

SERIES TPQ QUAD TRANSISTOR ARRAYS

In Dual In-Line Plastic Packages

THE SPRAGUE Series TPQ quad transistor arrays are general-purpose silicon transistor arrays consisting of four independent transistors. Shown are eight NPN types, five PNP types, and nine NPN/PNP dual complementary pairs.

All of these devices are furnished in the industry standard TO-116 (or MO-001AA) 14-lead dual in-line plastic package. The molded package is identical to that used in most consumer integrated circuits and offers superior mechanical protection during insertion into printed wiring boards.

TYPICAL RATINGS (Max.)

Power Dissipation, P_D (each transistor).....	500 mW
(total package).....	1700 mW*
Operating Temperature Range, T_A	0°C to +85°C
Storage Temperature Range, T_S	-65°C to +150°C

*Derate at the rate of 1.79 mW/°C above $T_A = +55^\circ\text{C}$

STANDARD RATINGS

Type No.	V_{CB0}	V_{CE0}	V_{EB0}	I_{CB0}	D-C Current Gain, h_{FE}		f_T	C_{ob}	$V_{CE(SAT)}$	Similar			
	V	V	V	nA	Limits	@ I_C & V_{CE}					MHz	pF	mV @ I_C
	Min.	Min.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	mA			
Four NPN Devices - Figure 1													
TPQ2221	60	40	5	50	40	—	150	10	200	8.0	400	150	2N2221
TPQ2222	60	40	5	50	100	—	150	10	200	8.0	400	150	2N2222
TPQ2483	60	40	6	20	100	—	0.1	5	50	6.0	350	1.0	2N2483
TPQ2484	60	40	6	20	200	—	0.1	5	50	6.0	350	1.0	2N2484
TPQ3724	50	30	5	500	35	—	100	1	250	8.0	450	500	2N3724
TPQ3725	60	40	5	500	35	200	100	1	250	10.0	450	500	2N3725
TPQ3725A	70	50	5	500	40	—	100	1	200	10.0	450	500	2N3725A
TPQ3904	60	40	6	50	75	—	10	1	250	4.0	200	10	2N3904
Four PNP Devices - Figure 2													
TPQ2906	60	40	5	50	40	—	150	10	200	8.0	400	150	2N2906
TPQ2907	60	40	5	50	100	—	150	10	200	8.0	400	150	2N2907
TPQ3798	60	40	5	10	150	—	0.1	5	60	4.0	250	1.0	2N3798
TPQ3799	60	60	5	10	300	—	0.1	5	60	4.0	250	1.0	2N3799
TPQ3906	40	40	5	50	75	—	10	1	200	4.5	250	10	2N3906
Two NPN/Two PNP Devices - Figure 3													
TPQ6001	60	30	5	30	40	—	150	10	200	8.0	400	150	2N2221/2N2906
TPQ6002	60	30	5	30	100	—	150	10	200	8.0	400	150	2N2222/2N2907
TPQ6100	60	40	5	10	75	—	1.0	5	50	4.0	250	1.0	2N2483/2N3798
TPQ6100A	60	45	5	10	150	—	1.0	5	50	4.0	250	1.0	2N2484/2N3799
Two NPN/Two PNP Devices - Figure 4													
TPQ6501	60	30	5	30	40	—	150	10	200	8.0	400	150	2N2221/2N2906
TPQ6502	60	30	5	30	100	—	150	10	200	8.0	400	150	2N2222/2N2907
TPQ6600	60	40	5	10	75	—	1.0	5	50	4.0	250	1.0	2N2483/2N3798
TPQ6600A	60	45	5	10	150	—	1.0	5	50	4.0	250	1.0	2N2484/2N3799
TPQ6700	40	40	5	50	70	—	10	1	200	4.5	250	10	2N3904/2N3906

