

# Transistors

## TO-92 (JEDEC Standards Numbers)

### ●NPN Transistors

#### General purpose small signal amplifiers

Part No.	Package	$V_{CE0}$ Min.	$V_{CE0}$ Min.	$V_{E0}$ Min.	$I_{C0}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ & $V_{BE(sat)}$ Max. Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	NF	$I_C$ Max.
2N2925	TO-92 (ECB)	25V	25V	5V	100nA	25V	235 470	2.0mA 10V			10pF	160MHz	Typ.		200mA
2N3711 MPS3711	TO-92 (ECB) (EBC)	30V	30V	6V	100nA	20V	180 650	1.0mA 5V	1.0V	10mA					200mA
2N3860	TO-92 (ECB)	30V	30V	4V	50nA	40V	150 300	2.0mA 4.5V	0.125V	10mA	4pF	90MHz	2.0mA		100mA
2N5088	TO-92 (EBC)	35V	30V	4.5V	100nA	30V	300 350 300	100 $\mu$ A 5V 1.0mA 5V 10mA 5V	0.3V 0.8V	10mA	4pF	50MHz	0.5mA	3dB	200mA
2N5172 MPS5172	TO-92 (ECB) (EBC)	25V	25V	5V	100nA	25V	100 500	10mA 10V	0.25V 1.2V	10mA	10pF	200MHz	Typ.		200mA
2N5210	TO-92 (EBC)	50V	50V	4.5V	50nA	35V	200 250 250	100 $\mu$ A 5V 1.0mA 5V 10mA 5V	0.7V 0.85V	10mA	4pF	30MHz	0.5mA	2dB	200mA
2N5232A	TO-92 (ECB)	70V	50V	5V	100nA	50V	250 500	2mA 5V	0.125V	10mA	4pF			5dB	100mA
MPS8097	TO-92 (EBC)	60V	40V	6V	30nA 10 $\mu$ A	40V 60V	250 700	100 $\mu$ A 5V	0.65V ( $V_{BE(on)}$ )	100mA	4pF	200MHz	10mA	2dB	200mA
MPS-A09	TO-92 (EBC)	50V	50V	3V	100nA	25V	100 600	100 $\mu$ A 5V	0.9V	10mA	5pF	30MHz	0.5mA	1.4dB (Typ.)	200mA
MPS-A18	TO-92 (EBC)	45V	45V	6.5V	50nA	30V	400 500 500 500	10 $\mu$ A 5V 100 $\mu$ A 5V 1.0mA 5V 10mA 5V	0.2V 0.3V	10mA 50mA	3pF	100MHz	1mA	4dB (Typ.)	200mA
MPS-A20	TO-92 (EBC)	40V	40V	4V	100nA	30V	40 400	5mA 10V	0.25V	10mA	4pF	125MHz	5mA		100mA

#### General purpose amplifiers and switches

Part No.	Package	$V_{CE0}$ Min.	$V_{CE0}$ Min.	$V_{E0}$ Min.	$I_{C0}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ & $V_{BE(sat)}$ Max. Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	$t_{off}$ Max.	$I_C$ Max.	
PN2222	TO-92 (EBC)	60V	30V	5V	100nA	50V	35 50 75 100 50 30	0.1mA 10V 1.0mA 10V 10mA 10V 150mA 10V 150mA 1V 500mA 10V	0.4V 1.6V	1.3V 2.6V	150mA 500mA	8pF	250MHz	20mA	600mA	
PN2222A	TO-92 (EBC)	75V	40V	6V	100nA	60V	35 50 75 100 50 30	0.1mA 10V 1.0mA 10V 10mA 10V 150mA 10V 150mA 1V 500mA 10V	0.3V 1V	1.2V 2V	150mA 500mA	8pF	250MHz	20mA	285ns	600mA
2N3704 MPS3704	TO-92 (ECB) (EBC)	50V	30V	5V	100nA	20V	100 300	50mA 2V	0.6V	1.0V	100mA	12pF	100MHz	50mA	800mA	
2N3706 MPS3706	TO-92 (ECB) (EBC)	40V	20V	5V	100nA	20V	30 60	50mA 2V	1.0V	1.0V	100mA	12pF	100MHz	50mA	800mA	
2N3903	TO-92 (EBC)	60V	40V	6V	50nA (CEX)	30V	20 35 50 30 15	0.1mA 1V 1.0mA 1V 10mA 1V 50mA 1V 100mA 1V	0.2V 0.3V	0.85V 0.95V	10mA 50mA	4pF	250MHz	10mA	225ns	200mA

