

Bipolar Power Transistor Selection Guide

January 2003

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January 2003

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General Purpose Transistors

Products		I _C (A)	V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	h _{FE}				V _{CE(sat)}				P _C (W)	
NPN	PNP					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)		
DPAK															
KSH340	KSH350	0.5	300	300	3	30	240	10	0.05	0.34	1	0.3	0.06	15	
MJD340	MJD350	0.5	300	300	3	30	240	10	0.05	0.35	1	0.1	0.01	15	
KSH29	KSH30	1	40	40	5	15	75	4	1	-	0.7	1	0.125	15	
MJD29	MJD30	1	40	40	5	15	75	4	1	-	0.7	1	0.125	15	
KSH29C	KSH30C	1	100	100	5	15	75	4	1	-	0.7	1	0.125	15	
MJD29C	MJD30C	1	100	100	5	15	75	4	1	-	0.7	1	0.125	15	
KSH47		1	250	350	5	30	150	10	0.3	-	1	1	0.2	15	
MJD47		1	250	350	5	30	150	10	0.3	-	1	1	0.2	15	
KSH50		1	400	500	5	30	150	10	0.3	-	1	1	0.2	15	
MJD50		1	400	500	5	30	150	10	0.3	-	1	1	0.2	15	
FJD3076		2	50	50	5	120	270	3	0.5	0.5	0.8	2	0.2	10	
KSC3233		2	400	500	7	20	-	5	0.1	-	1	1	0.2	20	
KSH31	KSH32	3	40	40	5	10	50	4	3	-	1.2	3	0.375	15	
MJD31	MJD32	3	40	40	5	10	50	4	3	-	1.2	3	0.375	15	
KSH31C	KSH32C	3	100	100	5	10	50	4	3	-	1.2	3	0.375	15	
MJD31C	MJD32C	3	100	100	5	10	50	4	3	-	1.2	3	0.375	15	
KSH200	KSH210	5	25	40	8	45	180	1	2	-	0.3	0.5	0.05	12.5	
MJD200	MJD210	5	25	40	8	45	180	1	2	-	0.3	0.5	0.05	12.5	
KSH41C	KSH42C	6	100	100	5	15	75	4	3	-	1.5	6	0.6	20	
MJD41C	MJD42C	6	100	100	5	15	75	4	3	-	1.5	6	0.6	20	
KSH44H11	KSH45H11	8	80	-	5	60	-	1	2	-	1	8	0.4	20	
MJD44H11	MJD45H11	8	80	-	5	60	-	1	2	-	1	8	0.4	20	
KSH3055	KSH2955	10	60	70	5	20	100	4	4	-	1.1	4	0.4	20	
MJD3055	MJD2955	10	60	70	5	20	100	4	4	-	1.1	4	0.4	20	
D ² PAK															
	KSB834W	3	60	60	7	60	200	-	0.5	0.5	1	3	0.3	30	
SOT-223															
NZT44H8	NZT45H8	8	60	-	-	60	-	1	2	-	1	8	0.4	1.5	
IPAK															
KSC5054		0.5	400	500	7	20	80	5	0.05	-	1	0.3	0.06	10	
KSC3076	KSA1241	2	50	50 55	5	70	240	2	0.5	-	0.5	1	0.05	10	
KSC3073	KSA1243	3	30	30	5	70	240	2	0.5	0.3	0.8	2	0.2	10	
KSD1221	KSB906	3	60	60	7	60	300 200	5	0.5	0.4 1	1 1.7	3	0.3	20	
	KSA1242	5	20	35	8	100	320	2	0.5	-	1	4	0.1	10	
KSC3074	KSA1244	5	50	60	5	70	240	1	1	-	0.5	3	0.15	20	
	FJU1615	10	20	30	7	200	600	2	0.5	0.17	0.25	4	0.05	1	
KSH3055I		10	60	70	5	20	100	4	4	-	1.1	4	0.4	20	
TO-126															
KSC2682	KSA1142	0.1	180	180	5	100	320	5	0.01	0.12 0.16	0.5	0.05	0.005	8	
KSC3502		0.1	200	200	5	40	320	10	0.01	-	0.6	0.02	0.002	5	
	KSA1406	0.1	200	200	4	40	120	10	0.01	-	0.8	0.03	0.003	7	
KSC2258		0.1	250	250	6	40	-	20	0.04	-	1.2	0.05	0.005	4	
KSC2258A		0.1	300	300	6	40	-	20	0.04	-	1.2	0.05	0.005	4	
KSC3503	KSA1381	0.1	300	300	5	40	320	10	0.01	-	0.6	0.02	0.002	7	
KSC3953		0.2	120	120	3	40	120	10	0.01	-	1	0.03	0.003	8	
KSC2688		0.2	300	300	5	40	250	10	0.01	-	1.5	0.05	0.005	10	
BD157		0.5	250	275	5	30	240	10	0.05	-	-	-	-	20	
BD158		0.5	300	325	5	30	240	10	0.05	-	-	-	-	20	
KSE340	KSE350	0.5	300	300	5	30	240	10	0.05	-	-	-	-	20	
MJE340	MJE350	0.5	300	300	5	30	240	10	0.05	-	-	-	-	20	
BD159		0.5	350	375	5	30	240	10	0.05	-	-	-	-	20	
KSC2690	KSA1220	1.2	120	120	5	60	320	5	0.3	0.4	0.7	1	0.2	20	
KSC2690A	KSA1220A	1.2	160	160	5	60	320	5	0.3	0.4	0.7	1	0.2	20	
BD135	BD136	1.5	45	45	5	40	250	2	0.15	-	0.5	0.5	0.05	12.5	
BD137	BD138	1.5	60	60	5	40	250	2	0.15	-	0.5	0.5	0.05	12.5	
BD139	BD140	1.5	80	80	5	40	250	2	0.15	-	0.5	0.5	0.05	12.5	
BD375	BD376	2	45	50	5	40	375	2	0.15	-	1	1	0.1	25	
BD233	BD234	2	45	45	5	40	-	2	0.15	-	0.6	1	0.1	25	
BD377	BD378	2	60	75	5	40	375	2	0.15	-	1	1	0.1	25	

