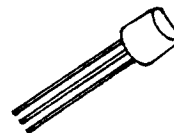
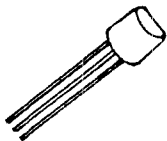


# SILICON SIGNAL TRANSISTORS GENERAL PURPOSE AMPLIFIERS TO-92 PACKAGE



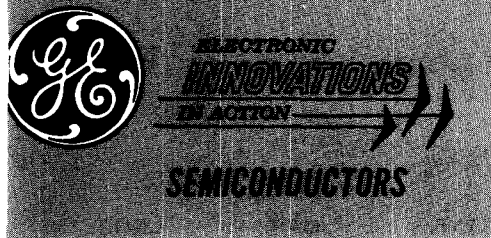
Device	Type	BV <sub>CEO</sub> @ 10mA (V)		h <sub>FE</sub> @ I <sub>C</sub> (mA)		V <sub>CE(sat)</sub>			f <sub>T</sub> Typical (MHz)	C <sub>cb</sub> @ 10V 1 MHz Typical (P <sub>F</sub> )	I <sub>C</sub> Continuous (mA)	P <sub>T</sub> @ 25°C (mW)	
		Min.	Max.	Min.	Max.	V <sub>CE</sub> (V)	Max. @ I <sub>C</sub> (mA)	I <sub>B</sub> (mA)					
GES5819	PNP	40	150	300	2	2	.75	500	50	150	8.0	750	500
GES5820	NPN	60	60	160	2	2	.75	500	50	125	6.0	750	500
GES5821	PNP	60	60	160	2	2	.75	500	50	125	8.0	750	500
MPSA05	NPN	60	50	—	100	1	.25	100	10	100	7.0	500	625
MPSA06	NPN	80	50	—	100	1	.25	100	10	100	7.0	500	625
MPSA12	NPN	20	20,000	—	10	5	1.0	10	.01	50	4.0	500	625
MPSA13	NPN	30	10,000	—	100	5	1.5	100	.1	50	4.0	500	625
MPSA14	NPN	30	20,000	—	100	5	1.5	100	.1	50	4.0	500	625
MPSA20	NPN	40	40	400	5	10	.25	10	1	140	2.0	100	350
MPSA55	PNP	60	50	—	100	1	.25	100	10	100	11.0	500	625
MPSA56	PNP	80	50	—	100	1	.25	100	10	100	11.0	500	625
MPSA65	PNP	30	50,000	—	10	5	1.5	10	.1	100	6.0	300	625
MPSA66	PNP	30	75,000	—	10	5	1.5	10	.1	100	6.0	300	625
MPS3638	PNP	25	30	—	50	1	.25	50	2.5	125	5.0	500	350
MPS3638A	PNP	25	100	—	50	1	.25	50	2.5	175	5.0	500	350
MPS3702	PNP	25	60	300	50	5	.25	50	5	150	5.0	200	350
MPS3703	PNP	30	30	150	50	5	.25	50	5	150	5.0	200	350
MPS3704	NPN	30	100	300	50	2	.6	100	5	100	6.0	800	350
MPS3705	NPN	30	50	150	50	2	.8	100	5	100	6.0	800	350
MPS3706	NPN	20	30	600	50	2	1.0	100	5	100	6.0	800	350
MPS5172	NPN	25	100	500	10	10	.25	10	1	100	5.0	100	350
MPS6076	PNP	25	100	500	10	10	.25	10	1	100	5.0	100	350
MPS6512	NPN	30	50	100	2	10	.5	50	5	275	2.0	100	350
MPS6513	NPN	30	90	180	2	10	.5	50	5	275	2.0	100	350
MPS6514	NPN	25	150	300	2	10	.5	50	5	425	2.0	100	350
MPS6515	NPN	25	250	500	2	10	.5	50	5	425	2.0	100	350
MPS6516	PNP	40	50	100	2	10	.5	50	5	225	2.5	100	350
MPS6517	PNP	40	90	180	2	10	.5	50	5	225	2.5	100	350
MPS6518	PNP	40	150	300	2	10	.5	50	5	350	2.5	100	350
MPS6519	PNP	25	250	500	2	10	.5	50	5	350	2.5	100	350
MPS6530	NPN	40	25	—	500	10	.5	100	10	250	3.5	600	350
MPS6531	NPN	40	60	—	500	10	.3	100	10	250	3.5	600	350
MPS6532	NPN	30	30	—	100	1	.5	100	10	250	3.5	600	350
MPS6533	PNP	40	25	—	500	10	.5	100	10	350	5.0	600	350
MPS6534	PNP	40	50	—	500	10	.3	100	10	350	5.0	600	350
MPS6535	PNP	30	30	—	100	1	.5	100	10	350	5.0	600	350
MPS6565	NPN	45	40	160	10	10	.4	10	1	225	2.0	200	350
MPS6566	NPN	45	100	100	400	10	.4	10	1	225	2.0	200	350
D39C1-6	PNP	25/40	2,000	70,000	—	2	1.5	500	.5	90	5.0	500	500
D38H1-6	NPN	60/80	60	500	10	1	.125	100	10	100	7.0	500	500
D39J1-6	PNP	60/80	60	500	10	1	.26	100	10	80	10.0	500	500
D38L1-6	NPN	25/40	2,000	70,000	2	5	1.75	600	.5	90	5.0	500	500
D38S1-10	NPN	30/60	400	3,000	10	5	.1	10	.5	200	2.0	100	400
D38Y1-3	NPN	200/300	30	—	20	10	1.0	40	4	100	5.0	100	500
D38W5-11	NPN	80	150	1,200	.1	5	.1	10	1	250	2.0	100	400



