SGS-THOMSON MICROELECTRONICS

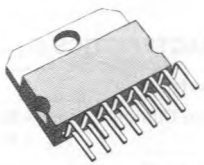
# L7180
# L7182

## 80 V QUAD DARLINGTON SWITCHES

- FOUR NPN DARLINGTONS WITH ISOLATED CONNECTIONS
- OUTPUT CURRENT TO 1.5 A EACH DARLINGTON
- MINIMUM BREAKDOWN 80 V
- MULTIWATT PACKAGE ALLOWS OPERATION AT 1.5 A, 80 V, 100 % DUTY CYCLE. ALL FOUR DEVICES ON
- INTEGRAL SUPPRESSION DIODES
- VERSIONS FOR 5 V AND 6-15 V LOGIC FAMILIES

The L7180 has 350 Ω input resistors and is compatible with TTL, DTL, LSTTL and 5 V CMOS logic. The L7182 has 3 KΩ input resistors for use with 6-15 V CMOS and PMOS logic.

These devices are suitable for driving a wide range of inductive and non-inductive loads including DC motors, stepper motors, solenoids, relays, lamps, multiplexed LEDs and heaters.



Multiwatt 15

**ORDER CODES :** L7180
L7182

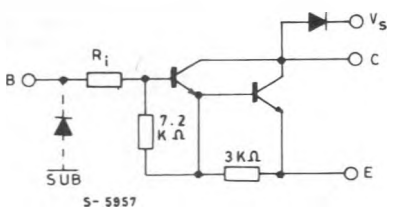
### DESCRIPTION

The L7180 and L7182 are 1.5 A quad darlington arrays mounted in the 15-lead Multiwatt plastic package. Each darlington is equipped with a suppression diode for inductive loads, and all three terminals are isolated.

### ABSOLUTE MAXIMUM RATINGS

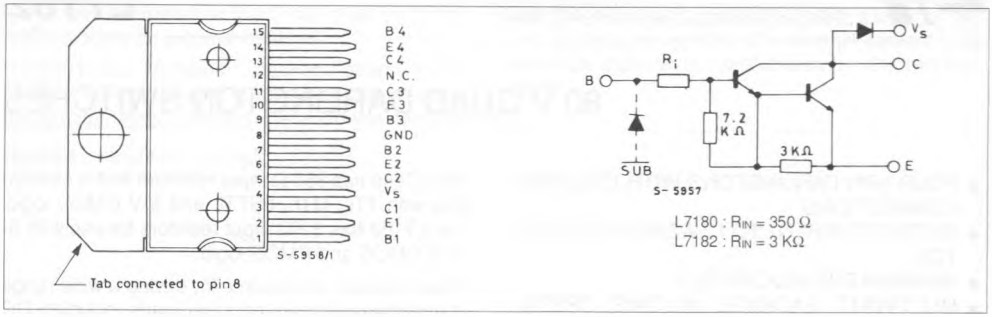
| Symbol | Parameter | Test Conditions | Unit |
|---|---|---|---|
| $V_{CEX}$ | Output Voltage | 80 | V |
| $I_o$ | Output Current | 1.75 | A |
| $V_i$ | Input Voltage | 60 | V |
| $I_B$ | Input Current | 25 | mA |
| $P_{tot}$ | Power Dissipation ($T_{case}$ = 75 °C) | 25 | W |
| $T_{amb}$ | Operating Ambient Temperature Range | 0 to 70 | °C |
| $T_{stg}$ | Storage Temperature | – 55 to 150 | °C |

### SCHEMATIC DIAGRAM




L7180 : $R_{IN}$ = 350 Ω
L7182 : $R_{IN}$ = 3 KΩ

## CONNECTION AND SCHEMATIC DIAGRAMS (top view)




## THERMAL DATA

| | | | | |
|---|---|---|---|---|
| $R_{th\ j\text{-}case}$ | Thermal Resistance Junction-case | Max | 3 | °C/W |
| $R_{th\ j\text{-}amb}$ | Thermal Resistance Junction-ambient | Max | 35 | °C/W |

## ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 25 °C unless otherwise specified)

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit | Fig. |
|---|---|---|---|---|---|---|---|---|
| $I_{CEX}$ | Output Leakage Current | $V_{CE}$ = 80 V | | | | 100 | µA | 1 |
| | | $V_{CE}$ = 80 V | $T_{amb}$ = 70 °C | | | 500 | µA | |
| $V_{CER(sus)}$ | Collector-emitter Sustaining Voltage(*) | $I_C$ = 50 mA | $V_i$ = 0.4 V | 50 | | | V | 2 |
| $V_{CE(sat)}$ | Collector-emitter Saturation Voltage | $I_C$ = 500 mA | $I_B$ = 625 µA | | | **1.15** | V | 3 |
| | | $I_C$ = 750 mA | $I_B$ = 935 µA | | | **1.3** | V | |
| | | $I_C$ = 1 A | $I_B$ = 1.25 mA | | | **1.4** | V | |
| | | $I_C$ = 1.5 A | $I_B$ = 2.25 mA | | | **1.6** | V | |
| $I_{i(on)}$ | Input Current | For **L7180** | $V_i$ = 2.4 V | **1.4** | | 4.3 | mA | 4 |
| | | For **L7180** | $V_i$ = 3.75 V | **3.3** | | 9.6 | mA | |
| | | For **L7182** | $V_i$ = 5 V | **0.6** | | 1.8 | mA | |
| | | For **L7182** | $V_i$ = 12 V | **1.7** | | 5.2 | mA | |
| $V_{i(on)}$ | Input Voltage | For **L7180** | | | | | | 5 |
| | | $V_{CE}$ = 2 V | $I_C$ = 1 A | | | 2 | V | |
| | | $V_{CE}$ = 2 V | $I_C$ = 1.5 A | | | 2.5 | V | |
| | | For **L7182** | | | | | | |
| | | $V_{CE}$ = 2 V | $I_C$ = 1 A | | | 6.5 | V | |
| | | $V_{CE}$ = 2 V | $I_C$ = 1.5 A | | | 10 | V | |
| $t_{PLH}$ | Turn-on Delay Time | 0.5 $V_i$ to 0.5 $V_o$ | | | | 1 | µs | |
| $t_{PHL}$ | Turn-off Delay Time | 0.5 $V_i$ to 0.5 $V_o$ | | | | 1.5 | µs | |

(*) $t_{sus}$ = 10 µs.
Guaranteed by design ; not tested 100 %.

## TEST CIRCUITS

Figure 1.

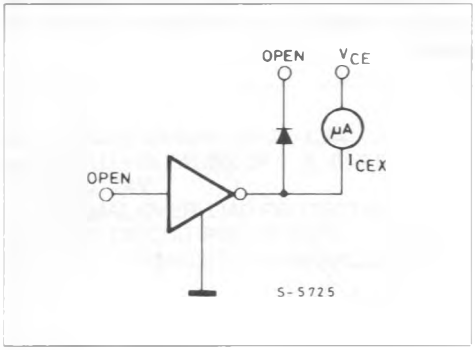



Figure 2.

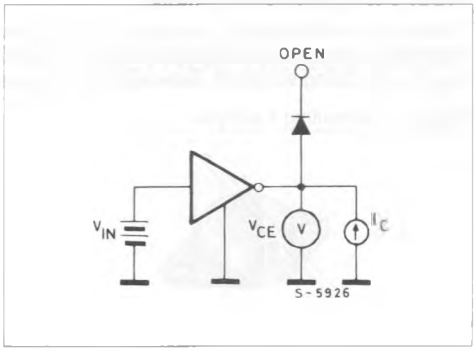



Figure 3.

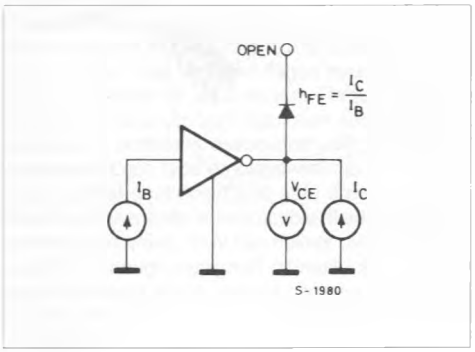



Figure 4.

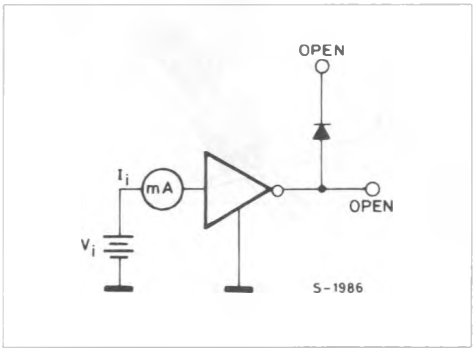
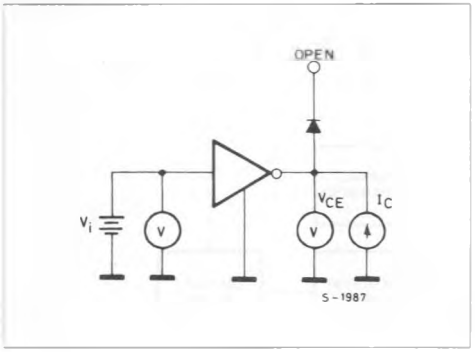



Figure 5.



## MOUNTING INSTRUCTIONS

The power dissipated in the circuit must be removed by adding an external heatsink.

Thanks to the Multiwatt® package attaching the heatsink is very simple, a screw or a compression spring (clip) being sufficient. Between the heatsink and the package it is better to insert a layer of silicon grease, to optimize the thermal contact : no electrical isolation is needed between the two surfaces.

**Figure 6 :** Mounting Example.