

Selection Guide

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Small Signal Transistors

Process	Principal Device	BV _{CBO}	BV _{CEO}	BV _{EBO}	I _{CBO} @ V _{CB}	h _{FE}		@V _{CE} @ I _C		V _{CE(SAT)} @ I _C		C _{ob}	f _T	NF	t _{off}
		(V) MIN	(V) MIN	(V) MIN	I _{CES} *I _{CEV} (nA) MAX	(V)	MIN	MAX	(V)	(mA)	(V)	(mA)	(pF) MAX	(MHz) TYP†	(dB) MAX

General Purpose Amplifier/Switch

Devices are listed in order of descending breakdown voltage

NPN

New

CP195	2N3501	150	150	6.0	50	75	100	300	10	150	0.4	150	8.0	150	–	–
CP191V	2N2222A	75	40	6.0	10	60	100	300	10	150	1.0	500	8.0	300	4.0	285
CP225	2N2221A	75	40	6.0	10	60	40	120	10	150	0.3	150	8.0	250	–	285
CP192V	2N3904	60	40	6.0	50**	30	100	300	1.0	10	0.3	50	4.0	300	5.0	250
CP392V	2N3904	60	40	6.0	50**	30	100	300	1.0	10	0.3	50	4.0	300	5.0	250

General Purpose Amplifier/Switch

Devices are listed in order of descending breakdown voltage

PNP

New

New

CP595	2N5680	120	120	4.0	1,000	120	40	150	2.0	250	2.0	1,000	50	300	–	–
CP591V	2N2907A	60	60	5.0	10	50	100	300	10	150	1.6	500	8.0	200	–	100
CP592V	2N3906	40	40	5.0	50**	30	100	300	1.0	10	0.4	50	4.5	250	4.0	300
CP792V	2N3906	40	40	5.0	50**	30	100	300	1.0	10	0.4	50	4.5	250	4.0	300
CP593	2N4403	40	40	5.0	100*	35	100	300	2.0	150	0.75	500	8.5	200	–	255

Saturated Switches

Devices are listed in order of descending t_{off}

NPN

CP337V	2N3725	80	50	6.0	1,700	60	60	150	1.0	100	0.52	500	10	300	–	60
CP207	2N2369A	40	15	4.5	400	20	–	120	1.0	10	0.20	10	4.0	500	–	18

Saturated Switches

Devices are listed in order of descending t_{off}

PNP

New

CP767V	2N3467	40	40	5.0	100	30	40	120	1.0	500	1.0	1,000	25	175	–	90
CP555	2N4209	15	15	4.5	10*	8.0	50	120	0.3	10	0.6	50	3.0	850	–	20

Low Noise Amplifiers

NPN

CP188	2N2484	60	60	6.0	10	45	250	–	5.0	1.0	0.35	1.0	6.0	30	3.0	–
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Low Noise Amplifiers

PNP

New

CP588V	2N3799	60	60	5.0	10	50	150	300	5.0	0.1	0.25	1.0	5.0	40	2.0	–
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Low V_{CE(SAT)}

NPN

CP341V	CMPT3410	40	25	6.0	100	40	100	300	1.0	100	0.05	50	10	100	–	–
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Low V_{CE(SAT)}

PNP

CP741V	CMPT7410	40	25	6.0	100	40	100	300	1.0	100	0.05	50	10	100	–	–
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High Current

Devices are listed in order of descending breakdown voltage

NPN

CP305	2N3019	140	80	7.0	10	90	100	300	10	150	0.5	500	12	100	4.0	–
CP304	MPSA06	80	80	4.0	100	80	100	–	1.0	100	0.25	100	–	100	–	–
CP314	MPS651	80	60	5.0	100	80	75	–	2.0	500	0.3	1,000	–	75	–	–

High Current

Devices are listed in order of descending breakdown voltage

PNP

New

CP705	2N4033	80	80	5.0	500	60	100	300	5.0	100	0.5	500	20	150	–	–
CP720	MPSA56	80	80	4.0	100	80	100	–	1.0	100	0.25	100	–	50	–	–
CP704V	MPSA55	60	60	4.0	100	60	100	–	1.0	100	0.25	100	–	50	–	–
CP714	MPS751	80	60	5.0	100	80	75	–	2.0	500	0.3	1,000	–	75	–	–