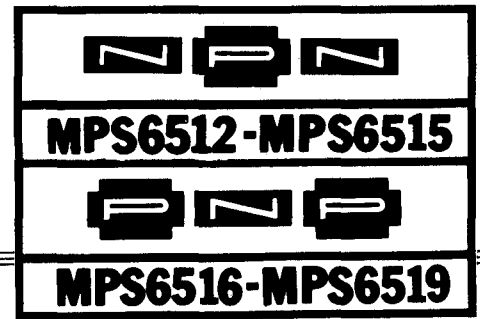


## SILICON SIGNAL TRANSISTORS COMPLEMENTARY PAIRS TO-92 PACKAGE

DEVICE		BV <sub>CEO</sub> (V)	h <sub>FE</sub>		V <sub>CE(SAT)</sub>		COMPLEMENT
NPN	PNP		MIN.-MAX.	@ I <sub>C</sub> , V <sub>CE</sub> (V)	(V) MAX.	@ I <sub>C</sub> , I <sub>B</sub>	
MPS A05		60	50-	100mA, 1	0.25	100mA, 10mA	MPS A55
MPS A06		80	50-	100mA, 1	0.25	100mA, 10mA	MPS A56
	MPS A55	60	50-	100mA, 1	0.25	100mA, 10mA	MPS A05
	MPS A56	80	50-	100mA, 1	0.25	100mA, 10mA	MPS A06
	MPS3702	25	60-300	50mA, 5	0.25	50mA, 5mA	MPS3704
	MPS3703	30	30-150	50mA, 5	0.25	50mA, 5mA	MPS3705
MPS3704		30	100-300	50mA, 2	0.6	100mA, 5mA	MPS3702
MPS3705		30	50-150	50mA, 2	0.8	100mA, 5mA	MPS3703
MPS3706		20	30-600	50mA, 2	1.0	100mA, 5mA	MPS3702
MPS6512		30	50-100	2mA, 10	0.5	50mA, 5mA	MPS6516
MPS6513		30	90-180	2mA, 10	0.5	50mA, 5mA	MPS6517
MPS6514		25	150-300	2mA, 10	0.5	50mA, 5mA	MPS6518
MPS6515		25	250-500	2mA, 10	0.5	50mA, 5mA	MPS6519
	MPS6516	40	50-100	2mA, 10	0.5	50mA, 5mA	MPS6512
	MPS6517	40	90-180	2mA, 10	0.5	50mA, 5mA	MPS6513
	MPS6518	40	150-300	2mA, 10	0.5	50mA, 5mA	MPS6514
	MPS6519	25	250-500	2mA, 10	0.5	50mA, 5mA	MPS6515
MPS6530		40	40-120	100mA, 1	0.5	100mA, 10mA	MPS6533
MPS6531		40	90-270	100mA, 1	0.3	100mA, 10mA	MPS6534
MPS6532		30	30-	100mA, 1	0.5	100mA, 10mA	MPS6535
	MPS6533	40	40-120	100mA, 1	0.5	100mA, 10mA	MPS6530
	MPS6534	40	90-270	100mA, 1	0.3	100mA, 10mA	MPS6531
	MPS6535	30	30-	100mA, 1	0.5	100mA, 10mA	MPS6532
MPS5172		25	100-500	10mA, 10	0.25	10mA, 1mA	MPS6076
	MPS6076	25	100-500	10mA, 10	0.25	10mA, 1mA	MPS5172
D38H1-3		60	60-500	10mA, 1	0.125	100mA, 10mA	D39J1-3
