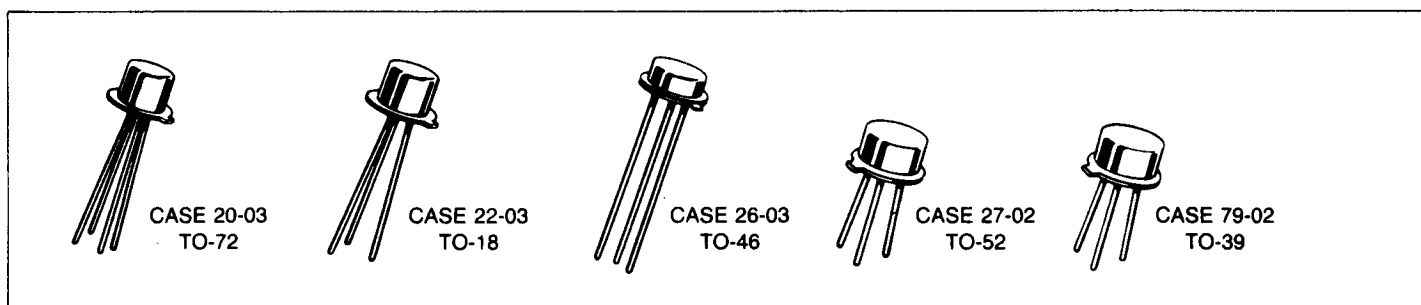


Metal Small-Signal Transistors



Motorola Small-Signal Metal Can Transistors are designed for use as General-Purpose Amplifiers, High-Speed Switches, High-Voltage Amplifiers, Low-Level/Low-Noise Amplifiers, High-Frequency Oscillators, Choppers, and Darlingtons. These devices are manufactured in a variety of packages, i.e., TO-18, TO-39, TO-46, TO-52, and TO-72.

The following selector guide tables also indicate those Motorola small-signal metal can transistors which are qualified under CECC 50000, and MIL-19500 high-reliability requirements. Devices are available to CECC Levels L, F and E (see qualified products Table page 26). JAN, JANTX, JANTXV and JANS versions as specified.

Switching Transistors

The following devices are intended for use in general-purpose switching and amplifier applications. Within each package group shown, the devices are listed in order of decreasing turn-on time (t_{on}).

Package	Device Type	t_{on} ns & t_{off} ns @ I_C mA			$V_{(BR)CEO}$ Volts Min	I_C mA Max	h_{FE} @ I_C mA		$V_{CE(sat)}$ Volts Max	I_C @ I_B mA		f_T MHz Min	I_C mA	Comments
		Max	Max	Max			Min	Max		Max				

NPN

TO-18	2N4014	35	60	500	50	1000	35	500	0.52	500	50	300	50	Exists under CECC Exists under CECC
	2N2369	12	18	100	15	500	20	100	0.25	10	1.0	500	10	
	2N2369A†	12	18	10	15	200	40	10	0.2	10	1.0	500	10	
	2N3227	12	18	100	20	50	30	100	0.25	10	1.0	500	10	
	BSX20	7	18	100	15	500	20	10	0.25	10	1.0	400	10	
TO-39	2N3735#	48	60	1000	50	1500	20	1000	0.5	500	50	250	50	
	2N3506#	45	90	1500	40	3000	40	1500	1.0	1500	150	60	100	
	BSX60	40	70	500	30	1000	30	500	0.5	500	50	—	—	
	2N3725	35	60	500	50	2000	35	500	0.52	500	50	300	50	
	BSX59	35	60	500	45	1000	25	500	0.5	500	50	—	—	
2N3724	35	60	500	30	2000	35	500	0.42	500	50	300	50		
TO-46	2N3737#	48	60	1000	50	1500	20	1000	0.5	500	50	250	50	

PNP

TO-18	2N2894	60	90	30	12	200	40	30	0.2	30	3.0	400	30	Exists under CECC
	2N3546	40	30	50	12		25	50	0.25	50	5.0	700	10	
	2N4208	15	20	10	12	200	30	10	0.15	10	1.0	700	10	
	2N4209	15	20	10	15	50	40	50	0.6	50	5.0	850	10	
TO-39	2N3635#	400	600	50	140	1000	100	50	0.5	50	5.0	200	30	Exists under CECC
	2N4036	110	700	150	65	1000	40	150	0.65	150	15	60	50	
	2N4033#	100	240	500	80	1000	25	1000	0.5	500	50	150	50	
			(typ)											
	2N4407	75	225	1000	80	1500	30	1000	0.7	1000	100	150	50	
	2N3244	50	185	500	40	1000	50	500	0.5	500	50	175	50	
	2N3467#	40	90	500	40	100	40	500	0.5	500	50	175	50	
	2N3762#	43	115	1000	40	1500	30	1000	0.9	1000	100	180	50	
2N4405**	40	210	500	80	1000	50	500	0.5	500	50	200	50		

