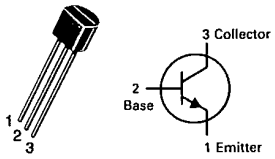
MPS929
MPS930A

CASE 29-04, STYLE 1
TO-92 (TO-226AA)



AMPLIFIER TRANSISTOR

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	MPS929	MPS930A	Unit
Collector-Emitter Voltage	V_{CEO}	45		Vdc
Collector-Base Voltage	V_{CBO}	45	60	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	6.0	Vdc
Collector Current — Continuous	I_C	100		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W

Refer to MPS3903 for additional graphs.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(1) (I_C = 10 mAdc, I_B = 0)		$V_{(BR)CEO}$	45	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	MPS929 MPS930A	$V_{(BR)CBO}$	45 60	— —	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	MPS929 MPS930A	$V_{(BR)EBO}$	5.0 6.0	— —	Vdc
Collector Cutoff Current (V_{CE} = 5.0 Vdc, I_B = 0)		I_{CEO}	—	2.0	nAdc
Collector Cutoff Current (V_{CB} = 45 Vdc, I_E = 0)	MPS929 MPS930A	I_{CBO}	— —	10 2.0	nAdc
Collector Cutoff Current (V_{CE} = 45 Vdc, V_{BE} = 0)	MPS929 MPS930A	I_{CES}	— —	10 2.0	nAdc
(V_{CE} = 45 Vdc, V_{BE} = 0, T_A = 125°C)	MPS929 MPS930A		— —	10 2.0	μAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)	MPS929 MPS930A	I_{EBO}	— —	10 2.0	nAdc
ON CHARACTERISTICS					
DC Current Gain(1) (I_C = 1.0 μAdc, V_{CE} = 5.0 Vdc)	MPS930A	h_{FE}	60	—	—
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc)	MPS929 MPS930A		40 100	120 300	
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc, T_A = −55°C)	MPS929 MPS930A		10 30	— —	
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc)	MPS929 MPS930A		60 150	— —	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	MPS929 MPS930A		— —	350 600	

MPS929, MPS930A

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
Collector-Emitter Saturation Voltage(1) (I_C = 10 mAdc, I_B = 0.5 mAdc)	MPS929 MPS930A	$V_{CE(sat)}$	— —	1.0 0.5	Vdc
Base-Emitter Saturation Voltage(1) (I_C = 10 mAdc, I_B = 0.5 mAdc)	MPS929 MPS930A	$V_{BE(sat)}$	0.6 0.7	1.0 0.9	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 500 μAdc, V_{CE} = 5.0 Vdc, f = 30 MHz)	MPS929 MPS930A	f_T	30 45	— —	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)	MPS929 MPS930A	C_{obo}	— —	8.0 6.0	pF
Input Impedance (I_E = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{ib}	25	32	Ohms
Voltage Feedback Ratio (I_E = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{rb}	—	600	X 10^{-6}
Small-Signal Current Gain (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	MPS929 MPS930A	h_{fe}	60 150	350 600	—
Output Admittance (I_E = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{ob}	—	1.0	μmho
Noise Figure (I_C = 10 μAdc, V_{CE} = 5.0 Vdc, R_S = 10 kohms, f = 10 Hz to 15.7 kHz)	MPS929 MPS930A	NF	— —	4.0 3.0	dB