	D39J1-3	60	60-500	10mA, 1	0.260	100mA, 10mA	D38H1-3
D38H4-6		80	60-500	10mA, 1	0.125	100mA, 10mA	D39J4-6
	D39J4-6	80	60-500	10mA, 1	0.260	100mA, 10mA	D38H4-6
D38L1-3		40	2K-70K	2mA, 5	1.5	500mA, 5mA	D39C1-3
	D39C1-3	40	2K-70K	2mA, 5	1.75	500mA, 5mA	D38L1-3
D38L4-6		25	2K-70K	2mA, 5	1.5	500mA, 5mA	D39C4-6
	D39C4-6	25	2K-70K	2mA, 5	1.75	500mA, 5mA	D38L4-6



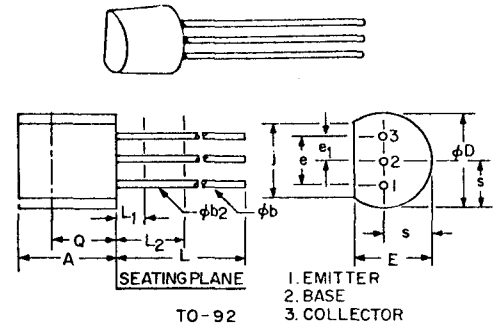
# Silicon Transistors



These Silicon Planar Epitaxial Passivated Complementary Transistors are designed for general purpose amplifier applications. Polarities are absolute, observe PNP/NPN polarity.

**absolute maximum ratings:** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

		NPN	PNP	UNITS
<b>Voltages</b>				
Collector to Emitter				
MPS6512, 13	$V_{CEO}$	30	—	Volts
MPS6514, 15	$V_{CEO}$	25	—	Volts
MPS6516, 17, 18	$V_{CEO}$	—	40	Volts
MPS6519	$V_{CEO}$	—	25	Volts
Collector to Base				
MPS6512, 13, 14, 15	$V_{CBO}$	40	—	Volts
MPS6516, 17, 18	$V_{CBO}$	—	40	Volts
MPS6519	$V_{CBO}$	—	25	Volts
Emitter to Base	$V_{EBO}$	4	4	Volts
<b>Current</b>				
Collector	$I_C$	100	100	mA
<b>Dissipation</b>				
Total Power $T_A \leq 25^\circ\text{C}$	$P_T$	350	350	mW
Total Power $T_C \leq 25^\circ\text{C}$	$P_T$	1	1	Watt
Derating Factor $T_A > 25^\circ\text{C}$		2.8	2.8	mW/ $^\circ\text{C}$
Derating Factor $T_C > 25^\circ\text{C}$		8	8	mW/ $^\circ\text{C}$
<b>Temperature</b>				
Operating	$T_J$	-55 $^\circ\text{C}$ to +150 $^\circ\text{C}$		$^\circ\text{C}$
Storage	$T_{STG}$	-55 $^\circ\text{C}$ to +150 $^\circ\text{C}$		$^\circ\text{C}$
Lead (1/16" $\pm$ 1/32" from case for 10 sec.)	$T_L$	260 $^\circ\text{C}$		$^\circ\text{C}$



