

# M54527P

6-UNIT 150mA DARLINGTON TRANSISTOR ARRAY WITH CLAMP DIODE

## DESCRIPTION

M54527P is six-circuit Darlington transistor arrays with clamping diodes. The circuits are made of NPN transistors. Both the semiconductor integrated circuits perform high-current driving with extremely low input-current supply.

## FEATURES

- High breakdown voltage ( $BV_{CEO} \geq 40V$ )
- High-current driving ( $I_{c(max)} = 150mA$ )
- With clamping diodes
- Driving available with PMOS IC output of 8-18V
- Wide input voltage range ( $V_I = -40$  to  $+40V$ )
- Wide operating temperature range ( $T_a = -20$  to  $+75^\circ C$ )

## APPLICATION

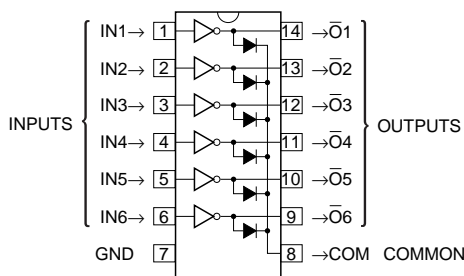
Drives of relays and printers, digit drives of indication elements (LEDs and lamps), and MOS-bipolar logic IC interfaces

## FUNCTION

The M54527P have six circuits consisting of NPN Darlington transistors. These ICs have resistance of  $20k\Omega$  between input transistor bases and input pins. A spike-killer clamping diode is provided between each output pin (collector) and COM pin (pin 8). The output transistor emitters are all connected to the GND pin (pin 7).

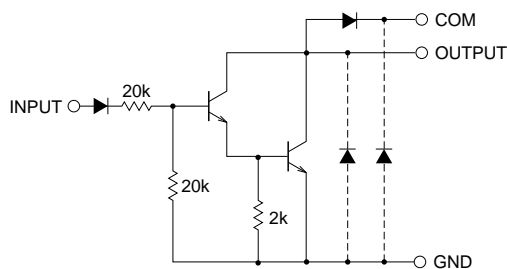
The collector current is 150mA maximum. Collector-emitter supply voltage is 40V maximum.

## PIN CONFIGURATION (TOP VIEW)



Outline 14P4

## CIRCUIT SCHEMATIC



The six circuits share the COM and GND.

The diodes shown by broken line are parasite diodes and must not be used.

Unit :  $\Omega$

## ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_a = -20 \sim +75^\circ C$ )

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CEO}$	Collector-emitter voltage	Output, H	-0.5 ~ +40	V
$I_C$	Collector current	Current per circuit output, L	150	mA
$V_I$	Input voltage		-40 ~ +40	V
$I_F$	Clamping diode forward current		150	mA
$V_R$	Clamping diode reverse voltage		40	V
$P_d$	Power dissipation	$T_a = 25^\circ C$ , when mounted on board	1.47	W
$T_{opr}$	Operating temperature		-20 ~ +75	$^\circ C$
$T_{stg}$	Storage temperature		-55 ~ +125	$^\circ C$

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**RECOMMENDED OPERATING CONDITIONS** (Unless otherwise noted, Ta = -20 ~ +75°C)

Symbol	Parameter	Limits			Unit
		min	typ	max	
Vo	Output voltage	0	—	40	V
IC	Collector current per channel	0	—	150	mA
	Percent duty cycle less than 50 %				
VIH	"H" input voltage	7	—	35	V
VIL	"L" input voltage	0	—	1	V

**ELECTRICAL CHARACTERISTICS** (Unless otherwise noted, Ta = -20 ~ +75°C)

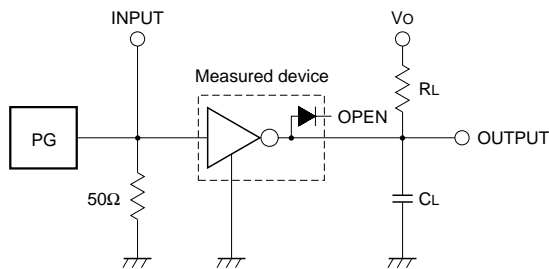
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ*	max	
V (BR) CEO	Collector-emitter breakdown voltage	ICEO = 100μA	40	—	—	V
VCE (sat)	Collector-emitter saturation voltage	VI = 7V, IC = 150mA	—	1.1	1.7	V
		VI = 7V, IC = 100mA	—	1.0	1.4	
II	Input current	VI = 18V	—	0.9	1.8	mA
		VI = 35V	—	1.9	5.0	
IIR	Input reverse current	VI = -35V	—	—	-20	μA
VF	Clamping diode forward voltage	IF = 150mA	—	1.15	1.6	V
IR	Clamping diode reverse current	VR = 40V	—	—	100	μA
hFE	DC amplification factor	VCE = 4V, IC = 150mA, Ta = 25°C	800	2500	—	—

\* : The typical values are those measured under ambient temperature (Ta) of 25°C. There is no guarantee that these values are obtained under any conditions.

