MHQ2369 (SILICON)
MPQ2369

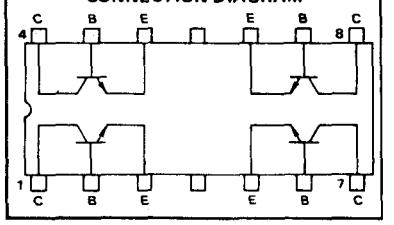
QUAD DUAL-IN-LINE NPN SILICON ANNULAR SWITCHING TRANSISTORS

. . . designed for low-current, high-speed switching and space saving applications.

- Choice of Ceramic or Plastic Package
- High Current-Gain–Bandwidth Product – f_T = 550 MHz (Typ) @ I_C = 10 mAdc
- Fast Switching Times – @ V_{CC} = 3.0 Vdc
  t_{on} = 9.0 ns (Typ)
  t_{off} = 15 ns (Typ)
- Low Saturation Voltage – $V_{CE(sat)}$ = 0.25 Vdc (Max) @ I_C = 10 mAdc
- Each Transistor Similar to 2N2369
- TO-116 Package – Compact Size Compatible With IC Automatic Insertion Equipment

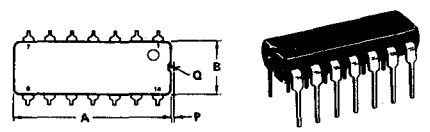
QUAD DUAL-IN-LINE NPN SILICON SWITCHING TRANSISTORS

CONNECTION DIAGRAM



MAXIMUM RATINGS

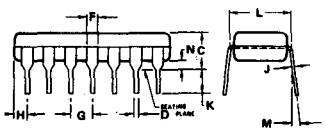
Rating		Symbol	Value		Unit
Collector-Emitter Voltage		V_{CEO}	15		Vdc
Collector-Base Voltage		V_{CB}	40		Vdc
Emitter-Base Voltage		V_{EB}	4.5		Vdc
Collector Current – Peak		I_C	500		mAdc
			Each Transistor	Total Device	
Total Device Dissipation @ T_A = 25°C		P_D	0.5	1.5	Watts
Derate above 25°C	MHQ2369		2.86	8.58	mW/°C
	MPQ2369		4.0	12	
Operating and Storage Junction Temperature Range	MHQ2369	T_J,T_{stg}	-65 to +200		°C
	MPQ2369		-55 to +150		



MPQ2369

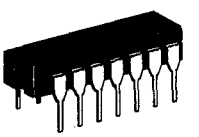
CASE 646

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

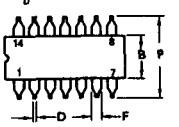


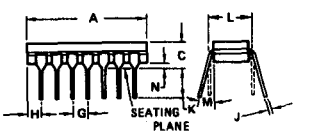
MHQ2369

CERAMIC

CASE 632-02

TO-116





DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	18.8	19.9	0.680	0.785
B	5.59	7.11	0.220	0.280
C	–	5.08	–	0.200
D	0.381	0.584	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	0.78	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.

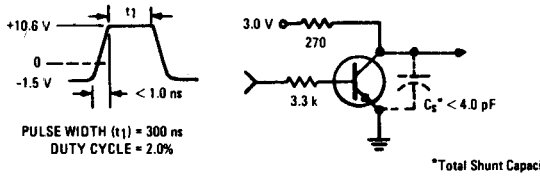
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(1) (I_C = 10 mAdc, I_B = 0)	BV_{CEO}	15	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	BV_{CBO}	40	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	BV_{EBO}	4.5	–	–	Vdc
Collector Cutoff Current (V_{CB} = 20 Vdc, I_E = 0)	I_{CBO}	–	–	0.4	μAdc
Emitter Cutoff Current (V_{BE} = 3.0 Vdc, I_C = 0)	I_{EBO}	–	–	0.5	μAdc
ON CHARACTERISTICS					
DC Current Gain(1) (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) (I_C = 100 mAdc, V_{CE} = 2.0 Vdc)	h_{FE}	40 20	– –	– –	–
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)	$V_{BE(sat)}$	–	–	0.9	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain–Bandwidth Product (1) (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	f_T	450	550	–	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 140 kHz)	C_{ob}	–	2.5	4.0	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 140 kHz)	C_{ib}	–	3.0	5.0	pF
SWITCHING CHARACTERISTICS					
Turn-On Time (V_{CC} = 3.0 Vdc, $V_{BE(off)}$ = 1.5 Vdc, I_C = 10 mAdc, I_{B1} = 3.0 mAdc)	t_{on}	–	9.0	–	ns
Turn-Off Time (V_{CC} = 3.0 Vdc, I_C = 10 mAdc, I_{B1} = 3.0 mAdc, I_{B2} = 1.5 mAdc)	t_{off}	–	15	–	ns

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

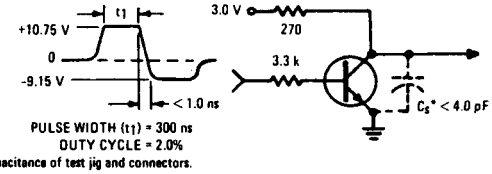
SWITCHING TIME EQUIVALENT TEST CIRCUITS

FIGURE 1 – t_{on} CIRCUIT



PULSE WIDTH (t_1) = 300 ns
DUTY CYCLE = 2.0%

FIGURE 2 – t_{off} CIRCUIT



PULSE WIDTH (t_1) = 300 ns
DUTY CYCLE = 2.0%

*Total Shunt Capacitance of test jig and connectors.