General Purpose Transistors (continued)

Products		I _C (A)	V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	h _{FE}				V _{CE(sat)}				P _C (W)
NPN	PNP					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)	
TO-126 (continued)														
BD235	BD236	2	60	60	5	40	-	2	0.15	-	0.6	1	0.1	25
BD379	BD380	2	80	100	5	40	375	2	0.15	-	1	1	0.1	25
BD237	BD238	2	80	100	5	40	-	2	0.15	-	0.6	1	0.1	25
KSD882	KSB772	3	30	40	5	60	400	2	1	0.3	0.5	2	0.2	10
KSE180	KSE170	3	40	60	7	50	250	1	0.1	-	0.3	0.5	0.05	12.5
MJE180	MJE170	3	40	60	7	50	250	1	0.1	-	0.3	0.5	0.05	12.5
KSD794	KSB744	3	45	70	5	60	320	5	0.5	0.5	2	1.5	0.15	10
BD175	BD176	3	45	45	5	40	250	2	0.15	-	0.8	1	0.1	30
KSD794A	KSB744A	3	60	70	5	60	320	5	0.5	0.5	2	1.5	0.15	10
KSE181	KSE171	3	60	80	7	50	250	1	0.1	-	0.3	0.5	0.05	12.5
MJE181	MJE171	3	60	80	7	50	250	1	0.1	-	0.3	0.5	0.05	12.5
BD177	BD178	3	60	60	5	40	250	2	0.15	-	0.8	1	0.1	30
KSE182	KSE172	3	80	100	7	50	250	1	0.1	-	0.3	0.5	0.05	12.5
MJE182	MJE172	3	80	100	7	50	250	1	0.1	-	0.3	0.5	0.05	12.5
BD179	BD180	3	80	80	5	40	250	2	0.15	-	0.8	1	0.1	30
BD433	BD434	4	22	22	5	40	-	5	0.01	0.2	0.5	2	0.2	36
BD435	BD436	4	32	32	5	40	-	5	0.01	0.2	0.5	2	0.2	36
BD437	BD438	4	45	45	5	30	-	5	0.01	0.2	0.6	2	0.2	36
BD439	BD440	4	60	60	5	20	-	5	0.01	-	0.8	2	0.2	36
BD441	BD442	4	80	80	5	15	-	5	0.01	-	0.8	2	0.2	36
KSE200	KSE210	5	25	40	8	45	180	1	2	-	0.75	2	0.2	15
MJE200	MJE210	5	25	40	8	45	180	1	2	-	0.75	2	0.2	15
KSD1691	KSB1151	5	60	60	7	100	400	1	2	0.1	0.3	2	0.2	20
TO-220														
KSC1507		0.2	300	300	7	40	240	10	0.01	-	2	0.05	0.005	15
TIP29	TIP30	1	40	40	5	15	75	4	1	-	0.7	1	0.125	30
TIP29A	TIP30A	1	60	60	5	15	75	4	1	-	0.7	1	0.125	30
TIP29B	TIP30B	1	80	80	5	15	75	4	1	-	0.7	1	0.125	30
TIP29C	TIP30C	1	100	100	5	15	75	4	1	-	0.7	1	0.125	30
TIP47		1	250	350	5	30	150	10	0.3	-	1	1	0.2	40
TIP48		1	300	400	5	30	150	10	0.3	-	1	1	0.2	40
TIP49		1	350	450	5	30	150	10	0.3	-	1	1	0.2	40
TIP50		1	400	500	5	30	150	10	0.3	-	1	1	0.2	40
KSC2073	KSA940	1.5	150	150	5	40	140	10	0.5	-	1 1.5	0.5	0.05	25
BD239	BD240	2	45	55	5	15	-	4	1	-	0.7	1	0.2	30
BD239A	BD240A	2	60	70	5	15	-	4	1	-	0.7	1	0.2	30
BD239B	BD240B	2	80	90	5	15	-	4	1	-	0.7	1	0.2	30
BD239C	BD240C	2	100	115	5	15	-	4	1	-	0.7	1	0.2	30
KSD401	KSB546	2	150	200	5	40	400 240	10	0.4	-	1	0.5	0.05	25
KSC1173	KSA473	3	30	30	5	70	240	2	0.5	0.3	0.8	2	0.2	10
TIP31	TIP32	3	40	40	5	10	50	4	3	-	1.2	3	0.375	40
BD241	BD242	3	45	55	5	10	-	4	3	-	1.2	3	0.6	40
KSD288	KSA614	3	55	80	5	40	240	5	0.5	0.15	1 0.5	1	0.1	25
TIP31A	TIP32A	3	60	60	5	10	50	4	3	-	1.2	3	0.375	40
KSD880	KSB834	3	60	60	7	60	300 200	5	0.5	0.4 0.5	1	3	0.3	30
BD241A	BD242A	3	60	70	5	10	-	4	3	-	1.2	3	0.6	40
TIP31B	TIP32B	3	80	80	5	10	50	4	3	-	1.2	3	0.375	40
BD241B	BD242B	3	80	90	5	10	-	4	3	-	1.2	3	0.6	40
TIP31C	TIP32C	3	100	100	5	10	50	4	3	-	1.2	3	0.375	40
BD241C	BD242C	3	100	115	5	10	-	4	3	-	1.2	3	0.6	40
KSC2233		4	60	200	5	30	150	5	1	-	1	4	0.4	40
KSD526	KSB596	4	80	80	5	40	240	5	0.5	0.45 1	1.5 1.7	3	0.3	30
KSD73		5	60	100	5	70	240	10	1	-	2	5	0.5	30
KSD362		5	70	150	8	20	140	5	5	-	1	5	0.5	40
KSD1943		3	60	80	8	400	2000	4	0.5	-	1.5	2	0.05	40
KSC2517		5	100	150	12	40	200	5	2	-	0.6	3	0.3	30
TIP41	TIP42	6	40	40	5	15	75	4	3	-	1.5	6	0.6	65
BD243	BD244	6	45	45	5	30	-	4	0.3	-	1.5	6	1	65
BD243A	BD244A	6	60	60	5	30	-	4	0.3	-	1.5	6	1	65
TIP41A	TIP42A	6	60	60	5	15	75	4	3	-	1.5	6	0.6	65

