

# 4-circuit High-side Power Switch Array SLA2502M

## Features

- Built-in diagnostic function to detect short and open circuiting of loads and output status signals
- Low saturation PNP transistor use ( $V_{CE(sat)} \leq 0.5V$ )
- Allows direct driving using LS-TTL and C-MOS logic levels
- Built-in overcurrent and thermal protection circuits
- Built-in protection against reverse connection of power supply
- $T_j = 150^\circ C$  guaranteed

## Absolute Maximum Ratings

( $T_a = 25^\circ C$ )

Parameter	Symbol	Ratings	Unit	Conditions
Power supply voltage	$V_B$	-13 to +40	V	
Input terminal voltage	$V_{IN}$	-0.3 to +7.0	V	
DIAG output applied voltage	$V_{DIAG}$	-0.3 to +7.0	V	
DIAG output source current	$I_{DIAG}$	3	mA	
Output current	$I_O$	1.2	A	
Power Dissipation	$P_D$	4.8	W	Stand-alone operation without heatsink; all circuits operating
Junction temperature	$T_j$	-40 to +150	$^\circ C$	
Operating temperature	$T_{OP}$	-40 to +100	$^\circ C$	
Storage temperature	$T_{stg}$	-50 to +150	$^\circ C$	

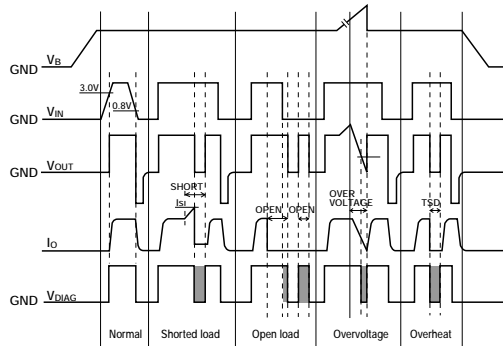
## Electrical Characteristics

( $V_{Bopr} = 14V$ ,  $T_a = 25^\circ C$  unless otherwise specified)

Parameter	Symbol	Ratings			Unit	Conditions
		min	typ	max		
Operating power supply voltage	$V_{Bopr}$	6.0		16	V	
Quiescent circuit current (per circuit)	$I_q$		5	12	mA	$V_{IN} = 0V$
Threshold input voltage	$V_{INth}$	0.8		3.0	V	
Input current	Hi output	$I_{IN}$		1.0	mA	$V_{IN} = 5V$
	Lo output	$I_{IN}$	0	100	$\mu A$	$V_{IN} = 0V$
Saturation voltage of output transistor	$V_{CE(sat)}$			0.5	V	$I_O \leq 1.0A$ , $V_{Bopr} = 6$ to $16V$
Output terminal sink current	$I_{O(off)}$			2.0	mA	$V_O = 0V$ , $V_{IN} = 0V$
Saturation voltage of DIAG output	$V_{DL}$			0.3	V	$I_{DIAG} = 3mA$
Leak current of DIAG output	$I_{DGH}$			100	$\mu A$	$V_{DIAG} = 5V$
Open load detection resistor	$R_{open}$			30	$k\Omega$	
Overcurrent protection starting current	$I_S$	1.6			A	$V_O = V_{Bopr} - 1.9V$
Output transfer time	$T_{ON}$		8	30	$\mu S$	$I_O = 1A$
	$T_{OFF}$		15	30	$\mu S$	$I_O = 1A$
DIAG output transfer time	$T_{PLH}$		10	30	$\mu S$	$I_O = 1A$
	$T_{PHL}$		15	30	$\mu S$	$I_O = 1A$

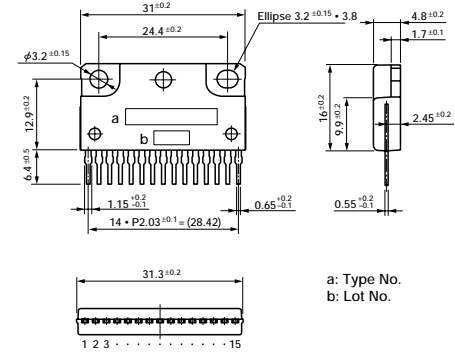
Note: \* The rule of protection against reverse connection of power supply is  $V_B = -13V$ , one minute (all terminals except  $V_B$  and GND should be open).

