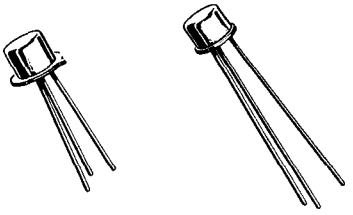
2N903–2N991

TYPE	MATERIAL	POLARITY	REPLACEMENT	PAGE NUMBER	USE	MAXIMUM RATINGS P_D @ 25°C	Ref Point	T_J °C	V_{CB} (volts)	V_{CE-} (volts)	Subscript	ELECTRICAL CHARACTERISTICS h_{FE} @ I_C (min)	(max)	Units	$V_{CE(SAT)}$ @ I_C (volts)	Units	h_{f-}	Subscript	f_-	Units	Subscript
2N903	S	N			AFA	150M	A	175	45	30	O				1.0	5.0M	18	E	2.0M		
2N904	S	N			AFA	150M	A	175	45	30	O				1.0	5.0M	18	E	8.0M		
2N905	S	N			AFA	150M	A	175	45	30	O				1.0	5.0M	36	E	2.0M		
2N906	S	N			AFA	150M	A	175	45	30	O				1.0	5.0M	76	E	2.0M		
2N907	S	N			RFA	0.15W	A	175	45	30	O	20	55	10M			19	E	12M	T	
2N908	S	N			RFA	0.15W	A	175	45	30	O	45	150	10M			39	E	25M	T	
2N909	S	N	2N2222	8-108	RFA	400M	A	175	60	30	R	110	350	50M	0.5	10M	40	E	50M	T	
2N910	S	N			AFA	500M	A	200	100	80	R	75		10M	0.4	10M	76	E	60M	T	
2N911	S	N			AFA	500M	A	200	100	80	R	35		10M	0.4	10M	36	E	50M	T	
2N912	S	N			AFA	500M	A	200	100	80	R	15		10M	0.4	10M	18	E	40M	T	
2N914	S	N		8-67	HSS	360M	A	200	40	20	R	30	120	10M	0.7	200M			300M	T	
2N914A	S	N			HSS	360M	A	200	40	20	R	30	120	10M	0.4	200M			300M	T	
2N915	S	N		8-69	RFA	360M	A	200	70	50	O	50	200	10M	1.0	10M	50	E	250M	T	
2N916	S	N		8-71	RFA	360M	A	200	45	25	O	50	200	10M	0.5	10M	50	E	300M	T	
2N916A	S	N			RFA	360M	A	200	45	25	O	50	200	10M	0.5	10M	50	E	300M	T	
2N917	S	N			RFA	200M	A	200	30	15	O	20	200	3.0M	0.5	3.0M			500M	T	
2N917A	S	N			RFA	200M	A	200	30	15	O	20	200	3.0M	0.4	10M			600M	T	
2N918	S	N		9-15	RFA	200M	A	200	30	15	O	20		3.0M	0.4	10M			600M	T	
2N919	S	N	2N834	8-54	HSS	0.36W	A	200	25	15	O	20	60	10M	0.2	10M			200M	T	
2N920	S	N	2N834	8-54	HSS	0.36W	A	200	25	15	O	40	120	10M	0.2	10M			200M	T	
2N921	S	N	2N834	8-54	HSS	0.36W	A	200	50	20	O	20	60	10M	0.3	10M			200M	T	
2N922	S	N	2N834	8-54	HSS	0.36W	A	200	50	20	O	40	120	10M	0.3	10M			200M	T	
2N923	S	P			AFA	0.25W	A	200	40	25	O				0.5	5.0M	12	E	0.8M	B	
2N924	S	P			AFA	0.25W	A	200	40	25	O				0.5	5.0M	24	E	0.8M	B	
2N925	S	P			AFA	0.25W	A	200	50	40	O				0.5	5.0M	10	E	0.8M	B	
2N926	S	P			AFA	0.25W	A	200	50	40	O				0.5	5.0M	20	E	0.8M	B	
2N927	S	P			AFA	0.25W	A	200	70	60	O				0.5	5.0M	8.0	E	0.8M	B	
2N928	S	P			AFA	0.25W	A	200	70	60	O				0.5	5.0M	18	E	0.8M	B	
2N929	S	N		8-72	AFA	600M	C	175	45	45	O	40	120	10*	1.0	10M	150	E	1.0M	E	
2N929A	S	N			AFA	0.5W	A	200	60	45	O	40	120	10*	0.5	10M	60	E	45M	T	
2N930	S	N		8-72	AFA	600M	C	175	45	45	O	100	300	10*	1.0	10M	150	E	1.0M	E	
2N930A	S	N			AFA	0.5W	A	200	60	45	O	100	300	10*	0.5	10M	150	E	45M	T	
2N934	G	P	2N965	8-74	HSS	150M	A	85	13	12		40		40M	0.3	40M			35M	T	
2N935	S	P			AFA	0.25W	A	160	50	40	O	9.0	22		0.3	5.0M					
2N936	S	P			AFA	0.25W	A	160	50	35	O	18	44		0.5	5.0M					
2N937	S	P			AFA	0.25W	A	160	50	30	O	36	88		0.6	5.0M					
2N938	S	P			AFA	0.25W	A	175	40	35	O				0.3	5.0M	9.0	E	1.0M	B	
2N939	S	P			AFA	0.25W	A	175	40	35	O				0.3	5.0M	18	E	2.0M	B	
2N940	S	P			AFA	0.25W	A	175	40	35	O				0.3	5.0M	36	E	2.0M	B	
2N941	S	P			CHP	0.25W	A	175	25	8	U	10		1.0M			25	E	16M	T	
2N942	S	P			CHP	0.25W	A	175	25	8	U	10		1.0M			25	E	10M	T	
