alarm Output

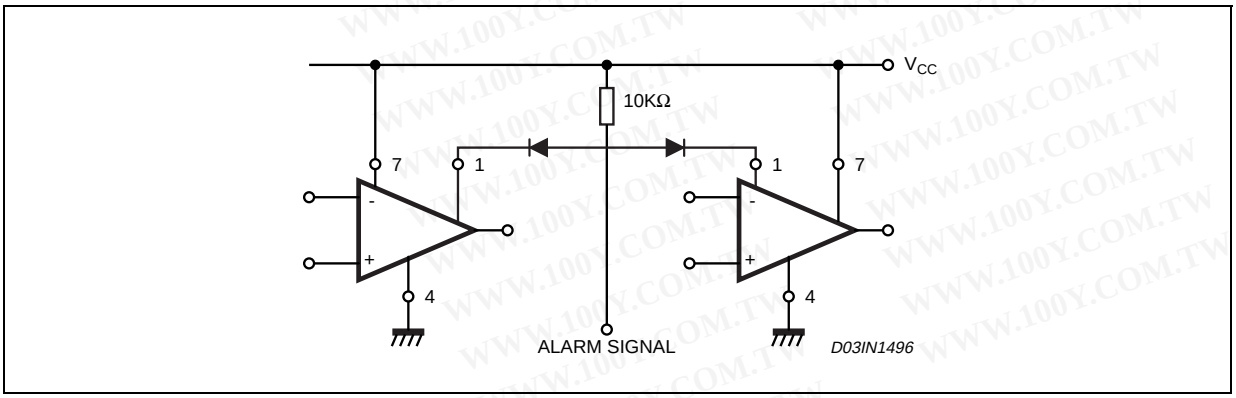


Figure 18. Led to VCC.

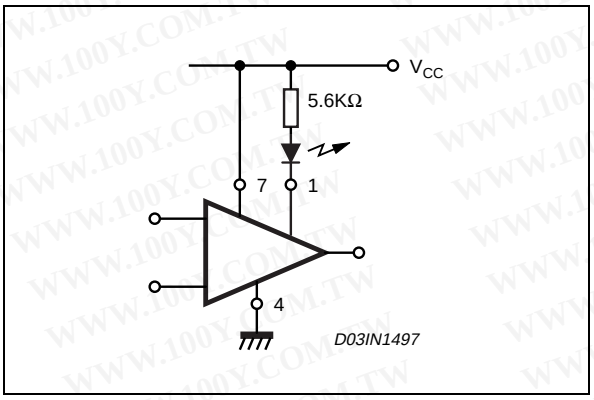


Figure 19. Led to Ground

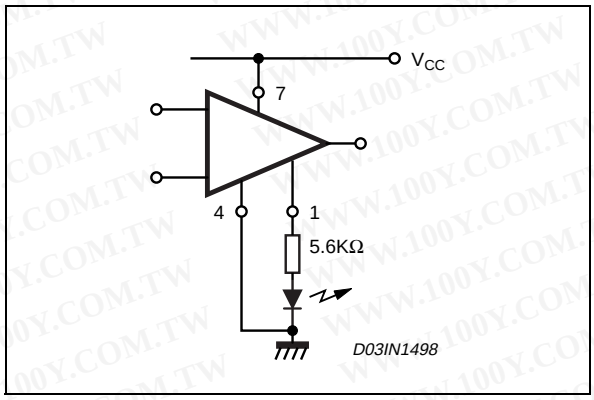


Figure 20. Interface Between High Voltage and Low Voltage System.

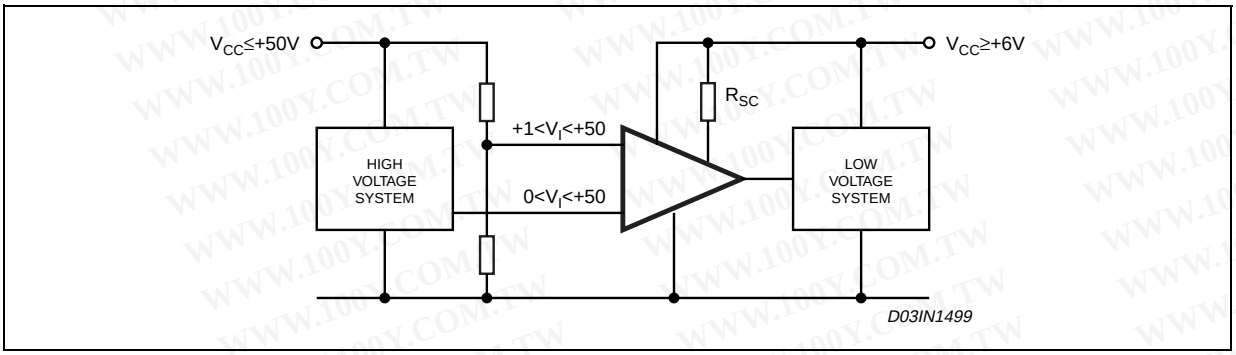
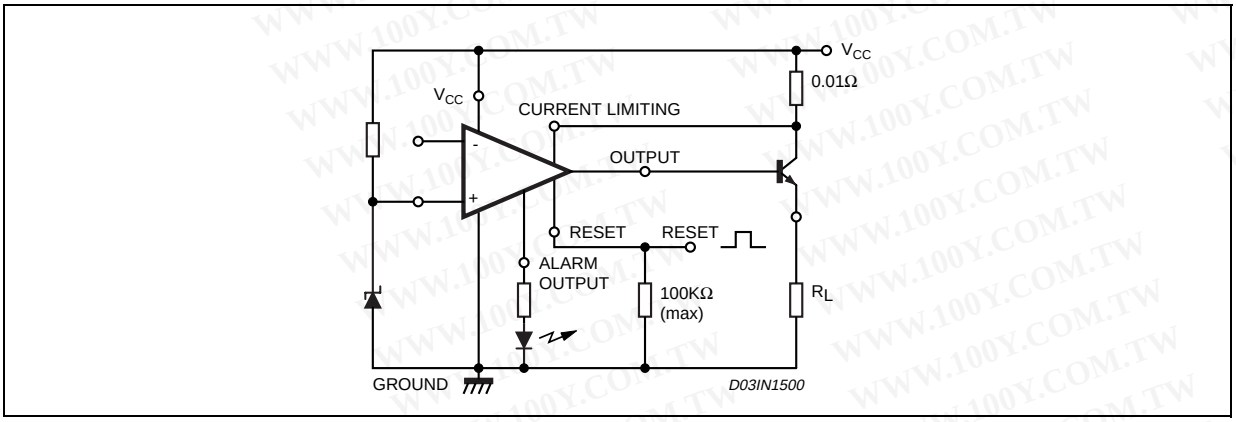
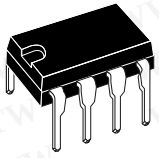


Figure 21. Increasing Current Up to 10A.



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

OUTLINE AND MECHANICAL DATA



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