General Purpose Transistors (continued)

Products		I _C (A)	V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	h _{FE}				V _{CE(sat)}				P _C (W)
NPN	PNP					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)	
TO-220 (continued)														
BD243B	BD244B	6	80	80	5	30	-	4	0.3	-	1.5	6	1	65
TIP41B	TIP42B	6	80	80	5	15	75	4	3	-	1.5	6	0.6	65
BD243C	BD244C	6	100	100	5	30	-	4	0.3	-	1.5	6	1	65
TIP41C	TIP42C	6	100	100	5	15	75	4	3	-	1.5	6	0.6	65
KSD363		6	120	300	8	40	240	5	1	-	1	1	0.1	40
KSD568	KSB707	7	60	100 80	7	40	200	1	3	-	0.5	5	0.5	40
KSD569	KSB708	7	80	100 80	7	40	200	1	3	-	0.5	5	0.5	40
KSC2334	KSA1010	7	100	150 100	7	40	240 200	5	3	-	0.6	5	0.5	40
BU407		7	150	330	6	-	-	-	-	-	1	5	0.5	60
BU407H		7	150	330	6	-	-	-	-	-	1	5	0.8	60
BU406		7	200	400	6	-	-	-	-	-	1	5	0.5	60
BU406H		7	200	400	6	-	-	-	-	-	1	5	0.8	60
BU408		7	200	400	6	-	-	-	-	-	1	6	1.2	60
BD533	BD534	8	45	45	5	20	-	5	0.01	-	0.8	2	0.2	50
BD535	BD536	8	60	60	5	20	-	5	0.01	-	0.8	2	0.2	50
BD537	BD538	8	80	80	5	15	-	5	0.01	-	0.8	2	0.2	50
KSE3055T	KSE2955T	10	60	70	5	20	100	4	4	-	1.1	4	0.4	75
KSE44H	KSE45H	10	80	-	5	60	-	1	2	-	1	8	0.4	50
MJE3055T	MJE2955T	10	60	70	5	20	100	4	4	-	1.1	4	0.4	75
TO-220F														
KSC3296	KSA1304	1.5	150	150	5	40	140	10	0.5	-	1.5	0.5	0.05	20
	KSA1614	3	55	80	5	40	240	5	0.5	0.15	0.5	1	0.1	20
KSD1406	KSB1015	3	60	60	7	60	300 200	5	0.5	0.4 0.5	1	3	0.3	25
KSD2012	KSB1366	3	60	60	7	100	320	5	0.5	0.4 0.5	1	2	0.2	25
KSD2058		3	60	60	7	60	300	5	0.5	-	1.5	2	0.2	25
KSD1273		3	60	80	6	500	2500	4	0.5	-	1	2	0.05	40
KSD1944		3	60	80	8	400	2000	4	0.5	-	1	2	0.05	30
KSD1408	KSB1017	4	80	80	5	40	240	5	0.5	0.45 1	1.5 1.7	3	0.3	25
KSD1362		5	70	150	8	20	140	5	5	-	1	5	0.5	20
KSD1588	KSB1097	7	60	100 80	7	40	200	1	3	-	0.5	5	0.5	30

Darlington Transistors

Products		I _C (A)	V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	h _{FE}				V _{CE(sat)}				P _C (W)
NPN	PNP					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (mA)	
DPAK														
KSH112	KSH117	2	100	100	5	1000	12000	3	2	-	2	2	8	20
KSH122	KSH127	8	100	100	5	1000	12000	4	4	-	2	4	16	20
MJD112	MJD117	2	100	100	5	1000	12000	3	2	-	2	2	8	20
MJD122	MJD127	8	100	100	5	1000	12000	4	4	-	2	4	16	20
IPAK														
KSD1222	KSB907	3	40	60	5	2000	-	2	1	-	1.5	2	4	15
TO-126														
KSD985	KSB794	1.5	60	150 60	8	2000	30000	2	1	-	1.5	1	1	10
KSD986	KSB795	1.5	80	150 80	8	2000	30000	2	1	-	1.5	1	1	10
KSD1692	KSB1149	3	100	150 100	8	2000	20000	2	1.5	0.9	1.2	1.5	1.5	15
KSE800	KSE700	4	60	60	5	750	-	3	1.5	-	2.5	1.5	30	14
KSE801	KSE701	4	60	60	5	750	-	3	2	-	2.8	2	40	14
KSE802	KSE702	4	80	80	5	750	-	3	1.5	-	2.5	1.5	30	14
KSE803	KSE703	4	80	80	5	750	-	3	2	-	2.8	2	40	14
BD675A	BD676A	4	45	45	5	750	-	3	2	-	2.8	2	40	14
BD677A	BD678A	4	60	60	5	750	-	3	2	-	2.8	2	40	14
BD679A	BD680A	4	80	80	5	750	-	3	2	-	2.8	2	40	14
BD681	BD682	4	100	100	5	750	-	3	1.5	-	2.5	1.5	30	14
MJE800	MJE700	4	60	60	5	750	-	3	1.5	-	2.5	1.5	30	14
MJE801	MJE701	4	60	60	5	750	-	3	2	-	2.8	2	40	14
MJE802	MJE702	4	80	80	5	750	-	3	1.5	-	2.5	1.5	30	14
MJE803	MJE703	4	80	80	5	750	-	3	2	-	2.8	2	40	14
TO-220														
TIP110	TIP115	2	60	60	5	500	-	4	2	-	2.5	2	8	50
TIP111	TIP116	2	80	80	5	500	-	4	2	-	2.5	2	8	50
TIP112	TIP117	2	100	100	5	500	-	4	2	-	2.5	2	8	50
KSD5018		4	275	600	10	-	-	-	-	-	1.5	2	5	40
FJP9100*		4	275	600	10	1000	5000	5	0.5	-	1.5	2	5	40
TIP120	TIP125	5	60	60	5	1000	-	3	0.5	-	2	3	12	65
TIP121	TIP126	5	80	80	5	1000	-	3	0.5	-	2	3	12	65
TIP122	TIP127	5	100	100	5	1000	-	3	0.5	-	2	3	12	65
KSD560	KSB601	5	100	150 100	7	2000	15000	2	3	0.9	1.5	3	3	30
BDW23	BDW24	6	45	45	5	750	20000	3	2	-	2	2	8	50
BDW23A	BDW24A	6	60	60	5	750	20000	3	2	-	2	2	8	50
BDW23B	BDW24B	6	80	80	5	750	20000	3	2	-	2	2	8	50
BDW23C	BDW24C	6	100	100	5	750	20000	3	2	-	2	2	8	50
BDX53	BDX54	8	45	45	5	750	-	3	3	-	2	3	12	60
BDX53A	BDX54A	8	60	60	5	750	-	3	3	-	2	3	12	60
TIP100	TIP105	8	60	60	5	1000	20000	4	3	-	2	3	6	80
BDX53B	BDX54B	8	80	80	5	750	-	3	3	-	2	3	12	60
TIP101	TIP106	8	80	80	5	1000	20000	4	3	-	2	3	6	80
BDX53C	BDX54C	8	100	100	5	750	-	3	3	-	2	3	12	60
TIP102	TIP107	8	100	100	5	1000	20000	4	3	-	2	3	6	80
BU807		8	150	330	6	-	-	-	-	-	1.5	5	50	60
BU806		8	200	400	6	-	-	-	-	-	1.5	5	50	60
KSE5740		8	300	-	8	50	-	5	0.5	-	2	4	200	80
KSE5741		8	350	-	8	50	-	5	0.5	-	2	4	200	80
KSE5742		8	400	-	8	50	-	5	0.5	-	2	4	200	80
BDX33	BDX34	10	45	45	-	750	-	3	4	-	2.5	4	8	70
BDX33A	BDX34A	10	60	60	-	750	-	3	4	-	2.5	4	8	70
BDX33B	BDX34B	10	80	80	-	750	-	3	3	-	2.5	3	6	70
TIP141T	TIP146T	10	80	80	5	1000	-	4	5	-	2	5	10	80
BDX33C	BDX34C	10	100	100	-	750	-	3	3	-	2.5	3	6	70
TIP142T	TIP147T	10	100	100	5	1000	-	4	5	-	2	5	10	80
BDW93	BDW94	12	45	45	-	750	20000	3	5	-	2	5	20	80
BDW93A	BDW94A	12	60	60	-	750	20000	3	5	-	2	5	20	80
BDW93B	BDW94B	12	80	80	-	750	20000	3	5	-	2	5	20	80
BDW93C	BDW94C	12	100	100	-	750	20000	3	5	-	2	5	20	80
TIP140T	TIP145T	10	60	60	5	1000	-	4	5	-	2	5	10	80

* available in Q2/2003

Darlington Transistors (continued)

Products		I _C (A)	V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	h _{FE}				V _{CE(sat)}				P _C (W)	
NPN	PNP					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (mA)		
TO-220F															
BDW93CF		12	100	100	-	750	20000	-	5	-	2	5	20	30	
KSD1413	KSB1023	3	60	60	5	2000	-	2	1	-	1.5	2	4	20	
KSD1589	KSB1098	5	100	150 100	7	2000	15000	2	3	0.9	1.5	3	3	20	
KSD1417	KSB1022	7	60	60	5	2000	15000	3	3	0.9 0.95	1.5	3	6	30	
	FJPF9020	2	550	550	6	400	700	4	1	-	1.5	1	20	15	
TO-3P															
KSC5047		15	50	100	15	40	-	5	5	-	0.5	5	120	100	
TIP140	TIP145	10	60	60	5	1000	-	4	5	-	2	5	10	125	
TIP141	TIP146	10	80	80	5	1000	-	4	5	-	2	5	10	125	
TIP142	TIP147	10	100	100	5	1000	-	4	5	-	2	5	10	125	
TO-3PF															
TIP140F	TIP145F	10	60	60	5	1000	-	4	5	-	2	5	10	60	
TIP141F	TIP146F	10	80	80	5	1000	-	4	5	-	2	5	10	60	
TIP142F	TIP147F	10	100	100	5	1000	-	4	5	-	2	5	10	60	