Small Signal Transistors

Process	Principal Device	BV _{CBO}	BV _{CEO}	BV _{EBO}	I _{CBO} @ V _{CB}	h _{FE} @ V _{CE} @ I _C		V _{CE(SAT)} @ I _C		C _{ob}	f _T	NF
		(V)	*BV _{CES}	(V)	*I _{CES}	MIN	MAX	(V)	(mA)	(V)	(mA)	*C _{cb}
		(V) MIN	(V) MIN	(V) MIN	**I _{CEV} (nA) MAX					(pF) MAX	(MHz) MIN	(dB) MAX

High Voltage NPN

Devices are listed in order of descending breakdown voltage

CP310	MPSA44	500	400	6.0	100	400	50	200	10	10	0.75	50	6.0	20	-
CP316V	2N5551	180	160	6.0	50	120	80	250	5.0	10	0.2	50	6.0	100	8.0
CP318V	MPS455	160	140	5.0	100	140	100	300	10	150	0.70	150	15	100	-

High Voltage PNP

Devices are listed in order of descending breakdown voltage

CP710	MPSA94	400	400	6.0	100	400	50	200	10	10	0.75	50	6.0	20	-
CP716V	2N5401	160	150	5.0	50	120	60	240	5.0	10	0.5	50	6.0	100	8.0

RF Oscillator NPN

Devices are listed in order of ascending f_T

CP223	2N3866	55	30	3.5	100**	55	10	200	5.0	50	1.0	100	3.0	500	-
CP302	MPSH10	30	25	3.0	100	25	60	-	10	4.0	0.5	4.0	0.7*	650	-
CP317	2N2857	30	15	3.0	10	15	30	150	1.0	3.0	-	-	1.0*	1,000	4.5
CP229	2N5109	40	20	3.0	5,000**	35	40	120	15	50	0.5	100	3.5	1,200	3.0*
CP243	CM5943	40	30	3.5	10	15	25	300	15	50	0.2	100	2.5	1,200	8.0

RF Oscillator PNP

Devices are listed in order of ascending f_T

CP616	CM5160	60	40	4.0	1,000	28	30	-	5.0	50	0.6	100	4.0*	500	-
CP617	CM4957	30	30	3.0	100	10	20	150	10	2.0	-	-	2.0*	1200	-
CP618	CM5583	30	30	3.0	50	20	25	100	2.0	100	0.8	100	5.0*	1300	-

Darlington NPN

Devices are listed in order of descending h_{FE}

CP307	MPSA14	30	30*	10	100	30	20,000	-	5.0	100	1.5	100	-	125	-
CP323	BSS52	90	80**	5.0	50	80	1,000	-	10	150	1.3	500	-	-	-

Darlington PNP

CP707	MPSA64	30	30*	10	100	30	20,000	-	5.0	100	1.5	100	-	125	2.0*
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High Voltage Darlington NPN

CP329V	CMPTA29	100	100*	12	100	80	10,000	-	5.0	100	1.5	100	8.0	125	-
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Chopper PNP

CP734V	MPS404A	40	35	25	100	10	100	400	0.15	12	0.2	24	40	-	-
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 Indicates Sorted Columns.

Bipolar Power Transistors

Process		Principal Device		I_C	P_D	BV_{CBO} * BV_{CEV}	BV_{CEO}	h_{FE}		@ I_C	$V_{CE(SAT)}$	@ I_C	f_T *TYP
NPN	PNP	NPN	PNP	(A) MAX	(W)	(V) MIN	(V) MIN	MIN	MAX	(A)	(V) MAX	(A)	(MHz) MIN

S Devices are listed in order of descending I_C

CP176	CP576	MJ15003	MJ15004	20	250	140	140	25	150	5.0	1.0	5.0	2.0
CP235	CP635	2N3055	MJ2955	15	115	100	60	20	70	4.0	1.1	4.0	2.5
CP219	-	D44H11	-	10	50	80	80	40	-	1.0	1.0	8.0	40
CP245	CP645	MJE15030	MJE15031	8.0	50	150	150	20	-	4.0	0.5	1.0	30
CP211	CP611	TIP41C	TIP42C	6.0	65	100	100	15	75	3.0	1.5	6.0	3.0
CP353V	CP753V	CZT853	CZT953	6.0	3.0	200	100	100	300	2.0	0.34	5.0	190*
CP315V	-	CZT3150	-	5.0	2.0	50	25	250	550	0.5	0.5	4.0	150*
CP312	CP712	CZT3120	CZT7120	3.0	2.0	120	70	100	300	0.5	0.5	2.0	8.0
CP208	CP608	TIP31C	TIP32C	3.0	40	100	100	10	50	3.0	1.2	3.0	3.0