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

TYPICAL CHARACTERISTICS

FIGURE 1 – DC CURRENT GAIN

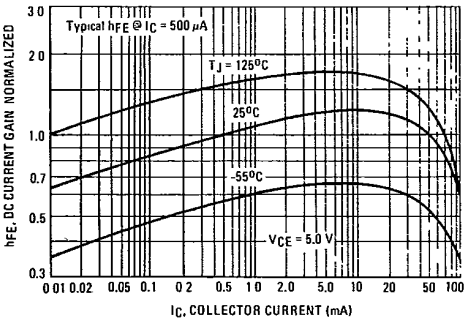


FIGURE 2 – "ON" VOLTAGES

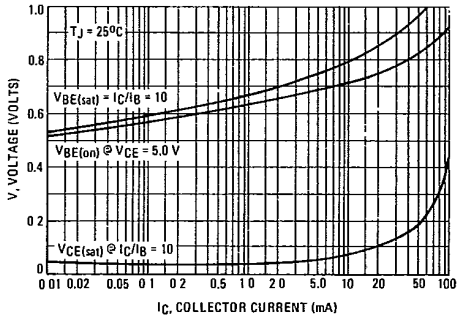


FIGURE 3 – COLLECTOR SATURATION REGION

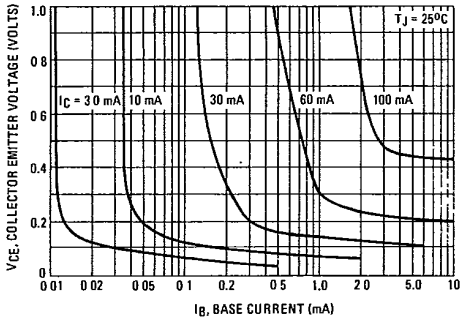


FIGURE 4 – TEMPERATURE COEFFICIENTS

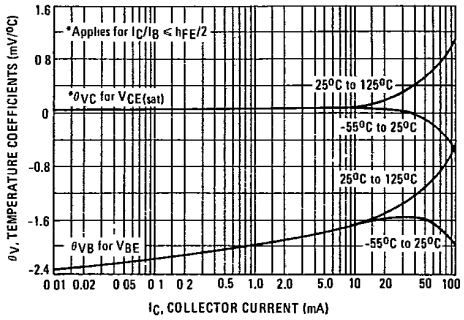


FIGURE 5 – CURRENT-GAIN – BANDWIDTH PRODUCT

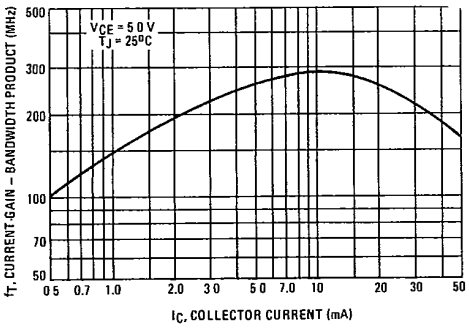
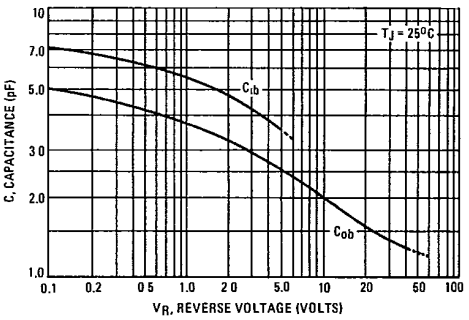
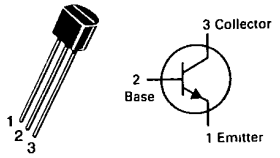


FIGURE 6 – CAPACITANCES



MPS3390, MPS3391, MPS3396 thru MPS3398

CASE 29-04, STYLE 1
TO-92 (TO-226AA)



GENERAL PURPOSE TRANSISTOR

NPN SILICON

Refer to 2N3903 for graphs.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	25	Vdc
Collector-Base Voltage	V_{CBO}	25	Vdc
Emitter-Base Voltage	V_{EBO}	5	Vdc
Collector Current — Continuous	I_C	100	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

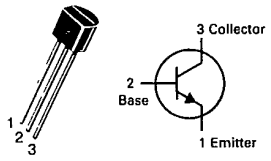
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)		$V_{(BR)CEO}$	25	—	V
Collector Cutoff Current (V_{CB} = 18 Vdc, I_E = 0)		I_{CBO}	—	0.1	μA
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)		I_{EBO}	—	0.1	μA
ON CHARACTERISTICS					
DC Current Gain (V_{CE} = 4.5 Vdc, I_C = 2.0 mAdc)	MPS3390	h_{FE}	400	800	—
	MPS3391		250	500	
	MPS3396		90	500	
	MPS3397		55	500	
	MPS3398		55	800	
SMALL-SIGNAL CHARACTERISTICS					
Output Capacitance (V_{CB} = 10 V, I_E = 0, f = 1.0 MHz)		C_{obo}	—	10	pF
Small-Signal Current Gain (V_{CE} = 4.5 V, I_C = 2.0 mA, f = 1.0 kHz)	MPS3390	h_{fe}	400	1250	—
	MPS3391		250	800	
	MPS3396		90	800	
	MPS3397		55	800	
	MPS3398		55	1250	

MPS5172

CASE 29-04, STYLE 1
TO-92 (TO-226AA)



AMPLIFIER TRANSISTOR

NPN SILICON

Refer to MPS3903 for graphs.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	25	Vdc
Collector-Base Voltage	V_{CBO}	25	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current — Continuous	I_C	100	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	25	—	—	Vdc
Collector Cutoff Current (V_{CB} = 25 Vdc, I_E = 0) (V_{CB} = 25 Vdc, I_E = 0, T_A = 100°C)	I_{CBO}	— —	— —	100 10	nAdc μAdc
Collector Cutoff Current (V_{CE} = 25 Vdc, V_{BE} = 0)	I_{CES}	—	—	100	nAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)	I_{EBO}	—	—	100	nAdc
ON CHARACTERISTICS					
DC Current Gain(1) (I_C = 10 mAdc, V_{CE} = 10 Vdc)	h_{FE}	100	—	500	—
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)	$V_{CE(sat)}$	—	—	0.25	Vdc
Base-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)	$V_{BE(sat)}$	—	0.75	—	Vdc
Base-Emitter On Voltage (I_C = 10 mAdc, V_{CE} = 10 Vdc)	$V_{BE(on)}$	0.5	—	1.2	Vdc
SMALL SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 2.0 mAdc, V_{CE} = 5.0 Vdc)	f_T	—	120	—	MHz
Collector-Base Capacitance (V_{CB} = 0, I_E = 0, f = 1.0 MHz)	C_{cb}	1.6	—	10	pF
Small Signal Current Gain (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{fe}	100	—	750	—

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.