Switching Transistors

Products		V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	I _C (A)	h _{FE}				V _{CE(sat)}				t _{STG} (Max) (us)	t _F (Max) (us)	P _C (W)
NPN	PNP					Min	Max	V _{CE} @ I _C	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)			
DPAK																
FJD23004*	FJD23003*	400	500	5	1	15	-	5	0.35	-	0.5	0.5	0.1	2.5	0.5	20
D²PAK																
KSC5338DW		450	1000	12	5	15	-	1	0.8	0.35	0.5	0.8	0.08	2.2	0.15	75
KSC5504D		600	1200	12	4	15	35	1	0.5	0.28	0.6	0.5	0.05	4.5	0.35	75
TO-92																
FJN23004*	FJN23003*	400	500	5	1	15	-	5	0.35	-	0.5	0.5	0.1	2.5	0.5	1
FJN13003		400	700	9	1.5	9	21	2	0.5	-	0.5	0.5	0.1	4	0.7	1.1
TO-126																
	KSA1156	400	400	7	0.5	30	200	5	0.1	-	1	0.1	0.01	4	1	10
KSC2752		400	500	7	0.5	20	80	5	0.05	-	1	0.3	0.06	2.5	1	10
KSE13003		400	700	9	1.5	8	40	2	0.5	-	0.5	0.5	0.1	4	0.7	20
KSE5020		500	800	7	3	15	50	5	0.3	-	1	1.5	0.3	3	0.3	30
KSC5026M		800	1100	7	1.5	10	40	5	0.1	-	2	0.75	0.15	3	0.3	20
TO-220																
KSE13006		300	600	9	8	8	60	5	2	-	1	2	0.4	3	0.7	80
KSE13008		300	600	9	12	8	40	5	5	-	1	5	1	3	0.7	100
KSC2333		400	500	7	2	20	80	5	0.1	-	1	0.5	0.1	2.5	1	15
KSC2518		400	500	7	4	20	80	5	0.3	-	1	1.5	0.3	2.5	0.7	40
KSE13005		400	700	9	4	10	60	5	1	-	0.5	1	0.2	4	0.9	75
FJP5304D*		400	700	12	4	8	40	5	2	-	1	1	0.2	2.9	0.2	70
BUT11		400	850	9	5	-	-	-	-	-	1.5	3	0.6	4	0.8	100
KSC5039		400	800	7	5	10	-	5	0.3	-	1.5	2.5	0.5	3	0.8	70
KSC2335		400	500	7	7	20	80	5	1	-	1	3	0.6	2.5	1	40
BUT12		400	850	-	8	-	-	-	-	-	1.5	6	1.2	4	0.8	100
KSE13007		400	700	9	8	8	60	5	2	-	1	2	0.4	3	0.7	80
KSE13009		400	700	9	12	8	40	5	5	-	1	5	1	3	0.7	100
BUT11A		450	1000	9	5	-	-	-	-	-	1.5	2.5	0.5	4	0.8	100
KSC5345		450	900	14	5	15	-	5	0.6	-	1	3	0.6	3	0.3	40
KSC5405		450	1000	9	5	10	40	5	0.6	-	1.5	2.5	0.5	4	0.8	100
BUT12A		450	1000	-	8	-	-	-	-	-	1.5	6	1.2	4	0.8	100
KSC5020		500	800	7	3	15	50	5	0.3	-	1	1.5	0.3	3	0.3	40
KSC5021		500	800	7	5	15	50	5	0.6	-	1	3	0.6	3	0.3	50
KSC5321		500	800	7	5	15	40	5	0.6	-	1	3	0.6	3	0.3	100
KSC5026		800	1100	7	1.5	10	40	5	0.1	-	2	0.75	0.15	3	0.3	40
KSC5027		800	1100	7	3	10	40	5	0.2	-	2	1.5	0.3	3	0.3	50
KSC5367		800	1600	12	3	12	35	3	0.4	-	2.5	0.25	0.025	2.2	0.5	80
TO-220F																
KSC3569		400	500	7	2	20	80	5	0.1	-	1	0.5	0.1	2.5	1	15
KSE13005F		400	700	9	4	10	60	5	1	-	0.5	1	0.2	4	0.9	30
BUT11F		400	850	9	5	-	-	-	-	-	1.5	3	0.6	4	0.8	40
KSC5039F		400	800	7	5	10	-	5	0.3	-	1.5	2.5	0.5	3	0.8	30
KSC2335F		400	500	7	7	20	80	-	1	-	1	3	0.6	2.5	1	30
KSE13007F		400	700	9	8	8	60	5	2	-	1	2	0.4	3	0.7	40
KSE13009F		400	700	9	12	8	40	5	5	-	1	5	1	3	0.7	50
BUT11AF		450	1000	9	5	-	-	-	-	-	1.5	2.5	0.5	4	0.8	40
KSC5405F		450	1000	9	5	10	40	5	0.6	-	1.5	2.5	0.5	4	0.8	40
KSC5021F		500	800	7	5	15	50	5	0.6	-	1	3	0.6	3	0.3	40
KSC5321F		500	800	7	5	15	40	5	0.6	-	1	3	0.6	3	0.3	40
KSC5027F		800	1100	7	3	10	40	5	0.2	-	2	1.5	0.3	3	0.3	40
KSC5367F		800	1600	12	3	12	35	3	0.4	-	2.5	0.25	0.025	2.2	0.5	40
TO-3P																
KSE13009L		400	700	9	12	8	40	5	5	-	1	5	1	3	0.7	130
KSC2751		400	500	7	15	15	80	5	2	0.3	1	10	2	2.5	0.7	120
KSC5024		500	800	7	10	15	50	5	0.8	-	1	4	0.8	3	0.3	90
KSC5025		500	800	7	15	15	50	5	1.2	-	1	6	1.2	3	0.3	100
KSC5029		800	1100	7	4.5	10	40	5	0.3	-	2	2	0.4	3	0.3	90
KSC5030		800	1100	7	6	10	40	5	0.4	-	2	3	0.6	3	0.3	100
KSC3552		800	1100	7	12	10	40	5	0.8	-	2	6	1.2	3	0.3	150
TO-3PF																
KSC5030F		800	1100	7	6	10	40	5	0.4	-	2	3	0.6	3	0.3	60