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.320	5.330	.170	.210	
$\phi_b$	4.07	5.50	.016	.022	1,3
$\phi_{b2}$	4.07	4.82	.016	.019	3
$\phi_D$	4.450	5.200	.175	.205	
E	3.180	4.190	.125	.165	
e	2.410	2.670	.095	.105	
$e_1$	1.150	1.395	.045	.055	
J	3.430	4.320	.135	.170	
L	12.700	—	.500	—	1,3
$L_1$	—	1.270	—	.050	3
$L_2$	6.350	—	.250	—	3
Q	2.920	—	.115	—	2
s	2.030	2.670	.080	.105	

- NOTES:  
 1. THREE LEADS  
 2. CONTOUR OF PACKAGE UNCONTROLLED OUTSIDE THIS SIDE.  
 3. (THREE LEADS)  $\phi_{b2}$  APPLIES BETWEEN  $L_1$  AND  $L_2$ .  $\phi_b$  APPLIES BETWEEN  $L_2$  AND 12.70 MM (.500") FROM THE SEATING PLANE. DIAMETER IS UNCONTROLLED IN  $L_1$  AND BEYOND 12.70 MM (.500") FROM SEATING PLANE.

**electrical characteristics:** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

### MPS6512 Thru MPS6515 (NPN)

	SYMBOL	MIN.	MAX.	UNITS
<b>Static Characteristics</b>				
Collector-Emitter Breakdown Voltage				
( $I_C = .5\text{mA}$ , $I_B = 0$ )	MPS6512, 13	$V_{(BR)CEO}$	30	—
	MPS6514, 15	$V_{(BR)CEO}$	25	—
Emitter-Base Breakdown Voltage				
( $I_E = 10\mu\text{A}$ , $I_C = 0$ )		$V_{(BR)EBO}$	4	—
Collector Cutoff Current				
( $V_{CB} = 30\text{V}$ , $I_E = 0$ )		$I_{CBO}$	—	50 $\eta\text{A}$
( $V_{CB} = 30\text{V}$ , $I_E = 0$ , $T_A = 60^\circ\text{C}$ )		$I_{CBO}$	—	1 $\mu\text{A}$

MPS6512-MPS6515
MPS6516-MPS6519

MPS6512 Thru MPS6515 (NPN)