## Diagnostic Function



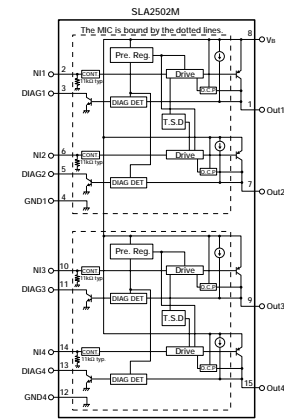
ERROR SIGNAL for CPU

## External Dimensions (unit: mm)



a: Type No.  
b: Lot No.

## Equivalent Circuit Diagram

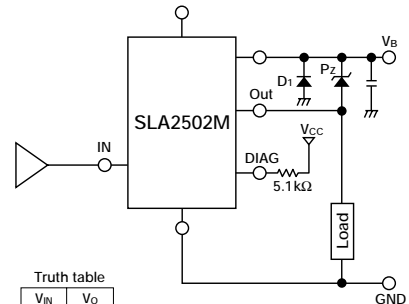


[Abbreviations]

Drive: Drive circuit  
CONT: ON/OFF circuit  
Pre.Reg: Pre-regulator

DIAG.DET.: Diagnostic circuit  
O.C.P.: Overcurrent protection  
T.S.D.: Thermal protection

## Standard Circuit Diagram



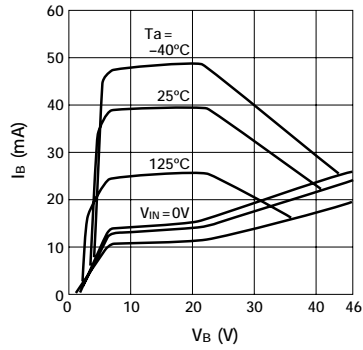
Truth table

$V_{IN}$	$V_O$
H	H
L	L

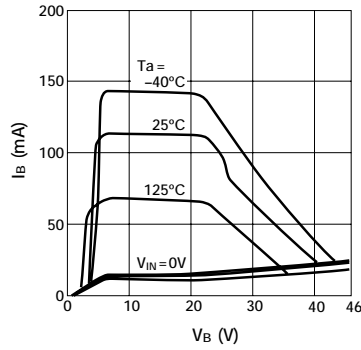
Note 1: A pull-down resistor (11kΩ typ.) is connected to the IN terminal.  $V_{OUT}$  turns "L" when a high impedance is connected to the IN terminal in series.

Note 2: Grounds GND1 and GND2 are not wired internally. They must be shorted at a pattern near the product.

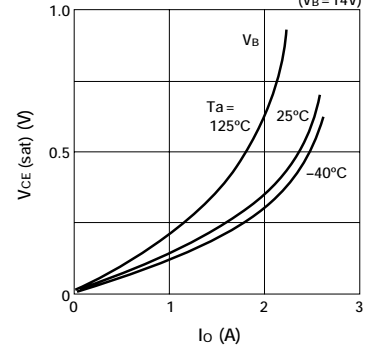
■ Circuit Current (single circuit)



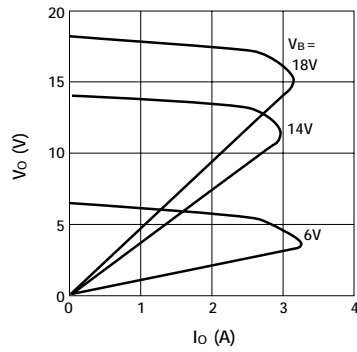
■ Circuit Current (4 circuits)



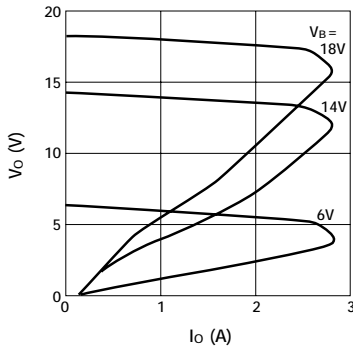
■ Saturation Voltage of Output Transistor



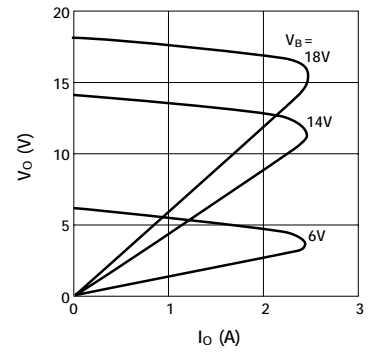
■ Overcurrent Protection Characteristics (Ta=-40°C)