High Voltage

S Devices are listed in order of descending breakdown voltage

CP283	-	MJE13003	-	1.5	40	700*	400	5.0	25	1.0	0.5	0.5	4.0
CP285	-	MJE13005	-	4.0	75	700*	400	8.0	40	2.0	0.5	1.0	4.0
CP287	-	MJE13007	-	8.0	80	700*	400	5.0	30	5.0	1.0	2.0	4.0
CP289	-	MJE13009	-	12	100	700*	400	6.0	30	8.0	1.0	5.0	4.0
CP319	-	TIP50	-	1.0	40	500	400	30	150	0.3	1.0	1.0	10
CP311	-	CJDD3110	-	3.0	80	400	400	20	-	1.0	0.25	1.0	10*
CP348	-	BUY48	-	7.0	10	200	170	15	-	5.0	1.0	5.0	90*
CP349	-	BUY49S	-	1.0	5.0	250	200	40	-	0.5	0.2	0.5	50

Darlington

S Devices are listed in order of descending I_C

CP147	CP547	MJ11016	MJ11015	30	200	120	120	200	-	30	4.0	30	4.0
CP117	CP517	2N6301	2N6299	8.0	75	80	80	750	18,000	4.0	3.0	8.0	4.0
CP230	CP630	CZT122	CZT127	5.0	2.0	100	100	1,000	-	3.0	4.0	5.0	4.0

Low $V_{CE(SAT)}$

CP309	-	CZT3090L	-	3.0	2.0	50	40	300	800	0.01	0.75	2.0	100
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Programmable UJTs

Process	Principal Device	Gate to Anode Reverse Voltage V_{GAR}	DC Anode Current I_T	Gate to Anode Leakage Current I_{GAO} $V_S=40Vdc$	Peak Current		Valley Current	
					$R_G=10K\Omega$ I_P (μA) MAX	$R_G=1.0M\Omega$ (μA) MAX	$R_G=10K\Omega$ I_V (μA) MIN	$R_G=1.0M\Omega$ (μA) MAX

CP622	2N6027	40	150	10	5.0	2.0	70	50
CP624	2N6028	40	150	10	1.0	0.15	25	25

Small Signal MOSFET

Process	Principal Device	$r_{DS(ON)}$	@ I_D	$V_{GS(th)}$		BV_{DSS}	C_{iss} *TYP	C_{rss} *TYP	t_{on} *TYP	t_{off} *TYP
				(Ω) MAX	(A)					

N-Channel Enhancement Mode

CP324	2N7002	7.5	0.05	1.0	2.5	60	50	5.0	20	20
CP326X	CMLDM7120	0.10	0.5	0.5	1.2	20	220*	45*	25*	140*
CP354X	CMLDM7003	3.0	0.05	0.49	1.0	50	50	5.0	-	-

P-Channel Enhancement Mode

New	CP726X	CMLDM8120								
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S Indicates Sorted Columns.

New Indicates New or Updated Process.

Junction FETs

Process	Principal Device	BV _{GSS} (V) MIN	I _{DSS} (mA)		V _{GS(OFF)} (V)		r _{DS(ON)} (Ω) MAX	NF (dB) MAX	t _{off} (ns) MAX
			MIN	MAX	MIN	MAX			

Amplifier N Channel

CP210	2N4416A	35	5.0	15	2.5	6.0	-	2.0	-
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Switcher/Chopper N Channel

CP206	2N4391	40	50	150	4.0	10	30	-	20
	2N4392	40	25	75	2.0	5.0	60	-	35
	2N4393	40	5.0	30	0.5	3.0	100	-	50

Switching Diodes

Process	Principal Device	V _R RRM (V) MAX	I _F *I _O (mA) MAX	V _F (V) MAX	@ I _F (mA)	t _{rr} (ns) MAX	C _T *TYP (pF) MAX
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High Current

New	CPD89V	CMPD5001	120	400	1.0	200	50	35
New	CPD93V	CMPD4150	50	250	1.0	200	4.0	4.0

High Speed

	CPD83V	1N4148	100	200	1.0	10	4.0	4.0
New	CPD30V	CMLD2838	75	200	1.0	50	4.0	4.0

High Voltage

	CPD80V	CMPD2004	300	225	1.0	100	50	5.0
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Schottky Diode

Process	Principal Device	V _R RRM (V) MAX	I _F *I _O (mA) MAX	V _F (V) MAX	@ I _F (mA)	t _{rr} (ns) MAX	C _T *TYP (pF) MAX
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High Voltage

New	CPD92X	1N6263	60	15*	0.41	1.0	-	2.2
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High Current

	CPD48V	CMP5H-3	30	100	1.0	100	5.0	7.0*
	CPD82X	CMD5H2-3	30	200*	0.55	200	-	15*
	CPD98V	CMUSH2-4S	40	200	0.75	100	5.0	10
New	CPD76X	CMLSH1-40	40	1,000	0.55	1,000	15 TYP	50*

Higher Current/Low V_F

	CPD96V	CMLSH05-4	20	500*	0.22	100	-	60*
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New Indicates New or Updated Process.