* available in Q2/2003

Horizontal Deflection Output / Dynamic Focus Transistors

Horizontal Deflection Output Transistors

Products NPN	V _{CBO} (V)	V _{CEO} (V)	V _{EBO} (V)	I _C (A)	h _{FE}				V _{CE(sat)}				t _{STG} (Max) (us)	t _F (Max) (us)	P _C (W)
					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)			
TO-220F															
FJPF6806D	1500	750	6	6	4	7	5	4	-	5	4	1	3	0.2	40
TO-3PF															
BU508AF	1500	700	5	5	2.25	-	5	4.5	-	1	4.5	2	-	-	60
FJAF6806D	1500	750	6	6	4	7	5	4	-	5	4	1	3	0.2	50
FJAF6808D	1500	750	6	8	4.5	7.5	5	5	-	5	5	1.2	3	0.2	50
FJAF6810	1500	750	6	10	5	8	5	6	-	3	6	1.5	3	0.2	60
FJAF6810D	1500	750	6	10	5	8	5	6	-	3	6	1.5	3	0.2	60
FJAF6812	1500	750	6	12	5	8	5	8	-	3	8	2	3	0.2	60
FJAF6815	1500	750	6	15	5	8	5	10	-	3	10	2.5	3	0.2	60
FJAF6820	1500	750	6	20	5.5	8.5	5	11	-	3	11	2.75	3	0.2	60
KSD5707	1500	800	6	6	5	15	5	3	2	5	4	0.8	-	0.4	60
FJAF6910	1700	800	6	10	7	10	5	6	-	3	6	1.5	4	0.3	60
FJAF6916	1700	800	6	16	6	9	5	8.5	-	3	10	2.5	4	0.3	60
FJAF6920	1700	800	6	20	5.5	8.5	5	11	-	3	11	2.75	3	0.2	60
TO-264															
FJL6820	1500	750	6	20	5.5	8.5	5	11	-	3	11	2.75	3	0.2	200
FJL6825	1500	750	6	25	6	9	5	12	-	3	12	3	3	0.2	200
FJL6920	1700	800	6	20	5.5	8.5	5	11	-	3	11	2.75	3	0.2	200

Dynamic Focus Transistors

Products NPN	V _{CBO} (V)	V _{CEO} (V)	V _{EBO} (V)	I _C (A)	h _{FE}				V _{CE(sat)}				P _C (W)
					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)	
TO-126													
KSC5042M	1500	900	5	0.1	30	-	5	0.01	-	5	0.02	0.004	4
TO-220													
KSC5042	1500	900	5	0.1	30	-	5	0.01	-	5	0.02	0.004	10
TO-220F													
KSC5042F	1500	900	5	0.1	30	-	5	0.01	-	5	0.02	0.004	6

Audio & Car Amp Output / Anti-Saturation Transistors

Audio & Car Amp Output Transistors

Products		I _C (A)	V _{CEO} (V)	V _{CBO} (V)	V _{EBO} (V)	h _{FE}				V _{CE(sat)}				P _C (W)
NPN	PNP					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)	
TO-3P														
KSC4010	KSA3010	6	120	120	5	55	160	5	1	-	2.5	5	0.5	60
FJA4310	FJA4210	10	140	200	6	50	180	4	3	-	0.5	5	0.5	100
FJA4313*	FJA4213*	13	230	230	5	55	160	5	1	0.4	3	8	0.8	130
TO-3PF														
FJAF4310	FJAF4210	10	140	200	6	50	180	4	3	-	0.5	5	0.5	80
TO-264														
KSC5200	KSA1943	13	230	230	5	55	160	5	1	0.4	3	8	0.8	130
FJL4315	FJL4215	15	230	230	5	55	160	5	1	0.4	3	8	0.8	150

* available in Q2/2003

Anti-Saturation Transistors

Products NPN	V _{CBO} (V)	V _{CEO} (V)	V _{EBO} (V)	I _C (A)	h _{FE}				V _{CE(sat)}				t _{STG} (Max) (us)	t _F (Max) (us)	P _C (W)	
					Min	Max	@ V _{CE} (V)	@ I _C (A)	Typ	Max	@ I _C (A)	@ I _B (A)				
DPAK																
KSC5402D	1000	450	12	2	14	-	1	0.4	0.25	0.6	0.4	0.04	0.65	0.175	50	
KSC5502D	1200	600	12	2	15	40	1	0.2	0.31	0.8	0.2	0.02	2	0.2	50	
IPAK																
KSC5302DI	800	400	12	2	20	-	1	0.4	-	0.4	0.4	0.04	2	0.2	25	
TO-126																
KSC5302DM	800	400	12	2	20	-	1	0.4	-	0.4	0.4	0.04	2	0.2	25	
TO-220																
KSC5302D	800	400	12	2	20	-	1	0.4	-	0.4	0.4	0.04	2	0.2	50	
KSC5305D	800	400	12	5	22	-	1	0.8	-	0.4	0.8	0.08	2	0.2	75	
KSC5402DT	1000	450	12	2	14	-	1	0.4	0.25	0.6	0.4	0.04	0.65	0.175	30	
KSC5338D	1000	450	12	5	6	-	1	2	0.47	0.75	2	0.4	2.2	0.15	75	
KSC5502DT	1200	600	12	2	15	40	1	0.2	0.31	0.8	0.2	0.02	2	0.2	50	
KSC5504DT	1200	600	12	4	15	35	1	0.5	0.28	0.6	0.5	0.05	4.5	0.35	75	
KSC5603D	1600	800	12	3	20	35	3	0.4	0.5	1.25	0.25	0.025	0.175	0.2	100	

Technical drawing of the 2.30TYP pressure sensor showing front, side, and top views with dimensions in mm.