**SWITCHING CHARACTERISTICS** (Unless otherwise noted, Ta = 25°C)

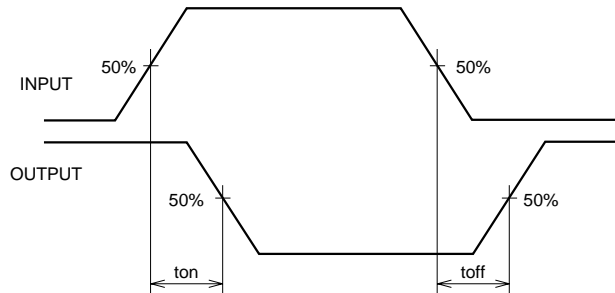
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
ton	Turn-on time	CL = 15pF (note 1)	—	35	—	ns
toff	Turn-off time		—	300	—	ns

**NOTE 1 TEST CIRCUIT**



- (1) Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, ZO = 50Ω, VP = 7VP-P
- (2) Input-output conditions : RL = 67.5Ω, VO = 10V
- (3) Electrostatic capacity CL includes floating capacitance at connections and input capacitance at probes

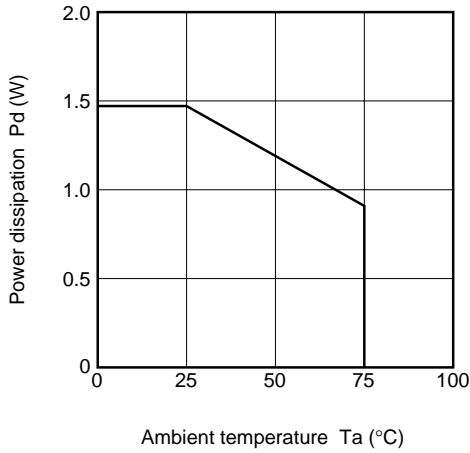
**TIMING DIAGRAM**



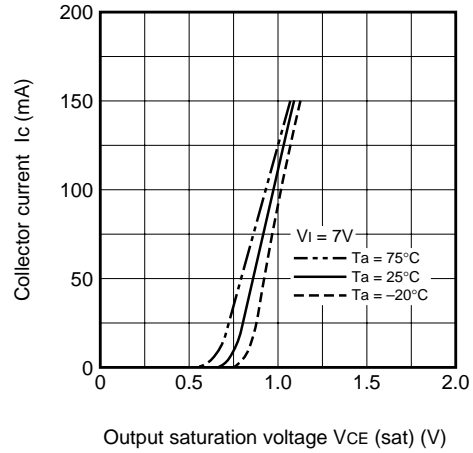
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TYPICAL CHARACTERISTICS

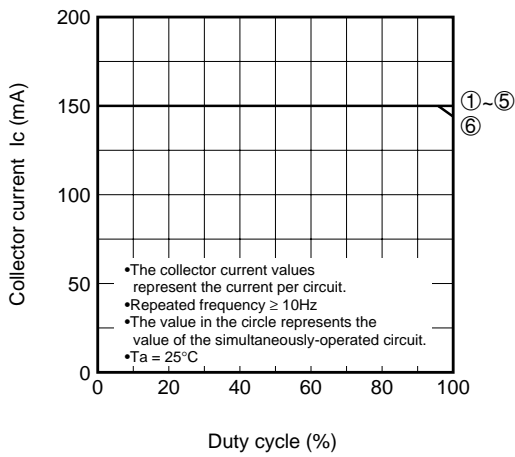
Thermal Derating Factor Characteristics



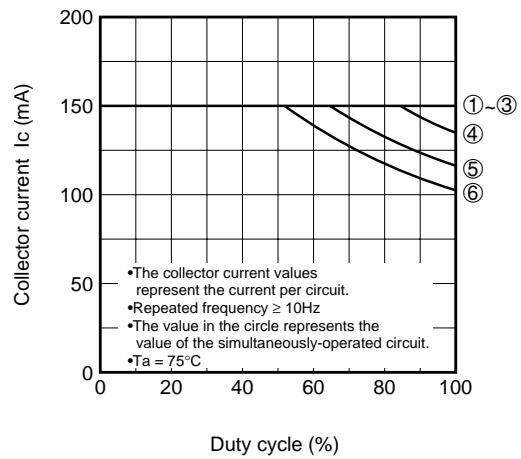
Output Saturation Voltage Collector Current Characteristics



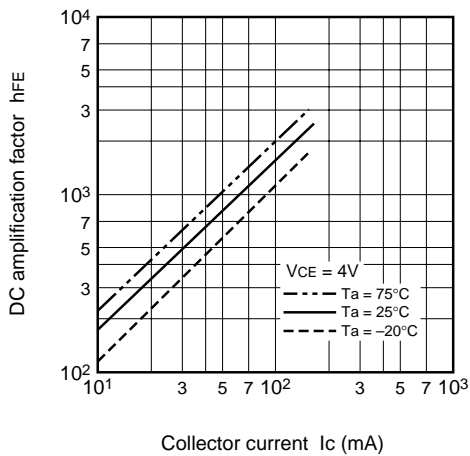
Duty-Cycle-Collector Characteristics



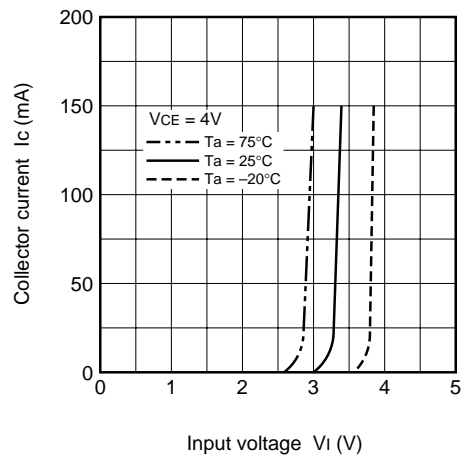
Duty-Cycle-Collector Characteristics



DC Amplification Factor Collector Current Characteristics



Grounded Emitter Transfer Characteristics



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