**General purpose amplifiers and switches**

Part No.	Package	$V_{CB0}$ Min.	$V_{CE0}$ Min.	$V_{EBO}$ Min.	$I_{CBO}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ Max.	& $V_{BE(sat)}$ Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	$t_{off}$ Max.	$I_C$ Max.	
2N3904	TO-92 (EBC)	60V	40V	6V	50nA	30V	40 70 150 60 30	0.1mA 1.0mA 10mA 50mA 100mA	1V 1V 1V 1V 1V	0.2V 0.3V	0.85V 0.95V	10mA 50mA	4pF	300MHz	10mA	250ns	200mA
2N4124	TO-92 (EBC)	30V	25V	5V	50nA	20V	120 60	2.0mA 50mA	1V 1V	0.3V	0.95V	50mA	4pF	300MHz	10mA		200mA
2N4400	TO-92 (EBC)	60V	40V	6V	100nA	35V	20 40 50 20	1.0mA 10mA 150mA 500mA	1V 1V 1V 2V	0.4V 0.75V	0.95V 1.2V	150mA 500mA	6.5pF	200MHz	20mA	255ns	600mA
2N4401	TO-92 (EBC)	60V	40V	6V	100nA	35V	20 40 80 100 40	0.1mA 1mA 10mA 150mA 500mA	1V 1V 1V 1V 2V	0.4V 0.75V	0.95V 1.2V	150mA 500mA	6.5pF	250MHz	20mA	225ns	600mA
MPS6515	TO-92 (EBC)	40V	25V	4V	50nA	30V	250 150	2mA 100mA	10V 10V	0.5V		50mA	3.5pF	250MHz	10mA	NF 2dB	100mA
MPS6530	TO-92 (EBC)	60V	40V	5V	100nA	40V	30 40 25	10mA 100mA 500mA	1V 1V 10V	0.5V	1.0V	100mA	8pF	390MHz	Typ.		600mA
MPS6531	TO-92 (EBC)	60V	40V	5V	50nA	40V	60 90 50	10mA 100mA 500mA	1V 1V 10V	0.3V	1.0V	100mA	5pF	390MHz	Typ.		600mA

**Medium power amplifiers**

Part No.	Package	$V_{CB0}$ Min.	$V_{CE0}$ Min.	$V_{EBO}$ Min.	$I_{CBO}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ Max.	& $V_{BE(sat)}$ Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	$t_{off}$ Max.	$I_C$ Max.	
MPS-A05	TO-92 (EBC)	60V	60V	4V	100nA	60V	100 100	10mA 100mA	1V 1V	0.25V		100mA		50MHz	10mA		500mA
MPS-A06	TO-92 (EBC)	80V	80V	4V	100nA	80V	100 100	10mA 100mA	1V 1V	0.25V		100mA		50MHz	10mA		500mA

**Darlington amplifiers**

Part No.	Package	$V_{CB0}$ Min.	$V_{CE0}$ Min.	$V_{EBO}$ Min.	$I_{CBO}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ Max.	& $V_{BE(sat)}$ Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	NF	$I_C$ Max.	
2N6426	TO-92 (EBC)	40V	40V	12V	50nA	30V	20k 30k 20k	200k 300k 200k	10mA 100mA 500mA	5V 5V 5V	1.2V 1.5V	5mA 500mA	7pF		10dB	500mA	
2N6427	TO-92 (EBC)	40V	40V	12V	50nA	30V	10k 20k 14k	100k 200k 140k	10mA 100mA 500mA	5V 5V 5V	1.2V 1.5V	50mA 500mA	7pF		10dB	500mA	
MPS-A13	TO-92 (EBC)	(CES) 30V		10V	100nA	30V	5k 10k	10mA 100mA	5V 5V	1.5V		100mA	10pF	125MHz	10mA		500mA
MPS-A14	TO-92 (EBC)	(CES) 30V		10V	100nA	30V	10k 20k	10mA 100mA	5V 5V	1.5V		100mA	10pF	125MHz	10mA		500mA
MPS-A26	TO-92 (EBC)	(CES) 50V		10V	100nA	40V	10k 10k	10mA 100mA	5V 5V	1.5V		100mA					500mA
MPS-A27	TO-92 (EBC)	(CES) 60V		10V	100nA	50V	10k 10k	10mA 100mA	5V 5V	1.5V		100mA					500mA
MPS-A28	TO-92 (EBC)	(CES) 80V		12V	100nA	60V	10k 10k	10mA 100mA	5V 5V	1.5V		100mA	8pF	125MHz	10mA		500mA
MPS-A29	TO-92 (EBC)	(CES) 100V		12V	100nA	80V	10k 10k	10mA 100mA	5V 5V	1.2V		10mA	8pF	125MHz	10mA		500mA
MPS-D04	TO-92 (EBC)	25V		10V	1.0 $\mu$ A	20V	1k 2k 1k	10mA 100mA 300mA	5V 5V 5V	1.0V		100mA					500mA