Front View Dimensions:

- Overall width: 6.60 ± 0.20
- Width between mounting holes: 5.34 ± 0.30
- Mounting hole diameter: $\varnothing 0.50$
- Distance from mounting hole to center: 4.34
- Distance from center to edge: 0.70 ± 0.20
- Overall height: 9.50 ± 0.30
- Distance from base to center: 6.10 ± 0.20
- Distance from base to mounting hole: 2.70 ± 0.20
- Base thickness: 0.60 ± 0.20
- Distance from base to top of housing: 0.80 ± 0.20
- Max. hole diameter: $\text{MAX} \varnothing 0.96$
- Distance between mounting holes: 0.76 ± 0.10

Side View Dimensions:

- Overall width: 2.30 ± 0.10
- Distance from base to top of housing: 0.50 ± 0.10
- Distance from base to center: 0.91 ± 0.10
- Distance from base to mounting hole: 0.89 ± 0.10
- Distance from base to top of housing: 0.50 ± 0.10
- Distance from base to top of housing: 1.02 ± 0.20
- Distance from base to top of housing: 2.30 ± 0.20
- Minimum height: $\text{MIN} 0.55$

Top View Dimensions:

- Overall width: 6.60 ± 0.20
- Width between mounting holes: 5.34
- Width between mounting holes: 5.04
- Distance from mounting hole to center: 1.50
- Distance from base to center: 6.10 ± 0.20
- Distance from base to mounting hole: 2.70 ± 0.20
- Distance from base to top of housing: 0.70
- Distance from base to top of housing: 0.90
- Distance from base to top of housing: 1.00
- Distance from base to top of housing: 3.05
- Distance from base to top of housing: 0.10
- Distance from base to top of housing: 0.76 ± 0.10

Bottom View Dimensions:

- Distance from base to top of housing: 2.70 ± 0.20
- Distance from base to top of housing: 0.70
- Distance from base to top of housing: 0.90
- Distance from base to top of housing: 1.00
- Distance from base to top of housing: 3.05
- Distance from base to top of housing: 0.10
- Distance from base to top of housing: 0.76 ± 0.10

Notes:

- 2.30TYP
- [2.30 ± 0.20]
- 2.30TYP
- [2.30 ± 0.20]
- (2X $\varnothing 0.25$)

Dimensions in Millimeters

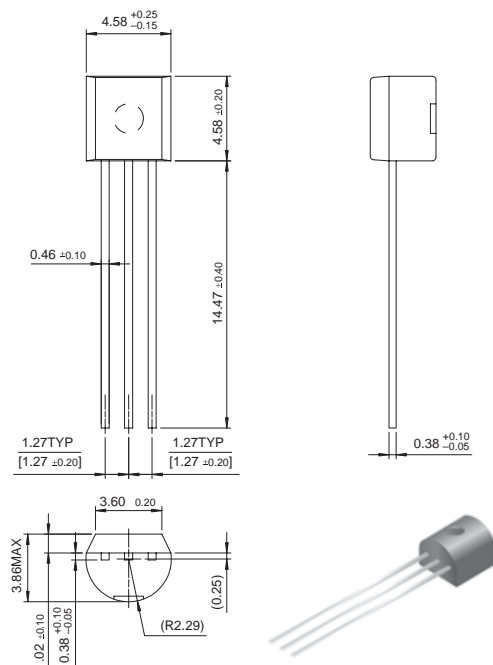
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Dimensions in Millimeters

Packages (continued)

