

<TRANSISTOR ARRAY>

# M54522FP

## 8-UNIT 400mA DARLINGTON TRANSISTOR ARRAY WITH CLAMP DIODE SINK TYPE

### DESCRIPTION

M54522FP is an eight-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 ( $I_{c(max)} = 400mA$ )
- With clamping diodes
- Driving available with PMOS IC output

### APPLICATIONS

Drives of relays and printers, digit drives of indication elements (LEDs and lamps), and interfaces between microcomputer output and high-current or high-voltage systems

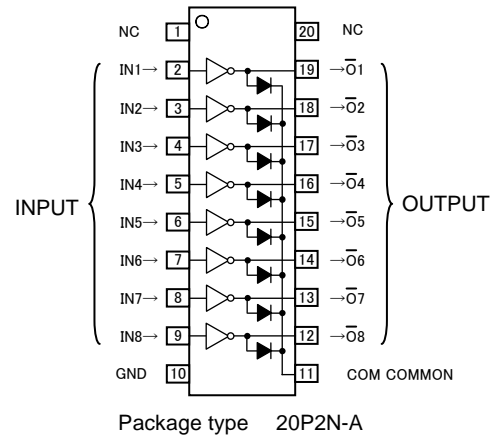
### FUNCTION

The M54522FP each have eight circuits consisting of NPN Darlington transistors. This ICs have resistance of 20k $\Omega$  between input transistor bases and input pins.

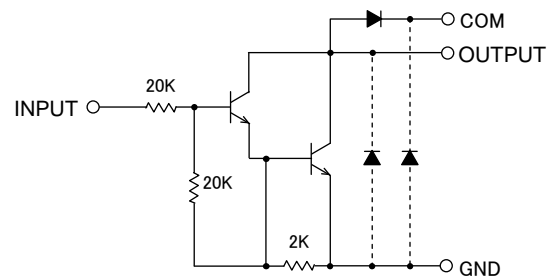
A spike-killer clamping diode is provided between each output pin (collector) and COM pin. The output transistor emitters are all connected to the GND pin (pin 10).

The collector current is 400mA maximum. Collector-emitter supply voltage is 40V maximum.

### PIN CONFIGURATION



### CIRCUIT DIAGRAM



The eight circuits share the COM and GND.

The diode, indicated with the dotted line, is parasitic, and cannot 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
$I_C$	Output current	Current per circuit output, L	400	mA
$V_i$	Input voltage		-0.5 ~ +40	V
$I_F$	Clamping diode forward current		400	mA
$V_R$	Clamping diode reverse voltage		40	V
$P_d$	Power dissipation	$T_a = 25^\circ C$ , when mounted on board	1.10	W
$T_{opr}$	Operating temperature		-20 ~ +75	$^\circ C$
$T_{stg}$	Storage temperature		-55 ~ +125	$^\circ C$

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**RECOMMENDED OPERATING** (Unless otherwise noted,  $T_a = -20 \sim +75^\circ\text{C}$ )

Symbol	Parameter		Limits			Unit
			min	typ	max	
$V_o$	Output voltage		0	—	40	V
$I_c$	Collector current (Current per 1 circuit when 8 circuits are coming on simultaneously)	Duty Cycle no more than 5%	0	—	400	mA
		Duty Cycle no more than 20%	0	—	200	
$V_{IH}$	“H” input voltage	$I_c \leq 400\text{mA}$	8	—	30	V
		$I_c \leq 200\text{mA}$	4	—		
$V_{IL}$	“L” input voltage		0	—	0.5	V