	SYMBOL	MIN.	TYP.	MAX.	UNITS
<b>Static Characteristics (continued)</b>					
Forward Current Transfer Ratio					
(I <sub>C</sub> = 2mA, V <sub>CE</sub> = 10V)					
MPS6512	h <sub>FE</sub>	50	—	100	
MPS6513	h <sub>FE</sub>	90	—	180	
MPS6514	h <sub>FE</sub>	150	—	300	
MPS6515	h <sub>FE</sub>	250	—	500	
(I <sub>C</sub> = 100mA, V <sub>CE</sub> = 10V)					
MPS6512	†h <sub>FE</sub>	30	—		
MPS6513	†h <sub>FE</sub>	60	—		
MPS6514	†h <sub>FE</sub>	90	—		
MPS6515	†h <sub>FE</sub>	150	—		
Collector-Emitter Saturation Voltage					
(I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA)					
	†V <sub>CE(sat)</sub>	—	—	.5	Volts
<b>Dynamic Characteristics</b>					
Current Gain, Bandwidth Product					
(I <sub>C</sub> = 2mA, V <sub>CE</sub> = 10V, f = 100 MHz)					
MPS6512, 13	f <sub>T</sub>	—	250	—	MHz
MPS6514, 15	f <sub>T</sub>	—	390	—	
(I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V, f = 100 MHz)					
MPS6512, 13	f <sub>T</sub>	—	330	—	
MPS6514, 15	f <sub>T</sub>	—	480	—	
Collector-Base Capacitance					
(V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 100 kHz)					
	C <sub>ob</sub>	—	—	3.5	pF
Noise Figure					
(I <sub>C</sub> = 10μA, V <sub>CE</sub> = 5V, R <sub>s</sub> = 10K Ohms, BW = 15.7 kHz, f = 10 Hz to 10 kHz)					
	NF	—	2	—	dB

## MPS6515 Thru MPS6519 (PNP)

		SYMBOL	MIN.	TYP.	MAX.	UNITS
<b>Static Characteristics</b>						
Collector-Emitter Breakdown Voltage ( $I_C = .5\text{mA}$ , $I_B = 0$ )						
	MPS6516, 17, 18	$V_{(BR)CEO}$	40	—	—	Volts
	MPS6519	$V_{(BR)CEO}$	25	—	—	Volts
Emitter-Base Breakdown Voltage ( $I_E = 10\mu\text{A}$ , $I_C = 0$ )						
		$V_{(BR)EBO}$	4	—	—	Volts
Collector Cutoff Current ( $V_{CB} = 30\text{V}$ , $I_E = 0$ )						
	MPS6516, 17, 18	$I_{CBO}$	—	—	50	$\eta\text{A}$
	MPS6519	$I_{CBO}$	—	—	50	$\eta\text{A}$
	MPS6516, 17, 18	$I_{CBO}$	—	—	1	$\mu\text{A}$
	MPS6519	$I_{CBO}$	—	—	1	$\mu\text{A}$
Forward Current Transfer Ratio ( $I_C = 2\text{mA}$ , $V_{CE} = 10\text{V}$ )						
	MPS6516	$h_{FE}$	50	—	100	
	MPS6517	$h_{FE}$	90	—	180	
	MPS6518	$h_{FE}$	150	—	300	
	MPS6519	$h_{FE}$	250	—	500	
( $I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$ )						
	MPS6516	$\dagger h_{FE}$	30	—	—	
	MPS6517	$\dagger h_{FE}$	60	—	—	
	MPS6518	$\dagger h_{FE}$	90	—	—	
	MPS6519	$\dagger h_{FE}$	150	—	—	
Collector-Emitter Saturation Voltage ( $I_C = 50\text{mA}$ , $I_B = 5\text{mA}$ )						
		$\dagger V_{CE(sat)}$	—	—	.5	Volts
<b>Dynamic Characteristics</b>						
Current Gain Bandwidth Product ( $I_C = 2\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 100\text{MHz}$ )						
	MPS6516, 17	$f_T$	—	200	—	MHz
	MPS6518, 19	$f_T$	—	340	—	
( $I_C = 10\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 100\text{MHz}$ )						
	MPS6516, 17	$f_T$	—	270	—	
	MPS6518, 19	$f_T$	—	420	—	
Collector-Base Capacitance ( $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 100\text{KHz}$ )						
		$C_{ob}$	—	—	4	pF
Noise Figure ( $I_C = 10\mu\text{A}$ , $V_{CE} = 5\text{V}$ , $R_s = 10\text{K}\Omega$ BW = 15.7kHz, $f = 10\text{Hz}$ to $10\text{kHz}$ )						
			—	2	—	dB

$\dagger$  Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .