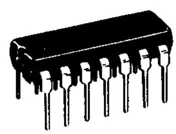
MPQ6100, MPQ6100A (SILICON)
MPQ6600, MPQ6600A

QUAD DUAL-IN-LINE SILICON ANNULAR COMPLEMENTARY PAIR TRANSISTORS

. . . designed for DC to VHF amplifier applications and complementary circuitry.

- DC Current Gain Specified – 100 μAdc to 10 mAdc
- Current-Gain—Bandwidth Product – f_T = 125 MHz (Typ) @ I_C = 0.5 mAdc
- NPN Transistor Similar to 2N2483 or 2N2484
- PNP Transistor Similar to 2N3798 or 2N3799
- MPQ6600,A Matching Characteristics Available as Specials on Q1-Q4 and Q2-Q3

QUAD DUAL-IN-LINE
SILICON
COMPLEMENTARY PAIR
TRANSISTORS

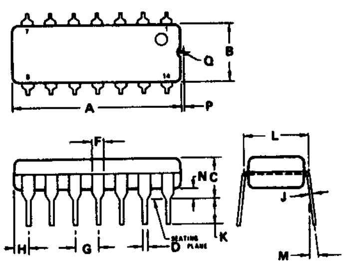


MAXIMUM RATINGS

Rating	Symbol	MPQ6100 MPQ6600	MPQ6100A MPQ6600A	Unit
Collector-Emitter Voltage	V_{CEO}	40	45	Vdc
Collector-Base Voltage	V_{CB}	60		Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current – Continuous	I_C	50		mAdc
		Each Transistor	Four Transistors Equal Power	
Power Dissipation @ T_A = 25°C (1) Derate above 25°C	P_D	500 4.0	900 7.2	mW mW/°C
Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	0.825 6.7	2.4 19.2	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic		Junction to Case	Junction to Ambient	Unit
Thermal Resistance	Each Die	134	250	°C/W
	Effective, 4 Die	52	151	°C/W
Coupling Factors	Q1-Q4 or Q2-Q3	34	70	%
	Q1-Q2 or Q3-Q4	2.0	26	%

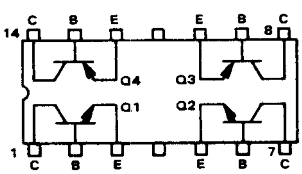


DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	18.16	18.80	0.715	0.740
B	6.10	6.60	0.240	0.260
C	4.06	4.57	0.160	0.180
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.32	1.83	0.052	0.072
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M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

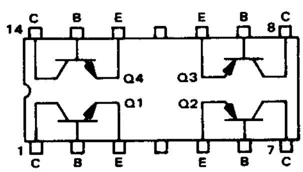
NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL

CASE 646

CONNECTION DIAGRAM



MPQ6100, MPQ6100A



MPQ6600, MPQ6600A

THERMAL COUPLING AND EFFECTIVE THERMAL RESISTANCE

In multiple chip devices, coupling of heat between die occurs. The junction temperature can be calculated as follows:

(1) $\Delta T_{J1} = R_{\theta 1} P_{D1} + R_{\theta 2} K_{\theta 2} P_{D2} + R_{\theta 3} K_{\theta 3} P_{D3} + R_{\theta 4} K_{\theta 4} P_{D4}$

Where ΔT_{J1} is the change in junction temperature of die 1
$R_{\theta 1}$ thru 4 is the thermal resistance of die 1 through 4
P_{D1} thru 4 is the power dissipated in die 1 through 4
$K_{\theta 2}$ thru 4 is the thermal coupling between die 1 and die 2 through 4.

An effective package thermal resistance can be defined as follows:

(2) $R_{\theta(EFF)} = \Delta T_{J1}/P_{DT}$

where: P_{DT} is the total package power dissipation.

Assuming equal thermal resistance for each die, equation (1) simplifies to

(3) $\Delta T_{J1} = R_{\theta 1} (P_{D1} + K_{\theta 2} P_{D2} + K_{\theta 3} P_{D3} + K_{\theta 4} P_{D4})$

For the conditions where $P_{D1} = P_{D2} = P_{D3} = P_{D4}$, $P_{DT} = 4 P_D$, equation (3) can be further simplified and by substituting into equation (2) results in

(4) $R_{\theta(EFF)} = R_{\theta 1}(1 + K_{\theta 2} + K_{\theta 3} + K_{\theta 4})/4$

Values for the coupling factors when either the case or the ambient is used as a reference are given in the table on page 1. If significant power is to be dissipated in two die, die at the opposite ends of the package should be used so that lowest possible junction temperatures will result.

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

Characteristic		Symbol	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage(1) (I_C = 10 mAdc, I_B = 0)	MPQ6100,6600 MPQ6100A,6600A	BV_{CEO}	40 45	– –	– –	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}	–	–	10	nAdc
ON CHARACTERISTICS (1)						
DC Current Gain		h_{FE}				–
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	MPQ6100,6600		50	95	–	
	MPQ6100A,6600A		100	200	–	
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc)	MPQ6100,6600		75	140	–	
	MPQ6100A,6600A		150	300	–	
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	MPQ6100,6600		75	140	–	
	MPQ6100A,6600A		150	300	–	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	MPQ6100,6600		60	110	–	
	MPQ6100A,6600A		125	275	–	
Collector-Emitter Saturation Voltage (I_C = 1.0 mAdc, I_B = 100 μAdc)		$V_{CE(sat)}$	–	0.1	0.25	Vdc
Base-Emitter Saturation Voltage (I_C = 1.0 mAdc, I_B = 100 μAdc)		$V_{BE(sat)}$	–	0.65	0.8	Vdc
DYNAMIC CHARACTERISTICS						
Current-Gain—Bandwidth Product (I_C = 500 μAdc, V_{CE} = 5.0 Vdc, f = 20 MHz)		f_T	50	125	–	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 100 kHz)	PNP NPN	C_{ob}	– –	1.2 1.8	4.0 4.0	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz)	PNP NPN	C_{ib}	– –	5.5 6.0	8.0 8.0	pF
Noise Figure (I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 10 kohms, f = 10 Hz to 15.7 kHz, BW = 10 kHz)		NF	–	4.0	–	dB

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