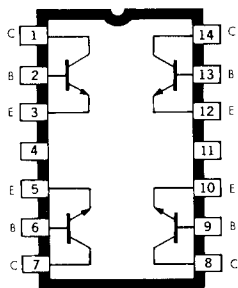


Figure 1

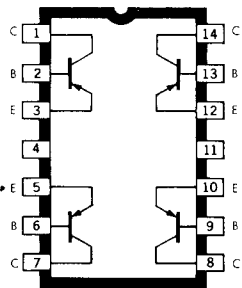


Figure 2

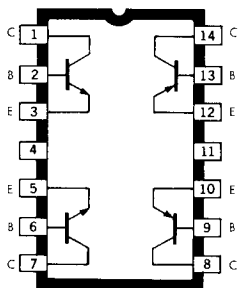


Figure 3

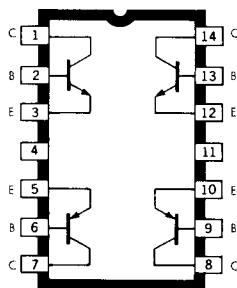


Figure 4

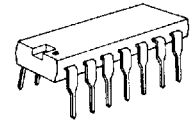
SERIES TPP MEDIUM POWER DARLINGTON ARRAYS

- Sprague Series TPP devices are medium-power Darlington arrays, consisting of 1, 2, 3, or 4 discrete Darlington chips in a single 14-pin DIP package.

These devices provide complements to Series TPQ quad transistor arrays. (See pages 96 through 99).

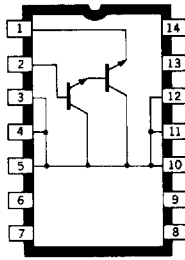
FOR PACKAGE DIMENSIONS, SEE PAGE 112.

Catalog Number	Polarity	$P_D(1)$ $T_A = 25^\circ\text{C}$ (W)	$V_{(BR)}$ CBO Volts	$V_{(BR)}$ CES Volts	$V_{(BR)}$ EBO Volts	I_{CBO} μA Max.	D-C CURRENT GAIN (h_{FE})				$V_{CE(SAT)}$		Pinning Diagram (Figure)		
							Conditions		Limits		I_C (A)	Max. Volts		I_C (A)	Max. Volts
							I_C (A)	V_{CE} Volts	Min.	Max.					
TPP1000	NPN	2	50	40	12	20	1	5	2000	—	1	1.50	1		
TPP2000	NPN	2	50	40	12	20	1	5	2000	—	1	1.50	2		
TPP3000	NPN	2	50	40	12	20	1	5	2000	—	1	1.50	3		
TPP4000	NPN	2	50	40	12	20	1	5	2000	—	1	1.50	4		

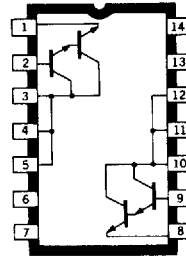


PACKAGE A
14 PINS

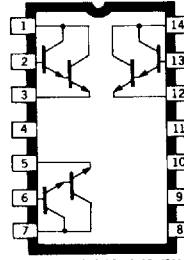
Notes: 1. Per Package.