JAN available

**JAN/JANTX available

†JAN/JANTX/JANTXV/JANS available

JAN/JANTX/JANTXV available

METAL SMALL-SIGNAL TRANSISTORS (continued)

General-Purpose Amplifiers (continued)

Package	Device Type	V _{(BR)CEO} Volts Min	f _T MHz Min	@ I _C mA	I _C mA Max	h _{FE}		I _C mA	Comments
						Min	Max		
PNP									
TO-18	2N3963	80	40	0.5	200	100	450	0.01	
	2N4026	80	100	50	1000	15	—	100	
	2N4029	80	150	50	1000	25	—	100	
	2N3799	60	30	0.5	50	300	900	0.5	
	2N2906A#	60	200	50	600	40	120	150	Exists under CECC
	2N2907A†	60	200	50	600	100	300	150	Exists under CECC
	2N3964	45	50	0.5	200	250	600	0.01	
	BC177	45	130	10	100	70	500	2	Exists in A, B, C HFE groups
	BCY79	45	180*	10	200	120	630	2	Exists in VII, VIII, IX, X HFE groups
	BCY71	45	200	10	200	100	600	10	
	2N2906#	40	200	50	600	40	120	150	Exists under CECC
	2N2907#	40	200	50	600	100	300	150	Exists under CECC
	BCY70	40	250	10	200	50	—	10	
	2N3251	40	300	10	200	100	300	10	
	BCY78	32	180*	10	200	120	630	2	Exists in VII, VIII, IX, X HFE groups
	BC178	30	130	10	100	70	800	2	Exists in A, B, C HFE groups
	BCY72	25	200	10	200	50	—	10	
BC179	20	130	10	100	120	800	2	Exists in A, B, C HFE groups	
TO-39	MM5007	100	30	50	2000	50	250	250	
	BSV17	80	50	50	1000	40	160	100	Exists in -10 HFE group
	2N4033#	80	150	50	1000	25	—	100	Exists under CECC
	2N4405**	80	200	50	1000	100	300	150	
	BFX41	75	100	50	1000	40	—	100	
	BFX40	75	100	50	1000	85	—	100	
	2N4036	65	60	50	1000	40	140	150	
	BSV16	60	50	50	1000	40	250	100	Exists in -6, -10 HFE groups
	BC161	60	50	50	1000	40	400	100	Exists in -6, -10, -16 HFE groups
	2N2904A#	60	200	50	600	40	120	150	Exists under CECC
	2N2905A†	60	200	50	600	100	300	150	Exists under CECC
	BC160	40	50	50	1000	40	400	100	Exists in -6, -10, -16, HFE groups
	BSV15	40	50	50	1000	40	250	100	Exists in -6, -10 HFE groups
	2N2904#	40	200	50	600	40	120	150	Exists under CECC
	2N2905#	40	200	50	600	100	300	150	Exists under CECC
TO-46	2N2605#	45	30	0.5	30	100	300	0.01	
	2N3486	40	200	50	600	100	300	150	

* JAN available

** JAN/JANTX available

JAN/JANTX/JANTXV available

METAL SMALL-SIGNAL TRANSISTORS (continued)

Choppers

Devices are listed in decreasing $V_{(BR)EBO}$.

Package	Device	$V_{(BR)EBO}$ Min	$V_{(BR)ECO}$	Min $h_{FE(inv)}$	Offset Voltage $V_{EC(ofs)}$ Max (mV)	On-State Resistance $r_{ec(on)}$ Max (Ω)
TO-46	2N2946	40	35	3.0	2.0	45
	2N2946A	40	35	20	2.0	8.0
	2N5230	30	20	15	0.5	8.0
	2N5231	30	20	15	0.8	10
	2N2945A	25	20	30	1.0	6.0
	2N2945	25	20	4.0	1.0	35
	2N5229	15	10	15	0.5	6.0

JAN/JANTX available

CECC Qualified Types

Qualified products to CECC 50000

All CECC types are available to assessment levels E, F, L

2N1613 (CECC) 2N1711 (CECC) 2N1893 (CECC) 2N2218 (CECC) 2N2218A (CECC) 2N2219 (CECC) 2N2219A (CECC) 2N2221 (CECC) 2N2221A (CECC) 2N2222 (CECC) 2N2222A (CECC) 2N2368 (UTE)	2N2369 (CECC) 2N2369A (CECC) 2N2484 (CECC) 2N2894 (CECC) 2N2904 (CECC) 2N2904A (CECC) 2N2905 (CECC) 2N2905A (CECC) 2N2906 (CECC) 2N2906A (CECC) 2N2907 (CECC) 2N2907A (CECC) 2N3439 (CECC)	2N3440 (CECC) 2N3501 (CECC) 2N4033 (CECC) 2N5415 (CECC) 2N5416 (CECC) BC107-108-109 (CECC) CV8616 (CECC) CV9507 (CECC) CV9543 (CECC) PO7726 (CECC)
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