**ELECTRICAL CHARACTERISTICS** (Unless otherwise noted,  $T_a = -20 \sim +75^\circ\text{C}$ )

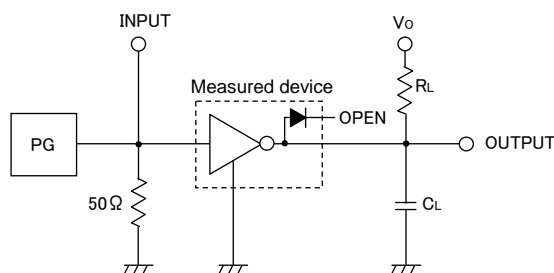
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ *	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_{CEO} = 100 \mu\text{A}$	40	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$V_I = 8\text{V}, I_c = 400\text{mA}$	—	1.15	2.4	V
		$V_I = 4\text{V}, I_c = 200\text{mA}$	—	0.95	1.6	
$I_i$	Input current	$V_I = 17\text{V}$	0.3	0.85	1.8	mA
$V_F$	Clamping diode forward voltage	$I_F = 400\text{mA}$	—	1.5	2.4	V
$I_R$	Clamping diode reverse current	$V_R = 40\text{V}$	—	—	100	$\mu\text{A}$
$h_{FE}$	DC amplification factor	$V_{CE} = 4\text{V}, I_c = 300\text{mA}, T_a = 25^\circ\text{C}$	1000	8000	—	—

\* : The typical values are those measured under ambient temperature ( $T_a$ ) of  $25^\circ\text{C}$ .  
There is no guarantee that these values are obtained under any conditions.

**SWITCHING CHARACTERISTICS** (Unless otherwise noted,  $T_a = 25^\circ\text{C}$ )

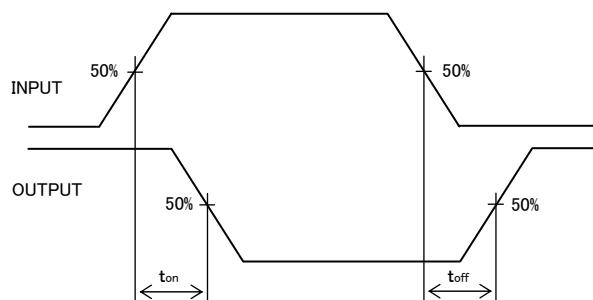
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$t_{on}$	Turn-on time	$C_L = 15\text{pF}$ (note 1)	—	30	—	ns
$t_{off}$	Turn-off time		—	930	—	ns

**NOTE 1 TEST CIRCUIT**



- (1) Pulse generator (PG) characteristics: PRR = 1kHz,  $t_w = 10 \mu\text{s}$ ,  $t_r = 6\text{ns}$ ,  $t_f = 6\text{ns}$ ,  $Z_o = 50 \Omega$ ,  $V_{IN} = 0$  to 8V
- (2) Input-output conditions :  $R_L = 25 \Omega$ ,  $V_o = 10\text{V}$
- (3) Electrostatic capacity  $C_L$  includes floating capacitance at connections and input capacitance at probes