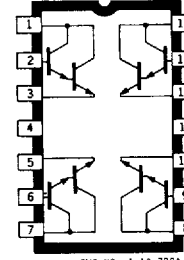
DWG. NO. A-10,779A
FIGURE 1



DWG. NO. A-10,780A
FIGURE 2



DWG. NO. A-10,781A
FIGURE 3



DWG. NO. A-10,782A
FIGURE 4

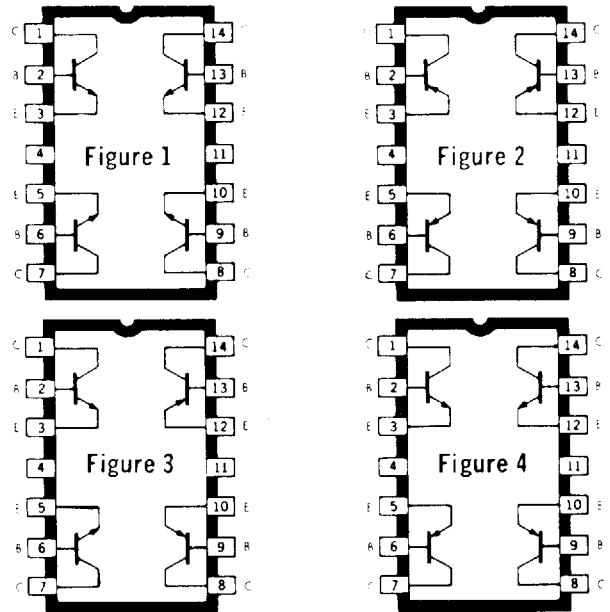
SERIES TPQ QUAD TRANSISTOR ARRAYS

- The Sprague Series TPQ quad transistor arrays are general-purpose silicon transistor arrays consisting of four independent transistors. Shown are eight NPN types, five PNP types, and nine NPN/PNP dual complementary pairs.
- All of these devices are furnished in a 14-lead dual in-line plastic A package. The molded package is identical to that used in most consumer integrated circuits and offers superior mechanical protection during insertion into printed wiring boards.

TYPICAL RATINGS (Max.)

Power Dissipation, P_D	
(each transistor)	500 mW
(total package)	2000 mW*
Operating Temperature	
Range, T_A	-55°C to $+150^\circ\text{C}$
Storage Temperature	
Range, T_S	-65°C to $+150^\circ\text{C}$

*Derate at the rate of 16.0 mW/ $^\circ\text{C}$ above $T_A = +25^\circ\text{C}$.



FOR PACKAGE DIMENSIONS, SEE PAGE 112.

Catalog Number	Package Style (Figure)	Polarity	V_{CBO} (V) Min.	V_{CEO} (V) Min.	V_{EBO} (V) Min.	I_{CBO} (nA) Max.	V_{CE} (V) @	h_{FE}		I_C (mA) @	V_{CE} (V)	$V_{CE(SAT)}$ (V) & $V_{BE(SAT)}$ (V) @		I_C (mA) @	C_{ob} (pF) Max.	f_T (MHz)		I_C (mA) @	t_{ST} (ns) Max.	Similar Discrete Device(s)
								Min.	Max.			Max.	Min.			Max.				
TPQ2221	1	NPN	60	40	5	50	50	35	—	10	10	0.40	—	1.3	8	200	—	20	—	2N2221
								40	—	150	10	1.60	—	2.6						
								20	—	300	10									
TPQ2222	1	NPN	60	50	5	50	50	75	—	10	10	0.40	—	1.3	8	200	—	20	—	2N2222
								100	—	150	10	1.60	—	2.6						
								30	—	300	10									