Low Leakage Diode

Process	Principal Device	V_{RRM} (V) MAX	I_F (mA) MAX	I_R (nA)	@ V_R (V)	V_F (V)	@ I_F (mA)	C_T (pF)
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Devices are listed in order of descending I_R

CPD64	1N3595	150	200	1.0	125	1.0	200	8.0
New CPD91V	CMPD6001	100	250	0.5	75	1.1	100	2.0

Ultra Low Leakage (Pico Amp) Diode

Process	Principal Device	V_{RRM} (V) MAX	I_F (mA) MAX	V_F (V) MAX	@ I_F (mA)	I_R (pA) MAX	@ V_R (V)	C_d (pF)
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CPD65	BAV45	35	50	1.0	10	10	20	1.3
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Zener Diodes

Process	Principal Device	ZENER VOLTAGE RANGE (V)	POWER
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CPZ18	1N5221B thru 1N5234B	1.8 - 6.2	500mW
CPZ19	1N5235B thru 1N5261B	6.8 - 47	500mW
CPZ25	1N5913B thru 1N5940B	3.3 - 43	1.5W
New CPZ28	CMPZ5221B thru CMPZ5267B	2.4 - 75	350mW

Monolithic Isolated Quad Switching Diode

Process	Principal Device	V_{RRM} (V) MAX	I_F (mA) MAX	V_F (V) MAX	@ I_F (mA)	t_{rr} (ns) MAX	C_T *TYP (pF) MAX
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CPD74	CMEDA-6i	60	250	1.0	10	100	-
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New Indicates New or Updated Process.

S Indicates Sorted Columns.

General Purpose Rectifiers

Process	CPD04	CPD05	New CPD69	CPD06	CPD07
I_O (AMPS)	0.5	1.0	1.0	3.0	8.0
@ T_A (°C)	40	75	25	75	60
I_{FSM} (AMPS)	30	30	10	200	400
V_{RRM} (VOLTS)	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device
200	CBRHD-02*	CMR1-02	–	CMR3-02	–
400	CBRHD-04*	CMR1-04	CZR1-04	CMR3-04	CR6A4GPP
600	CBRHD-06*	CMR1-06	–	CMR3-06	CR6A6GPP
1000	CBRHD-10*	CMR1-10	–	CMR3-10	CR6A10GPP

*This principal device uses four CPD04 chips.

V_F MAX @ $I_F=I_O$	1.0V @ 0.4A	1.1V	1.2V	1.2V	1.0V
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I_R MAX @ V_{RRM}	5.0 μ A	10 μ A	1.0 μ A	5.0 μ A	10 μ A
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Fast Recovery Rectifiers

Process	CPD24	CPD25	CPD26
I_O (AMPS)	1.0	3.0	8.0
@ T_A (°C)	-	90	60
@ T_L (°C)	120	-	-
I_{FSM} (AMPS)	30	150	300
V_{RRM} (VOLTS)	Principal Device	Principal Device	Principal Device
200	CMR1F-02M	CR3F-020	CR6AF2GPP
400	CMR1F-04M	CR3F-040	CR6AF4GPP
600	CMR1F-06M	CR3F-060	CR6AF6GPP
1000	CMR1F-10M	CR3F-100	CR6AF10GPP

V_F MAX @ $I_F=I_O$	1.3V	1.2V	1.3V
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I_R MAX @ V_{RRM}	5.0 μ A	5.0 μ A	10 μ A
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t_{rr} (200V)	150ns	150ns	200ns
t_{rr} (400V)	150ns	150ns	200ns
t_{rr} (600V)	250ns	250ns	250ns
t_{rr} (1000V)	500ns	500ns	500ns

New Indicates New or Updated Process.