**TIMING DIAGRAM**

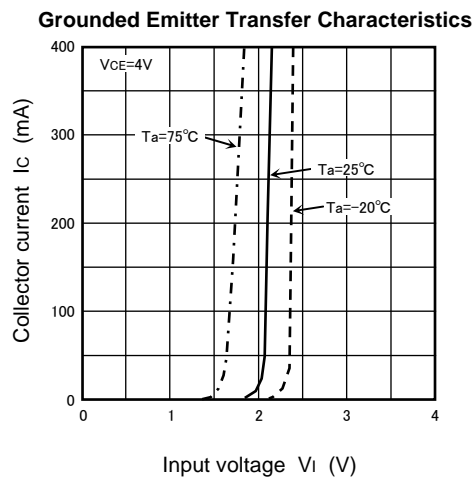
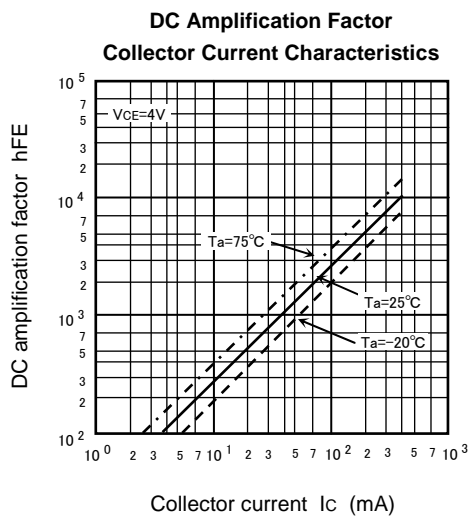
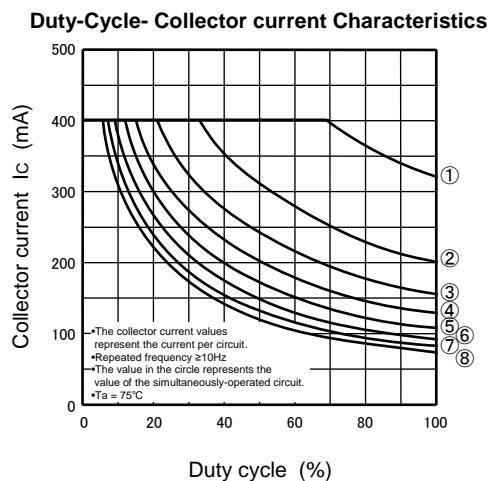
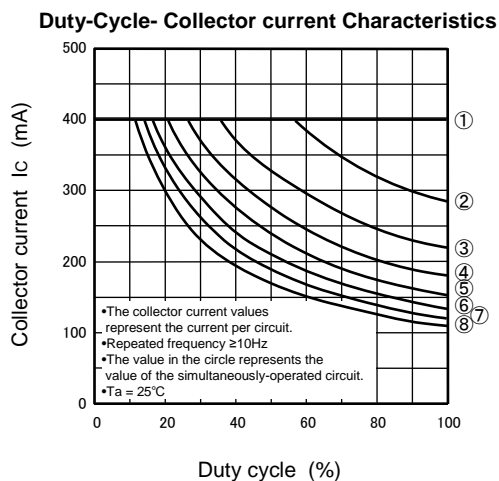
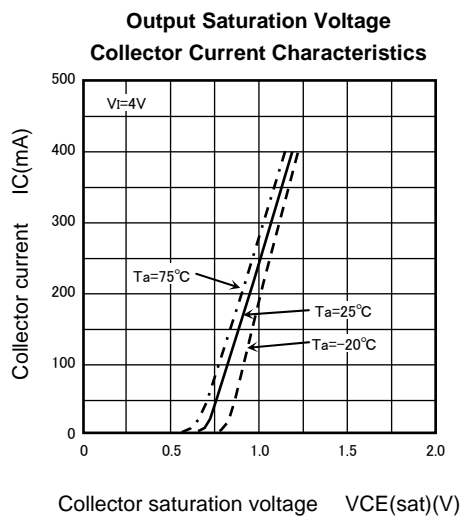
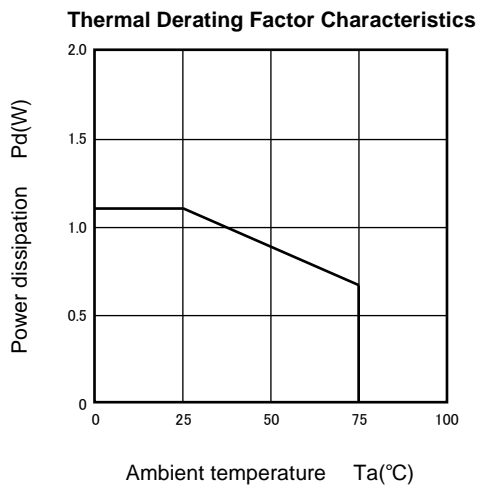


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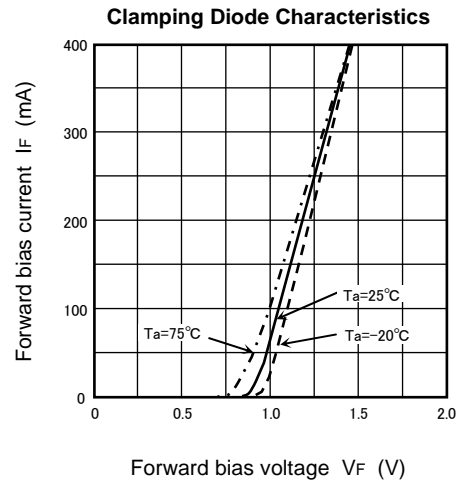
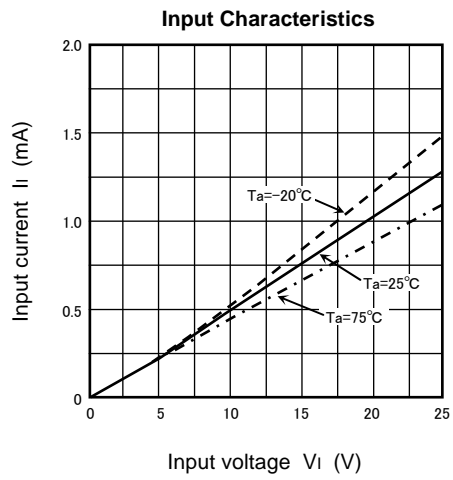
TYPICAL CHARACTERISTICS