continued on next page

SERIES TPQ QUAD TRANSISTORS, continued

Catalog Number	Package Style (Figure)	Polarity	V_{CB0}	V_{CE0}	V_{EB0}	I_{CB0}	V_{CB}	h_{FE}		I_C	V_{CE}	$V_{CE(SAT)}$		$V_{BE(SAT)}$	I_C	C_{ob}	f_T		t_{off}	Similar Discrete Device(s)	
			(V) Min.	(V) Min.	(V) Min.	(nA) Max.	(V) @	Min.	Max.	(mA) @	(V)	Max.	Min.	Max.	(mA) @	(pF) Max.	(MHz) Min.	(MHz) Max.	(mA) @		(ns) Max.
TPQ2483	1	NPN	60	40	6	20	45	100	—	0.1	5	0.35	—	0.7 ⁽²⁾	1	6	50	—	0.5	—	2N2483
								150	—	1	5	0.50	—	0.8 ⁽²⁾	10						
								150	—	10	5										
TPQ2484	1	NPN	60	40	6	20	45	200	—	0.1	5	0.35	—	0.7 ⁽²⁾	1	6	50	—	0.5	—	2N2484
								300	—	1	5	0.50	—	0.8 ⁽²⁾	10						
								300	—	10	5										
TPQ2906	2	PNP	-60	-40	-5	-50	-30	35	—	-10	-10	-0.40	—	-1.3	-150	8	200	—	-50	—	2N2906
								40	—	-150	-10	-1.60	—	-2.6	-300						
								30	—	-300	-10										
TPQ2907	2	PNP	-60	-40	-5	-50	-30	75	—	-10	-10	-0.40	—	-1.3	-150	8	200	—	-50	—	2N2907
								100	—	-150	-10	-1.60	—	-2.6	-300						
								50	—	-300	-10										
TPQ2907A	2	PNP	-60	-60	-5	-50	-30	75	—	-10	-10	-0.40	—	-1.3	-150	8	200	—	-50	—	2N2907A
								100	—	-150	-10	-1.60	—	-2.6	-300						
								50	—	-300	-10										
TPQ3724	1	NPN	60 ⁽³⁾	30	5	500	40	35	200	100	1	0.45	0.8	1	500	10	250	—	50	60 ⁽⁴⁾	2N3724
								25	—	500	2										
TPQ3725	1	NPN	60	40	5	500	40	35	200	100	1	0.45	0.8	1	500	10	250	—	50	60 ⁽⁴⁾	2N3725
								25	—	500	2										
TPQ3725A	1	NPN	70 ⁽³⁾	50	5	500	40	40	—	100	1	0.45	0.8	1	500	10	200	—	50	60 ⁽³⁾	2N3725A
								30	—	500	2										
TPQ3798	2	PNP	-60	-40	-5	-10	-50	100	—	-0.01	-5	-0.2	—	-0.7	-0.1	4	60	—	-1	—	2N3798
								150	—	-0.10	-5	-0.25	—	-0.8	-1						
								150	—	-0.50	-5										
								125	—	-10	-5										
TPQ3799	2	PNP	-60	-60	-5	-10	-50	225	—	-0.01	-5	-0.20	—	-0.7	-0.1	4	60	—	-1	—	2N3799
								300	—	-0.1	-5	-0.25	—	-0.8	-1						
								300	—	-0.5	-5										
								250	—	-10	-5										
TPQ3904	1	NPN	60	40	6	50	40	30	—	0.1	1	0.20	—	0.85	10	4	250	—	10	—	2N3904
								50	—	1	1										
								75	—	10	1										
TPQ3906	2	PNP	-40	-40	-5	-50	-30	40	—	-0.1	-1	-0.25	—	-0.85	-10	4.5	200	—	-10	—	2N3906
								60	—	-1	-1										
								75	—	-10	-1										
TPQ4258	2	PNP	-12	-12	-4.5	-10	-6.0	30	120	-10	-3	-0.15	-0.8	-0.95	-10	3	700	—	-10	—	2N4258
TPQ4354	2	PNP	-60	-60	-5	-50	-50	25	—	-0.1	-10	-0.15	—	-0.9	-150	30 ⁽⁵⁾	100	500	-50	—	2N4354
								40	—	-1	-10										
								50	—	-10	-10										
								40	—	-100	-10										
TPQ5400	1	NPN	130	120	5	100 ⁽⁶⁾	—	30	—	1	5	0.20	—	1	10	6	100	—	10	—	2N5400
								40	180	10	5	0.50	—	1	50						
								40	—	50	5										
TPQ5401	1	NPN	160	150	5	100 ⁽⁷⁾	—	50	—	1	5	0.20	—	1	10	6	100	—	10	—	2N5401
								60	240	10	5	0.50	—	1	50						
								50	—	50	5										

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SERIES TPQ QUAD TRANSISTORS, continued