2N943	S	P			CHP	0.25W	A	175	40	18	O	10			0.003		25	E	1.0M	B	
2N944	S	P			CHP	0.25W	A	175	40	18	O	10			0.004		25	E	1.0M	B	
2N945	S	P			CHP	0.25W	A	175	50	50	O	10			0.005		25	E	1.0M	B	
2N946	S	P			CHP	0.25W	A	175	80	80	O	10			0.005		25	E	1.0M	B	
2N947	S	N	2N834	8-54	MSA	360M	A	150	20	15	R	20		10M	0.4	5.0M			200M	T	
2N948 thru	Thyristors, see Table on Page 1-154																				
2N951																					
2N955	G	N			HSS	150M	A	100	12	8.0	O	30		30M	0.5	30M					
2N955A	G	N			HSS	150M	A	100	12	8.0	O	30		30M	0.3	30M					
2N956	S	N	2N2222	8-108	RFA	500M	A	200	75	50	R	100	300	150M	1.5	150M	50	E	70M	T	
2N957	S	N	2N2501	8-148	RFA	250M	A	150	40	20	O	45		10M	1.5	10M			200M	T	
2N958	S	N			HSS	0.25W	C	150	25	15	O	20		10M	0.2	10M			200M	T	
2N959	S	N			HSS	0.25W	C	150	25	15	O	40		10M	0.2	10M			200M	T	
2N960	G	P		8-74	HSS	150M	A	100	15	15	S	20		10M	0.2	10M			300M	T	
2N961	G	P		8-74	HSS	150M	A	100	12	12	S	20		10M	0.2	10M			300M	T	
2N962	G	P		8-74	HSS	150M	A	100	12	12	S	20		10M	0.2	10M			300M	T	
2N963	G	P		8-76	HSS	150M	A	100	12	12	S	20		10M	0.2	10M			250M	T	
2N964	G	P		8-74	HSS	150M	A	100	15	15	S	40		10M	0.18	10M			300M	T	
2N964A	G	P		8-79	HSS	150M	A	100	15	15	S	40		10M	0.18	10M			300M	T	
2N965	G	P		8-74	HSS	150M	A	100	12	12	S	40		10M	0.18	10M			300M	T	
2N966	G	P		8-74	HSS	150M	A	100	12	12	S	40		10M	0.18	10M			300M	T	
2N967	G	P		8-76	HSS	150M	A	100	12	12	S	40		10M	0.2	10M			250M	T	
2N968	G	P		8-85	HSS	150M	A	100	15	15	S	17		10M	0.25	10M			300M	T	
2N969	G	P		8-85	HSS	150M	A	100	12	12	S	17		10M	0.25	10M			300M	T	
2N970	G	P		8-85	HSS	150M	A	100	12	12	S	17		10M	0.25	10M			300M	T	
2N971	G	P		8-85	HSS	150M	A	100	7.0	7.0	S	17		10M	0.25	10M			300M	T	
2N972	G	P		8-85	HSS	150M	A	100	15	15	S	40		10M	0.25	10M			300M	T	
2N973	G	P		8-85	HSS	150M	A	100	12	12	S	40		10M	0.25	10M			300M	T	
2N974	G	P		8-85	HSS	150M	A	100	12	12	S	40		10M	0.25	10M			300M	T	
2N975	G	P		8-85	HSS	150M	A	100	7.0	7.0	S	40		10M	0.25	10M			300M	T	
2N976	G	P	2N964	8-74	HSS	100M	A	100	15	10	O	30		20M	0.17	20M			249M	T	
2N977	G	P	2N964	8-74	HSS	150M	A	100	15	10	O	50		40M	0.2	40M			400M	T	
2N978	S	P	2N2837	8-161	RFA	330M	A	150	30	20	O	15	60	150M	1.5	150M			40M	T	
2N979	G	P			HSS	60M	A	100	20	15	O	30		10M	0.25	10M			100M	T	
2N980	G	P			HSS	60M	A	100	20	12	O	30		10M	0.25	10M			100M	T	
2N981	S	N			AFA	0.5W	A	200	80	80	O				3.0	10M	36	E	50M	B	
2N982	G	P			HSS	60M	A	100	20	15	O	50		10M	0.125	10M					
2N983	G	P			HSS	60M	A	100	15	15	O	40		10M	0.15	10M					
2N984	G	P			HSS	60M	A	100	15	10	O	50		10M	0.18	10M					
2N985	G	P		8-88	HSS	150M	A	100	15	7.0	O	40		10M	0.15	10M			300M	T	
2N986	S	N			SPP	500M	A	200	100	80	R										
2N987	G	P			RFA	0.1W	A	100	40	40	O	40	250	1.0M			40	E			
2N988	S	N	2N2221	8-108	RFA	0.3W	A	175	20	10	O	20	120	10M	0.5	10M			300M	T	
2N989	S	N	2N2221	8-108	RFA	0.3W	A	175	20	10	O	20	120	10M	0.5	10M			300M	T	
2N990	G	P			RFC	67M	A	75	20	20	R	40		1.0M			40	E	44M	T	
2N991	G	P			RFC	67M	A	75	20	20	R	40		1.0M			40	E	44M	T	