Transistors TRANSISTORS

# Transistors

## TO-92 (JEDEC Standards Numbers)

### ●PNP Transistors

#### General purpose small signal amplifiers

Part No.	Package	$V_{CB0}$ Min.	$V_{CE0}$ Min.	$V_{EB0}$ Min.	$I_{CB0}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ Max.	& $V_{BE(sat)}$ Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	$t_{off}/NF$ Max.	$I_C$ Max.
2N3703 MPS3703	TO-92 (ECB) (EBC)	50V	30V	5V	100nA	20V	30 150	50mA 5V	0.25V	1.0V ( $V_{BE(on)}$ )	50mA	12pF	100MHz	50mA		200mA
2N5086	TO-92 (EBC)	50V	50V	3V	100nA	40V	150 500 150 100 150 100	100 $\mu$ A 5V 1.0mA 5V 10mA 5V	0.3V	0.85V ( $V_{BE(on)}$ )	10mA	6pF	40MHz	0.5mA	NF 3dB	200mA
2N5087	TO-92 (EBC)	50V	50V	3V	100nA	40V	250 800 250 100 250 100	100 $\mu$ A 5V 1.0mA 5V 10mA 5V	0.3V		10mA	6pF	40MHz	0.5mA	NF 2dB	200mA
MPS-A70	TO-92 (EBC)	40V	40V	4V	100nA	30V	40 400	5mA 10V	0.25V		10mA	6pF	125MHz	5mA		100mA

#### General purpose amplifiers and switches

Part No.	Package	$V_{CB0}$ Min.	$V_{CE0}$ Min.	$V_{EB0}$ Min.	$I_{CB0}$ Max.	@ $V_{CB}$	$h_{FE}$ Min. Max.	@ $I_C$ & $V_{CE}$	$V_{CE(sat)}$ Max.	& $V_{BE(sat)}$ Max.	@ $I_C$	$C_{ob}$ Max.	$f_T$ Min.	@ $I_C$	$t_{off}$ Max.	$I_C$ Max.
PN2907	TO-92 (EBC)	60V	40V	5V	100nA	50V	35 50 75 100 100 300 30 300	0.1mA 10V 1.0mA 10V 1.0mA 10V 1.50mA 10V 5.00mA 10V	0.4V 1.6V	1.3V 2.6V	150mA 500mA	8pF	200MHz	50mA	180ns	600mA
PN2907A	TO-92 (EBC)	60V	60V	5V	100nA	50V	75 100 100 300 100 300 50 300	0.1mA 10V 1.0mA 10V 1.0mA 10V 1.50mA 10V 5.00mA 10V	0.4V 1.6V	1.3V 2.6V	150mA 500mA	8pF	200MHz	50mA	180ns	600mA
2N3906	TO-92 (EBC)	40V	40V	5V	50nA (CES)	30V	60 80 150 300 60 300 30 300	0.1mA 1V 1.0mA 1V 1.0mA 1V 5.0mA 1V 1.0mA 1V	0.25V 0.4V	0.85V 0.95V	10mA 50mA	4.5pF	250MHz	10mA	300ns	200mA
2N4125	TO-92 (EBC)	30V	30V	4V	50nA	20V	50 150 25 50	2mA 1V 50mA 1V	0.4V	0.95V	50mA	4.5pF	200MHz	10mA		200mA
2N4126	TO-92 (EBC)	25V	25V	4V	50nA	20V	120 360 60 60	2mA 1V 50mA 1V	0.4V	0.95V	50mA	4.5pF	250MHz	10mA		200mA
2N4403	TO-92 (EBC)	40V	40V	5V	100nA	35V	30 60 100 100 100 300 20 20	0.1mA 1V 1.0mA 1V 1.0mA 1V 1.50mA 2V 5.00mA 2V	0.4V 0.75V	0.95V 1.3V	150mA 500mA	8.5pF	200MHz	20mA	255ns	600mA
2N6076	TO-92 (ECB)	25V	25V	5V	100nA (CES)	25V	100 500	10mA 10V	0.25V	0.85V	10mA	13pF	200MHz	Typ.	260ns	100mA
MPS3638	TO-92 (EBC)	25V	(CES) 25V	4V	100nA (CES)	15V	20 30 30 300	10mA 10V 50mA 1V 300mA 2V	0.25V 1.0V	1.1V 2.0V	50mA 300mA	20pF	100MHz	50mA	170ns	500mA
MPS3638A	TO-92 (EBC)	25V	(CES) 25V	4V	100nA (CES)	15V	80 100 100 100 100 20	1.0mA 10V 1.0mA 10V 50mA 1V 300mA 2V	0.25V 1.0V	1.1V 2.0V	50mA 300mA	10pF	150MHz	50mA	170ns	500mA
MPS4250	TO-92 (EBC)	40V	40V	5V	100nA	40V	250 700 250 100 250 100	0.1mA 5V 1mA 5V 10mA 5V	0.25V		10mA	6pF			NF 2.0dB	200mA
MPS6519	TO-92 (EBC)	40V	25V	4V	50nA	20V	250 500 150 100	2mA 10V 10mA 10V	0.5V		50mA	6pF	200MHz	Typ.	NF 2.0dB	100mA
MPS6534	TO-92 (EBC)	40V	40V	4V	100nA	30V	60 90 90 270 50 50	10mA 1V 10mA 1V 50mA 10V	0.5V	1.0V	100mA	8pF	260MHz	Typ.		600mA