Catalog Number	Package Style (Figure)	Polarity	V_{CB0}	V_{CE0}	V_{EB0}	I_{CB0}	V_{CB}	h_{FE}		I_C	V_{CE}	$V_{CE(SAT)}$		$V_{BE(SAT)}$	I_C	C_{ob}	f_T		I_C	t_{off}	Similar Discrete Device(s)
			(V) Min.	(V) Min.	(V) Min.	(nA) Max.	(V)	Min.	Max.	(mA) @	(V)	Max.	Min.	Max.	(mA) @	(pF) Max.	Min.	Max.	(mA) @	(ns) Max.	
TPQ5550	2	PNP	-160	-140	-6	-100	-100	60	—	-1	-5	-0.15	—	-1	-10	6	100	—	-10	—	2N5550
								60	250	-10	-5	-0.25	—	-1.2	-50						
								20	—	-50	-5										
TPQ5551	2	PNP	-180	-160	-6	-50	-120	80	—	-1	-5	-0.15	—	-1	-10	6	100	—	-10	—	2N5551
								80	250	-10	-5	-0.25	—	-1.2	-50						
								30	—	-50	-5										
TPQ6001	3	(Note 1)	60	30	5	30	50	25	—	1	10	0.40	—	1.3	150	8	200	—	50	—	2N2221 and 2N2906
								35	—	10	10	1.40	—	-2	300						
								40	—	150	10										
								20	—	300	10										
TPQ6002	3	(Note 1)	60	30	5	30	50	50	—	1	10	0.40	—	1.3	150	8	200	—	50	—	2N2222 and 2N2907
								75	—	10	10	1.40	—	-2	300						
								100	—	150	10										
								30	—	300	10										
TPQ6100	3	(Note 1)	60	40	5	10	50	50	—	0.1	5	0.25	—	0.8	1.0	4	100	—	0.5	—	2N2483 and 2N3798
								75	—	0.5	5										
								75	—	1	5										
								60	—	10	5										
TPQ6100A	3	(Note 1)	60	45	5	10	50	100	—	0.1	5	0.25	—	0.8	1.0	4	100	—	0.5	—	2N2484 and 2N3799
								150	—	0.5	5										
								150	—	1	5										
								60	—	10	5										
TPQ6501	4	(Note 1)	60	30	5	30	50	25	—	1	10	0.40	—	1.3	150	8	200	—	50	—	2N2221 and 2N2906
								35	—	10	10	1.40	—	-2	300						
								40	—	150	10										
								20	—	300	10										
TPQ6502	4	(Note 1)	60	30	5	30	50	50	—	1	10	0.40	—	1.3	150	8	200	—	50	—	2N2222 and 2N2907
								75	—	10	10	1.40	—	-2	300						
								100	—	150	10										
								30	—	300	10										
TPQ6600	4	(Note 1)	60	40	5	10	50	50	—	0.1	5	0.25	—	0.8	1.0	4	100	—	0.5	—	2N2483 and 2N3798
								75	—	0.5	5										
								75	—	1	5										
								60	—	10	5										
TPQ6600A	4	(Note 1)	60	45	5	10	50	100	—	0.1	5	0.25	—	0.8	1.0	4	100	—	0.5	—	2N2484 and 2N3799
								150	—	0.5	5										
								150	—	1	5										
								60	—	10	5										
TPQ6700	4	(Note 1)	40	40	5	50	30	30	—	0.1	1	0.25	—	0.9	10	4.5	200	—	10	—	2N3904 and 2N3906
								50	—	1	1										
								70	—	10	1										
TPQA05	1	NPN	60	60	4	100 ⁽⁸⁾	—	50	—	10	1	0.25	—	—	100	10	—	—	—	—	MPSA05
TPQA06	1	NPN	80	80	4	100 ⁽⁹⁾	—	50	—	10	1	0.25	—	—	100	10	—	—	—	—	MPSA06
								50	—	100	2										

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SERIES TPQ QUAD TRANSISTORS, continued

Catalog Number	Package Style (Figure)	Polarity	V_{CB0}	V_{CE0}	V_{EB0}	I_{CB0}	V_{CB}	h_{FE}		I_C	V_{CE}	$V_{CE(SAT)}$		$V_{BE(SAT)}$	I_C	C_{ob}	f_T		I_C	t_{off}	Similar Discrete Device(s)
			(V) Min.	(V) Min.	(V) Min.	(nA) Max.	(V) @	Min.	Max.	(mA) @	(V)	Max.	Min.	Max.	(mA) @	(pF) Max.	(MHz) Min.	(MHz) Max.	(mA) @	(ns) Max.	
TPQA55	2	PNP	60	60	4	100 ⁽⁸⁾	—	50	—	10	1	0.25	—	—	100	15	—	—	—	—	MPSA55
TPQA56	2	PNP	80	80	4	100 ⁽⁹⁾	—	50	—	10	1	0.25	—	—	100	15	—	—	—	—	MPSA56

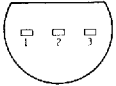
Notes: 1. NPN/PNP Complementary pairs. Polarity shown is for NPN devices.
 2. $V_{BE(ON)}$ @ I_C as indicated. $V_{CE} = 5$ V
 3. BV_{CES}
 4. $I_C = \approx 500$ mA, $I_{B1} = I_{B2} = \approx 15$ mA

5. C_{ce}
 6. I_{ces} @ $V_{CE} = 100$ V, $V_{BE} = 0$.
 7. I_{ces} @ $V_{CE} = 120$ V, $V_{BE} = 0$.


8. I_{ces} @ $V_{CE} = 50$ V, $V_{BE} = 0$.
 9. I_{ces} @ $V_{CE} = 60$ V, $V_{BE} = 0$.

SERIES TZ TRANSISTORS

- Small-signal TO-92 plastic transistors. In-house type numbers designed for amplifier/switching applications.