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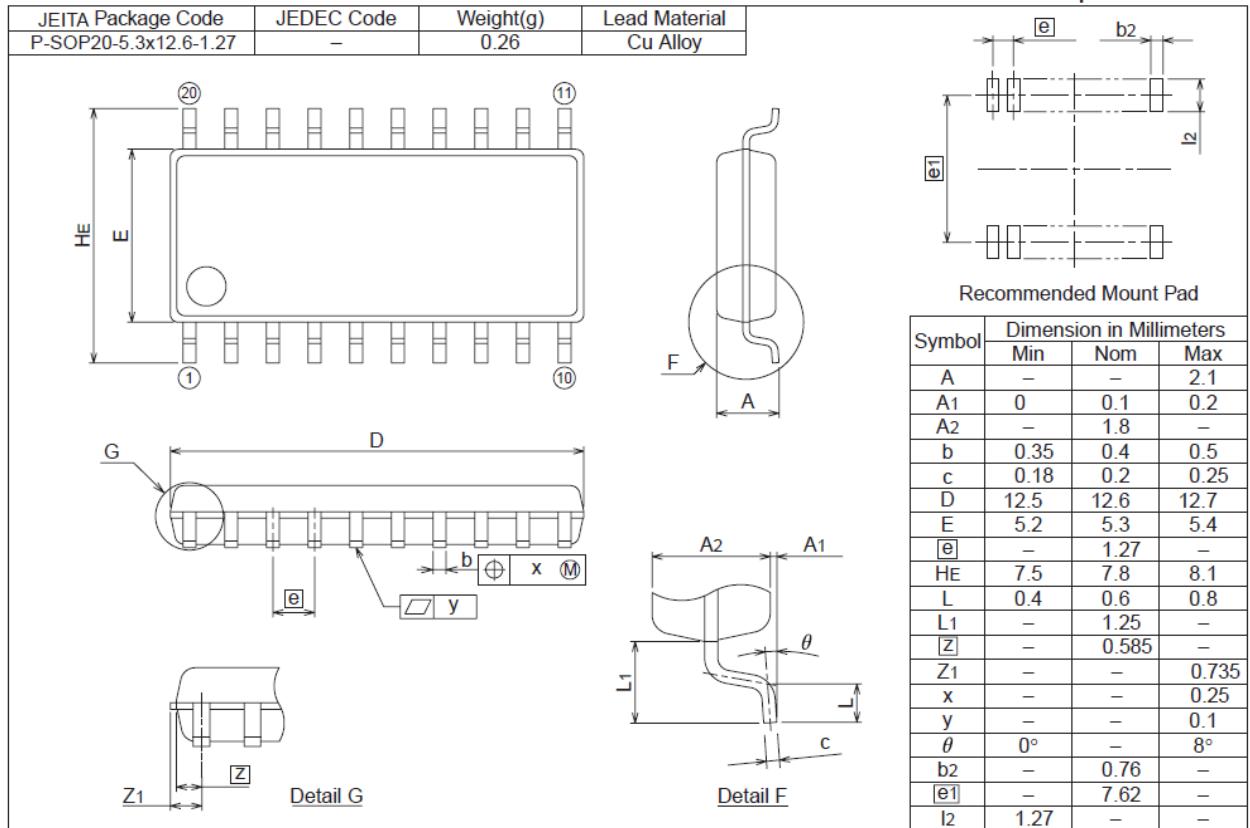
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PACKAGE OUTLINE

## 20P2N-A

JEITA Package Code	JEDEC Code	Weight(g)	Lead Material
P-SOP20-5.3x12.6-1.27	-	0.26	Cu Alloy

Plastic 20pin 300mil SOP



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