● Medium power amplifiers

Part No.	Package	BV <sub>CEO</sub> Min.	BV <sub>CE0</sub> Min.	BV <sub>EBO</sub> Min.	I <sub>CBO</sub> Max.	@V <sub>CB</sub>	h <sub>FE</sub> Min.Max.	@I <sub>c</sub> & V <sub>CE</sub>	V <sub>CE</sub> (sat) & V <sub>BE</sub> (sat) Max. Max.	@ I <sub>c</sub>	Cob Max.	f <sub>r</sub> Min.	@ I <sub>c</sub>	t <sub>off</sub> N	I <sub>c</sub> Max.
2N5819	TO-92 (EBC)	50V	40V	5V	100nA	25V	150 25	2mA 500mA	5V 2V	500mA	15pF	135MHz	50mA		500mA
MPS4354	TO-92 (EBC)	60V	60V	5V	100nA	50V	25 40 50 40 30	0.1mA 1.0mA 10mA 100mA 500mA	10V 10V 10V 10V 10V	150mA 500mA	30pF	100MHz	50mA	400ns	500mA
MPS6562	TO-92 (EBC)	25V	25V	5V	100nA	20V	35 50 50	10mA 100mA 500mA	1V 1V 3V	500mA	30pF	60MHz	10mA		500mA
MPS-A55	TO-92 (EBC)	60V	60V	4V	100nA	60V	100 100	10mA 100mA	1V 1V	100mA		50MHz	100mA		500mA
MPS-A56	TO-92 (EBC)	80V	80V	4V	100nA	80V	50 50	10mA 100mA	1V 1V	100mA		50MHz	100mA		500mA

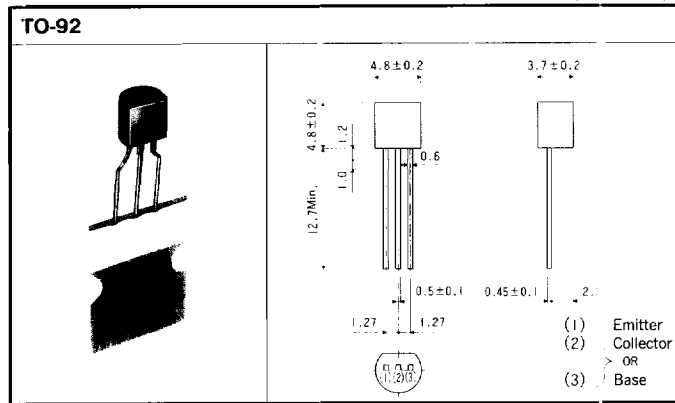
Transistors

TRANSISTORS

● Darlington amplifiers

Part No.	Package	BV <sub>CEO</sub> Min.	BV <sub>CE0</sub> Min.	BV <sub>EBO</sub> Min.	I <sub>CBO</sub> Max.	@V <sub>CB</sub>	h <sub>FE</sub> Min.Max.	@I <sub>c</sub> & V <sub>CE</sub>	V <sub>CE</sub> (sat) & V <sub>BE</sub> (sat) Max. Max.	@ I <sub>c</sub>	Cob Max.	f <sub>r</sub> Min.	@ I <sub>c</sub>	t <sub>off</sub> /NF	I <sub>c</sub> Max.
MPS-A63	TO-92 (EBC)	30V	30V (CES)	10V	100nA	30V	5K 10K	10mA 100mA	5V 5V	100mA	7pF	125MHz	10mA		500mA
MPS-A64	TO-92 (EBC)	30V	30V (CES)	10V	100nA	30V	10K 20K	10mA 100mA	5V 5V	100mA	7pF	125MHz	10mA		500mA
MPS-A65	TO-92 (EBC)	30V	30V (CES)	8V	100nA	30V	50K 20K	10mA 100mA	5V 5V	100mA		100MHz	10mA	2dB Typ.	500mA

(Unit : mm)



● Packaging specifications

(Unit : mm)