PINNING
Bottom View



CZ

Style	1	2	3
CZ	E	C	B

FOR PACKAGE DIMENSIONS, SEE PAGE 112.

Catalog Number	Case Style	P_D $T_A = 25^\circ\text{C}$ (mW)	Polarity	V_{CB0}	V_{CE0}	V_{EB0}	I_{CB0}	V_{CB}	h_{FE}		I_C	V_{CE}	$V_{CE(SAT)}$		$V_{BE(SAT)}$	I_C	C_{ob}	f_T		I_C	t_{off}	NF	Test					
				(V) Min.	(V) Min.	(V) Min.	(nA) Max.	(V) @	Min.	Max.	(mA) @	(V)	Max.	Min.	Max.	(mA) @	(pF) Max.	(MHz) Min.	(MHz) Max.	(mA) @	(ns) Max.	(dB) @	Cond. (note)					
TZ81	CZ	360	NPN	60	30	5	10	30	60	—	.001	5	0.2	0.65	0.8	10	8	30	120	0.5	—	2	1					
									100	500	.01	5	1.6	—	2.6	500												
									120	—	1	5	0.4	—	1	150												
									165	—	10	5																
TZ82	CZ	360	NPN	60	30	5	10	30	40	500	.010	5	0.2	0.65	0.8	10	8	30	120	0.5	—	3	1					
									100	—	1	5	1.6	—	2.6	500												
									120	—	10	5	0.4	—	1	150												
TZ551	CZ	360	PNP	-60	-30	-5	-50	-40	20	—	-1	-10	-0.3	—	-1.3	-150	10 ⁽²⁾	150	—	-20	150 ⁽³⁾	—	—					
									30	—	-10	-10																
									40	120	-150	-10																
TZ552	CZ	360	PNP	-60	-30	-5	-50	-40	50	—	-1	-10	-0.3	—	-1.3	-150	10 ⁽²⁾	150	—	-20	150 ⁽³⁾	—	—					
									75	—	-10	-10																
									100	300	-150	-10																
TZ553	CZ	360	PNP	-60	-30	-5	-50	-40	100	—	-1	-10	-0.3	—	-1.3	-150	10 ⁽²⁾	150	—	-20	175 ⁽³⁾	—	—					
									150	—	-10	-10																
									200	400	-150	-10																
TZ554	CZ	360	PNP	-40	-30	-5	-50	-30	20	—	-1	-10	-0.3	—	-1.3	-150	10 ⁽²⁾	150	—	-20	175 ⁽³⁾	—	—					
									30	—	-10	-10																
									40	400	-150	-10																
TZ581	CZ	360	PNP	-40	-30	-5	-10	-30	60	—	-.001	-5	-0.2	-0.65	-0.8	-10	10	20	100	-0.5	—	2	1					
									100	500	-.010	-5	-1.6	—	-2.6	-500												
									120	—	-1	-5	-0.4	—	-1	-150												
									150	—	-10	-5																
TZ582	CZ	360	PNP	-40	-30	-5	-10	-30	40	500	-0.01	-5	-0.2	-0.65	-0.8	-10	10	20	100	-0.5	—	3	1					
									100	—	-1	-5	-1.6	—	-2.6	-500												
									120	—	-10	-5	-0.4	—	-1	-150												

Notes: 1. WBNF: $I_C = -10$ μA , $V_{CE} = -5$ V, $R_g = 10$ k Ω , Bw = 10 Hz to 15.7 kHz.
 2. C_{ob}
 3. $I_C = 150$ mA, $I_{B1} = I_{B2} = 15$ mA, $V_{CE} = 6$ V.