2N718A (SILICON)
2N956
2N1613
2N1711

(JAN 2N1613 AND 2N1711 Available)

V_{CER} = 50 V
f_T = 300 MHz Typ



CASE 22
(TO-18)
2N718A
2N956

CASE 31
(TO-5)
2N1613
2N1711

Collector connected to case

NPN silicon annular Star transistors for high-speed switching and DC to UHF amplifier applications.

MAXIMUM RATINGS

Rating	Symbol	2N718A 2N956	2N1613 2N1711	Unit
Collector-Emitter Voltage	V_{CER}	50		Vdc
Collector-Base Voltage	V_{CB}	75		Vdc
Emitter-Base Voltage	V_{EB}	7.0		Vdc
Total Device Dissipation @ T_A = 25°C	P_D	500	800	mW
Derate above 25°C		2.86	4.57	mW/°C
Total Device Dissipation @ T_C = 25°C	P_D	1.8	3.0	Watts
Derate above 25°C		10.3	17.1	mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

2N718A, 2N956, 2N1613, 2N1711 (continued)

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, pulsed; $R_{BE} \leq$ 10 ohms)		BV_{CER}	50	-	-	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)		BV_{CBO}	75	-	-	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		BV_{EBO}	7.0	-	-	Vdc
Collector Cutoff Current (V_{CB} = 60 Vdc, I_E = 0)		I_{CBO}	-	0.001	0.01	μAdc
(V_{CB} = 60 Vdc, I_E = 0, T_A = 150°C)			-	-	10	
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)	2N718A, 2N1613	I_{EBO}	-	-	0.010	μAdc
	2N956, 2N1711		-	-	0.005	
ON CHARACTERISTICS						
DC Current Gain (I_C = 0.01 mAdc, V_{CE} = 10 Vdc)	2N956, 2N1711	h_{FE}	20	-	-	-
(I_C = 0.1 mAdc, V_{CE} = 10 Vdc)	2N718A, 2N1613		20	-	-	
	2N956, 2N1711		35	-	-	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)	2N718A, 2N1613		35	-	-	
	2N956, 2N1711		75	-	-	
(I_C = 10 mAdc, V_{CE} = 10 Vdc, T_A = -55°C)	2N718A, 2N1613		20	-	-	
	2N956, 2N1711		35	-	-	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)*	2N718A, 2N1613		40	-	120	
	2N956, 2N1711		100	-	300	
(I_C = 500 mAdc, V_{CE} = 10 Vdc)*	2N718A, 2N1613		20	-	-	
	2N956, 2N1711		40	-	-	
Collector-Emitter Saturation Voltage* (I_C = 150 mAdc, I_B = 15 mAdc)		$V_{CE(sat)}$*	-	0.24	1.5	Vdc
Base-Emitter Saturation Voltage* (I_C = 150 mAdc, I_B = 15 mAdc)		$V_{BE(sat)}$*	-	1.0	1.3	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Current-Gain—Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 MHz)	2N718A, 2N1613	f_T	60	300	-	MHz
	2N956, 2N1711		70	300		
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	-	4.0	25	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ib}	-	20	80	pF
Input Impedance (I_C = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{ib}	24	-	34	ohms
(I_C = 5.0 mAdc, V_{CB} = 10 Vdc, f = 1.0 kHz)			4.0	-	8.0	
Voltage Feedback Ratio (I_C = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)	2N718A, 2N1613	h_{rb}	-	-	3.0	X 10^{-4}
	2N956, 2N1711		-	-	5.0	
(I_C = 5.0 mAdc, V_{CB} = 10 Vdc, f = 1.0 kHz)	2N718A, 2N1613		-	-	3.0	
	2N956, 2N1711		-	-	5.0	
Small-Signal Current Gain (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	2N718A, 2N1613	h_{fe}	30	-	100	-
	2N956, 2N1711		50	-	200	
(I_C = 5.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N718A, 2N1613		35	-	150	
	2N956, 2N1711		70	-	300	
Output Admittance (I_C = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)		h_{ob}	0.1	-	0.5	μmho
(I_C = 5.0 mAdc, V_{CB} = 10 Vdc, f = 1.0 kHz)			0.1	-	1.0	
Noise Figure (I_C = 300 μAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N718A, 2N1613	NF	-	-	12	dB
	2N956, 2N1711		-	-	8.0	

* Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.