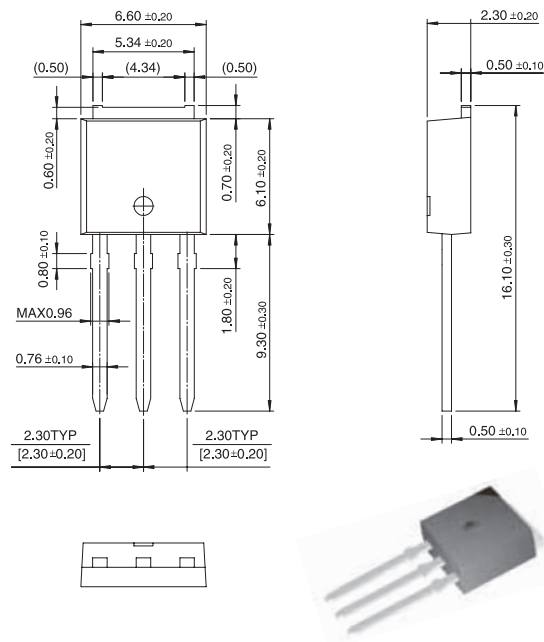
Through-Hole

TO-92



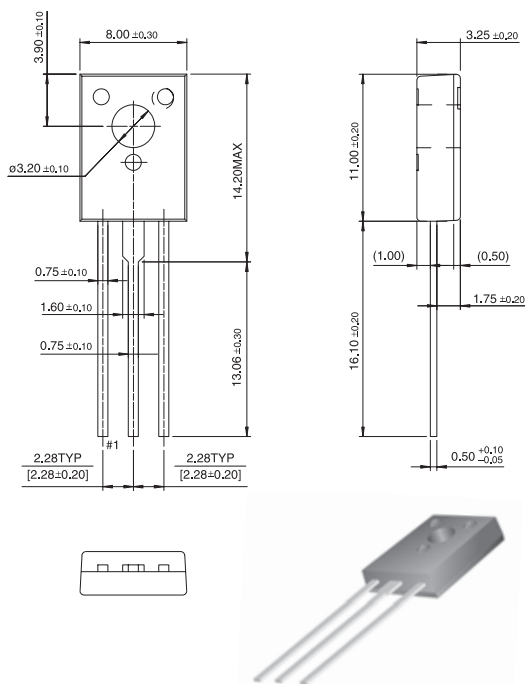
Dimensions in Millimeters

IPAK



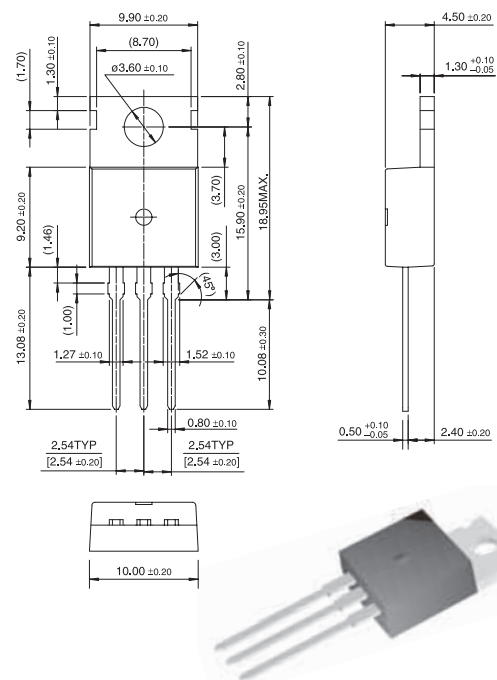
Dimensions in Millimeters

TO-126



Dimensions in Millimeters

TO-220

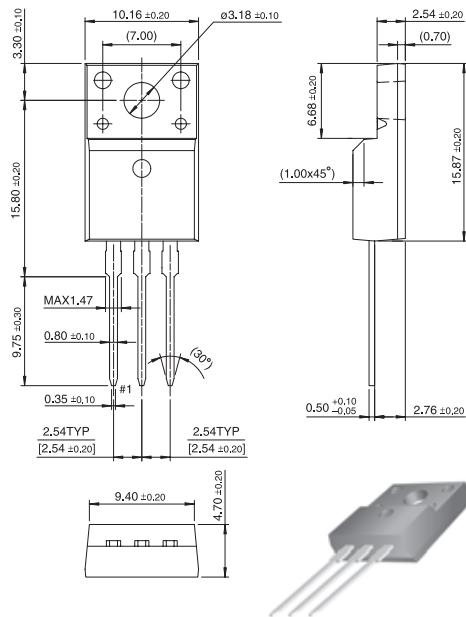


Dimensions in Millimeters

Packages (continued)

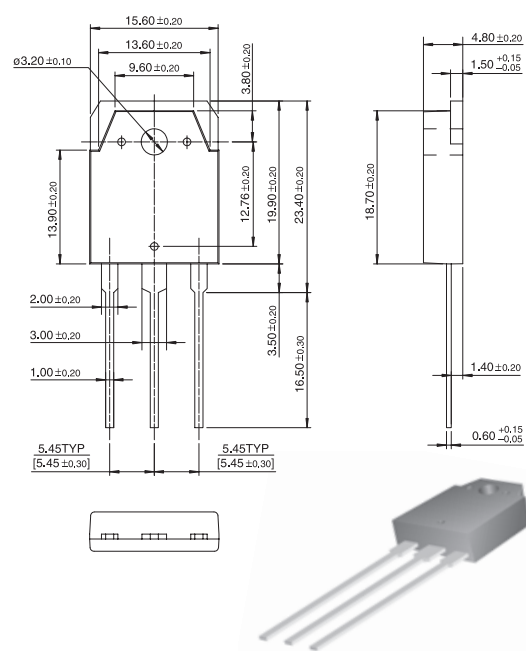
Through-Hole (continued)

TO-220F



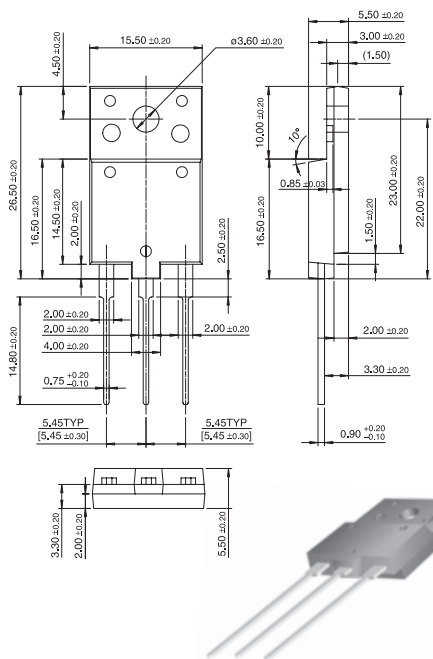
Dimensions in Millimeters

TO-3P



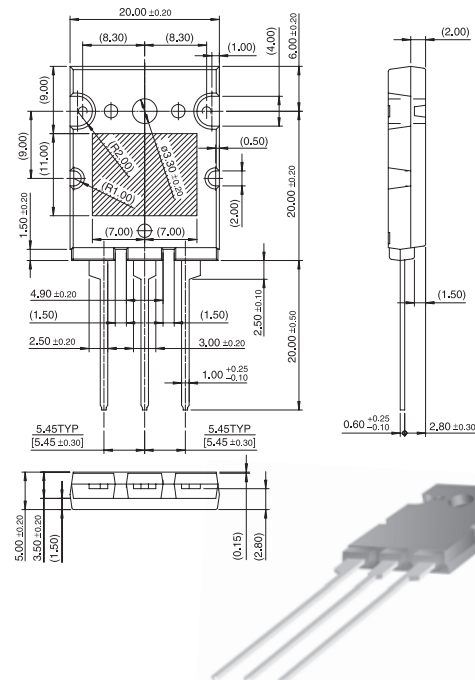
Dimensions in Millimeters

TO-3PF



Dimensions in Millimeters

TO-264



Dimensions in Millimeters

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