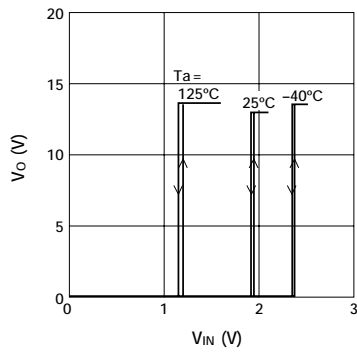
■ Overcurrent Protection Characteristics (Ta=25°C)



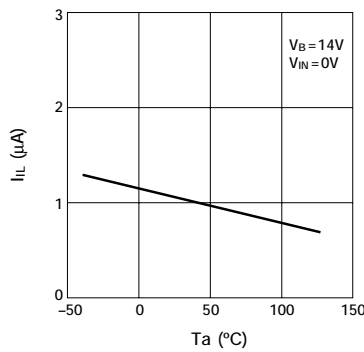
■ Overcurrent Protection Characteristics (Ta=125°C)



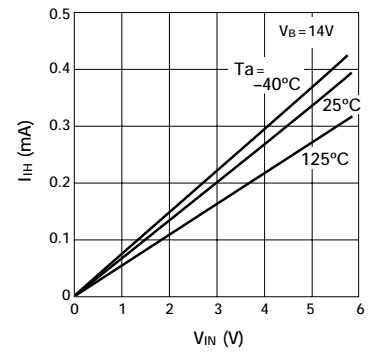
■ Threshold Input Voltage



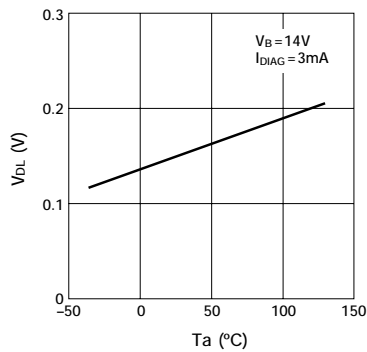
■ Input Current (Output OFF)



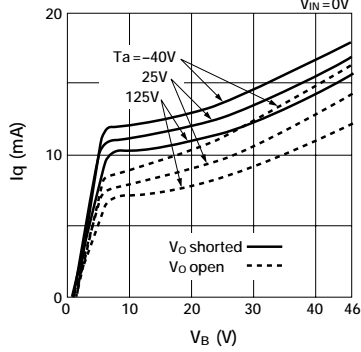
■ Input Sink Current (Output HI)



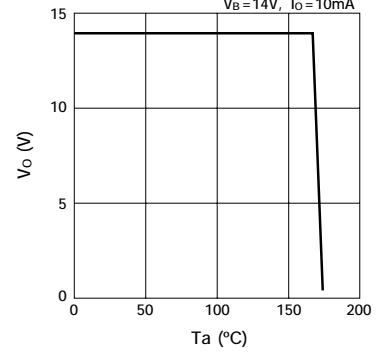
■ Saturation Voltage of DIAG Output



■ Quiescent Circuit Current (dual circuit)

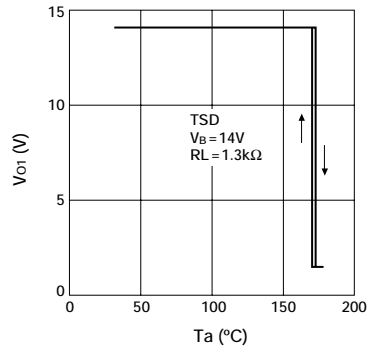


■ Thermal Protection Characteristics

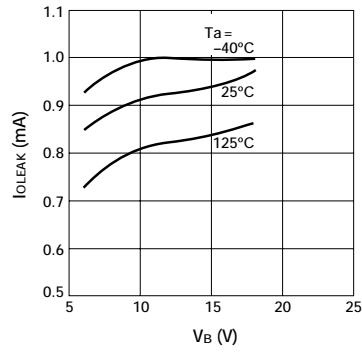


# 4-circuit High-side Power Switch Array SLA2502M

■ Thermal Protection Characteristics



■ Output Terminal Leak Current ( $V_O = 0V$ )



■ Open Load Detection Resistor

