MHQ2221, MHQ2222 (SILICON)
MPQ2221, MPQ2222

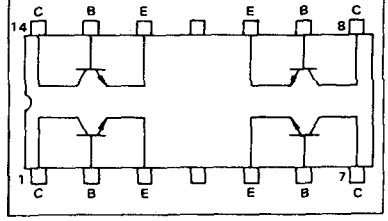
QUAD DUAL-IN-LINE
NPN SILICON ANNULAR
GENERAL-PURPOSE TRANSISTORS

. . . Designed for general-purpose switching circuits and DC to VHF amplifier applications.

- Choice of Ceramic or Plastic Package
- DC Current Gain Specified – 10 to 300 mAdc
- Low Collector-Cutoff Current – I_{CBO} = 50 nAdc (Max) @ V_{CB} = 50 Vdc
- High Collector Breakdown Voltages – BV_{CEO} = 40 Vdc (Min) BV_{CBO} = 60 Vdc (Min)
- Transistors Similar to 2N2218 thru 2N2222 Series
- TO-116 Packaging – Compact Size Compatible With IC Automatic Insertion Equipment
- MHQ2221 Available With BV_{CEO} = 60 Vdc on Specified Request

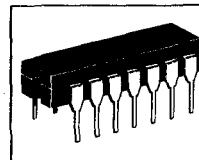
QUAD DUAL-IN-LINE
NPN SILICON
GENERAL-PURPOSE
TRANSISTORS

CONNECTION DIAGRAM

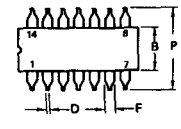


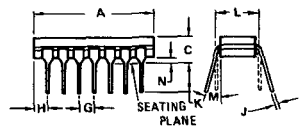
MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		Each Transistor	Total Device	
Collector-Emitter Voltage	V_{CEO}	40		Vdc
Collector-Base Voltage	V_{CB}	60		Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current – Continuous	I_C	500		mAdc
Total Power Dissipation @ T_A = 25°C	P_D	0.65	1.9	Watts
Derate above 25°C MHQ2221, MHQ2222		3.72	10.88	mW/°C
Derate above 25°C MPQ2221, MPQ2222		5.2	15.2	mW/°C
Operating and Storage Junction Temperature Range MHQ2221,22	T_J,T_{stg}	-65 to +200		°C
Operating and Storage Junction Temperature Range MPQ2221,22		-55 to +150		°C



MHQ2221, MHQ2222
CERAMIC
CASE 632-02
TO-116

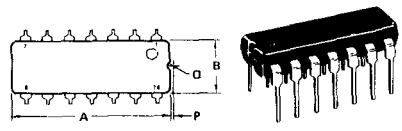




DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	16.8	19.9	0.660	0.785
B	5.59	7.11	0.220	0.280
C	–	5.08	–	0.200
D	0.381	0.564	0.015	0.023
F	0.77	1.77	0.030	0.070
G	2.54 BSC		0.100 BSC	
J	0.203	0.381	0.008	0.015
K	2.54	–	0.100	–
L	7.62 BSC		0.300 BSC	
M	–	15°	–	15°
N	0.51	0.76	0.020	0.030
P	–	8.25	–	0.325

All JEDEC dimensions and notes apply.

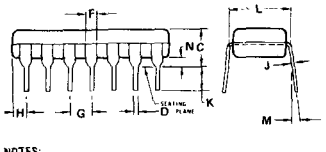
NOTE:
DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.



MPQ2221, MPQ2222

CASE 646

PLASTIC PACKAGE



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	18.16	18.80	0.715	0.740
B	6.10	6.60	0.240	0.260
C	4.06	4.57	0.160	0.180
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.32	1.83	0.052	0.072
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51	1.02	0.020	0.040
P	0.13	0.38	0.005	0.015
Q	0.51	0.76	0.020	0.030

NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL

MHQ2221, MHQ2222, MPQ2221, MPQ2222 (continued)

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage(1) (I_C = 10 mAdc, I_B = 0)		BV_{CEO}	40	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		BV_{CBO}	60	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		BV_{EBO}	5.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 50 Vdc, I_E = 0)		I_{CBO}	–	–	50	nAdc
Emitter Cutoff Current (V_{BE} = 3.0 Vdc, I_C = 0)		I_{EBO}	–	–	50	nAdc
ON CHARACTERISTICS						
DC Current Gain(1)		h_{FE}				–
(I_C = 10 mAdc, V_{CE} = 10 Vdc)	MHQ2221, MPQ2221		35	–	–	
	MHQ2222, MPQ2222		75	–	–	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)	MHQ2221, MPQ2221		40	–	–	
	MHQ2222, MPQ2222		100	–	–	
(I_C = 300 mAdc, V_{CE} = 10 Vdc)	MHQ2221, MPQ2221		20	–	–	
	MHQ2222, MPQ2222		30	–	–	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = 150 mAdc, I_B = 15 mAdc)			–	–	0.4	
(I_C = 300 mAdc, I_B = 30 mAdc)			–	–	1.6	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$				Vdc
(I_C = 150 mAdc, I_B = 15 mAdc)			–	–	1.3	
(I_C = 300 mAdc, I_B = 30 mAdc)			–	–	2.6	
DYNAMIC CHARACTERISTICS						
Current-Gain–Bandwidth Product (1) (I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)		f_T	200	350	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	–	4.5	8.0	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ib}	–	17	30	pF
SWITCHING CHARACTERISTICS (Figure 1)						
Turn-On Time (V_{CC} = 30 Vdc, $V_{BE(off)}$ = 0.5 Vdc, I_C = 150 mAdc, I_{B1} = 15 mAdc) (Figure 1)		t_{on}	–	25	–	ns
Turn-Off Time (V_{CC} = 30 Vdc, I_C = 150 mAdc, I_{B1} = I_{B2} = 15 mAdc) (Figure 2)		t_{off}	–	250	–	ns

(1)Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle = 2%.

FIGURE 1 – DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT

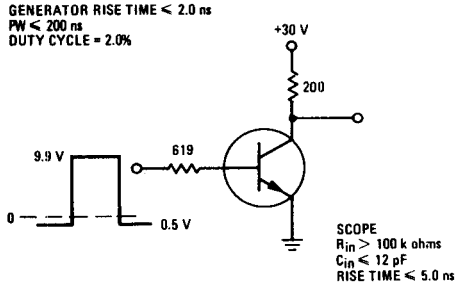


FIGURE 2 – STORAGE TIME AND FALL TIME EQUIVALENT TEST CIRCUIT