Ultra Fast Rectifiers

Process	CPD16	CPD17	CPD18
I_O (AMPS)	1.0	3.0	8.0
@ T_A (°C)	75	75	–
@ T_C	–	–	100
I_{FSM} (AMPS)	30	150	–
V_{RRM} (VOLTS)	Principal Device	Principal Device	Principal Device
100	CMR1U-01	CMR3U-01	–
200	CMR1U-02	CMR3U-02	CUDD8-02
400	CMR1U-04	CMR3U-04	CUDD8-04
600	CMR1U-06	CMR3U-06	–
800	–	–	CUDD8-08
1000	CMR1U-10	CMR3U-10	–
V_F MAX @ $I_F = I_O$			
100-200	1.0V	1.0V	0.975V
400	1.25V	1.25V	1.3V
600	1.4V	1.4V	–
800	–	–	1.5V
1000	1.7V	1.7V	–
I_R MAX @ V_{RRM}	5.0 μ A	5.0 μ A	5.0 μ A*
t_{rr} (100V)	50ns	50ns	–
t_{rr} (200V)	50ns	50ns	25ns
t_{rr} (400V)	50ns	50ns	25ns
t_{rr} (600V)	100ns	100ns	–
t_{rr} (800V)	–	–	50ns
t_{rr} (1000V)	100ns	100ns	–

*200 Volt Device.

Schottky Rectifiers

Process	Principal Device	V_{RRM} (V)	I_O (AMPS)	@ T_A (°C)	I_{FSM} (AMPS)	V_F @ $I_F = I_O$ (V) MAX	I_R @ V_{RRM} (mA) MAX
CPD76X	CMLSH1-40	40	1.0	25	10	0.55	0.2
CPD85V	CMPSH1-4L	40	1.0	25	20	0.39	1.5
CP108	CZSH-4	40	2.0	25	25	0.60	1.0
New CPD79	CTLSH2-40M832	40	2.0	25	–	0.50	0.2
CPD77	CTLSH3-30M833	30	3.0	25	25	0.45	1.0
CPD81	CZSH5-40	40	5.0	25	125	0.55	3.0
CPD86	CTLSH5-40M833	40	5.0	25	50	0.52	0.2

New Indicates New or Updated Process.

TRIACS

Process	CPQ057	CPQ090	CPQ110	CPQ130	CPQ150	CPQ165
I_T (AMPS)	2.0	4.0	8.0	12	16	25
@ T_C (°C)	50	80	90	90	90	90
I_{TSM} (AMPS)	20	40	50	50	110	150
V_{RRM} (VOLTS)	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device
400	–	–	–	–	–	–
600	CQ223-2M	CQ223-4M	CQDD-8M	CQDD-12M	CQDD-16M	CQDD-25M
$I_{GT\ QI}$	5.0mA	5.0mA	20mA	20mA	25mA	30mA
$I_{GT\ QII}$	5.0mA	5.0mA	20mA	20mA	25mA	30mA
$I_{GT\ QIII}$	5.0mA	5.0mA	20mA	20mA	25mA	30mA
$I_{GT\ QIV}$	8.0mA	9.0mA	50mA	50mA	75mA	60mA
$V_{GT\ QI-QIII}$	1.8V	1.75V	1.5V	1.5V	1.5V	1.5V
$V_{GT\ QIV}$	1.8V	1.75V	2.5V	2.5V	2.5V	2.5V
I_H	5.0mA	5.0mA	25mA	25mA	25mA	50mA

SCRs

Process	CPS041	CPS053	CPS057	CPS090	CPS110	CPS130	CPS150	CPS165
I_T (AMPS)	0.8	2.0	4.0	8.0	12	16	25	35
@ T_C (°C)	60	60	85	90	90	90	90	90
I_{TSM} (AMPS)	10	10	30	70	110	160	250	350
V_{RRM} (VOLTS)	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device	Principal Device
400	–	–	–	–	–	–	–	–
600	CS89M	CS223-2M	CS223-4M	CSDD-8M	CSDD-12M	CSDD-16M	CSDD-25M	CS220-35M
I_{GT}	200µA	200µA	200µA	15mA	15mA	15mA	30mA	30mA
V_{GT}	0.8V	0.8V	0.8V	1.5V	1.5V	1.5V	1.5V	1.0V
I_H	5.0mA	2.0mA	2.0mA	20mA	20mA	20mA	50mA	40mA

Special, Custom or Selected Devices

Please call Central Semiconductor for any principal device types not shown in this data book. Special, Custom or Selected devices are also available based on individual specifications.

Selected Devices

A selected device is a standard device that is selected for additional or tightened electrical parameter(s).

Special Devices

A special device is required when a selection of a standard device is not possible. Normally, this is accomplished through a special diffusion of the standard process.

Custom Devices

A custom device may be developed for a unique customer requirement.

While other manufacturers shy away from Selected, Special and Custom devices, Central is committed to meeting Customer needs. Central will review and determine feasibility of Custom devices.

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