



Mini size of Discrete semiconductor elements



Diode Rectifier

→	Schottky SOD-723 / SOD-523 / SOD-323	-----	P1
→	TO-252 / TO263		
→	SOT-23-6 / TSSOP-8 / SOP-8		
→	mini-MELF / MELF		
→	SMA / SMB / SMC		
→	Switching SOT-523 / SOT-323 / SOT-23	-----	P2
→	Bridge (Single phase / Three phase)	-----	P3
→	RF (low capacitance) & Varactor	-----	P4



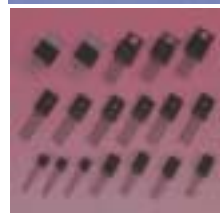
MOSFET

→	SOT-323	-----	P5
→	SOT-23		
→	TO-252 / TO-263 / TO-220 / TO-3P	-----	P6
→	TSSOP-8 / SOP-8		



Regulator

→	Switching Regulator / Charger pump	-----	P7
→	DC-DC converter / PWM IC	-----	P8
→	Step-up/down (Boost / Buck)		
→	LDO Regulator	-----	P9~
→	Ultra LDO Regulator	-----	P11



Transistor (Digital)

→	SOT-323 / SOT-363 (Dual N , Dual P , P+N)	-----	P12
→	SOT-23 / SOT-89	-----	P13
→	TO-252 / TO-263	-----	P14
→	TO-92 / TO-220 / TO-3P	-----	P15
→	Triac / SCR / RF (1GHz ~)		
→	Digital	-----	P16~



Reset IC

→	SOT-23 / SOT-23-5	-----	P18
→	SOT-89 / TO-92	-----	P19

Logic IC

→	SOT-23-5 / SOT-323-5	-----	P20
→	Standard		

EEPROM IC



Protection Device

→	Sidac / Thyristor / EMI Filter	-----	P21
→	TVS / ESD Arrays / Varistor (chip)	-----	P22
→	Gastube arrester / 5~6 pin arrester	-----	P23
→	Polymer resetable fuse / Thermal switch & sensor	-----	P24

Film Capacitor

→	Class X1 / X2 Safety license (300Vac)	-----	P25
→	MPP / MPE / DMP (High current)		
→	Minibox DC film cap. / <u>X+Y</u> combint cap.	-----	P26
→	Lighting film / AC starting film cap.		



Ceramic Cap.

→	Class Y1 / Y2 Safety license	-----	P27
→	High voltage (1KV ~ 6KV)		
→	Chip Capacitors & Multilayer (MLCC)		
→	Tantalum Capacitors		



Package Outline Dimensions

----- P28 ~ P34

***Other Industrial specification (-20°C / -30°C / - 40°C ~ 85°C)**

Power MOSFETs

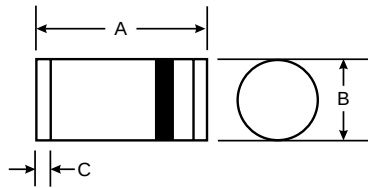
Part NO.	Package	Type	BV - Volt	ID - Amp	Vt - Volt	R _{DSon} (Vg_10V) Max(Typ)-mohm	R _{DSon} (Vg_4.5V) Max(Typ)-mohm	R _{DSon} (Vg_2.5V) Max(Typ)-mohm	Qg(Vg=4.5V) Typ-nC	Available
SOT-323 (P.28)										
GT120NWS	SOT-323	N	20	0.7	0.6	-	350	450	1.85	OK
GT130NWS	SOT-323	N	20	1.2	0.6	-	225	290	1.85	OK
GT120PWS	SOT-323	P	-20	-0.7	-0.6	-	430	700	1.7	OK
GT130PWS	SOT-323	P	-30	-1.2	-0.6	-	135	170	1.7	OK
SOT-23 (P.28)										
2N7002	SOT-23	N	60	0.2	1	7.5Ω	3.2Ω	-	-	
GT130NS	SOT-23	N	20	1.2	-	-	400	500	-	
GT230NS	SOT-23	N	30	2.5	1	117	190	-	10	
GT330NS	SOT-23	N	30	3.5	1.5	70	90	-	10.5	
GT430NS	SOT-23	N	30	4.2	1	55	90	-	-	
GT516NS	SOT-23	N	16	5	0.7	-	35	45	-	
GT620NS	SOT-23	N	20	6	0.9	45	60	120	12	
GT120PS	SOT-23	P	-20	1	-	-	650	850	-	
GT220PS	SOT-23	P	-20	2	-1	70	100	-	12	
GT230PS	SOT-23	P	-30	2	-1.5	100	140	-	10	
GT330PS	SOT-23	P	-16	-3.5	-0.7	70	85	105	13	
GT430PS	SOT-23	P	-30	-4.2	-1	50	65	120	-	
1206 size										
GT9926NW	1206	N	20	5.6	1	50	80	-	14	
GT4435PW	1206	P	20	5.6	-1	50	80	-	14	
SOT-89 (P.32)										
GAPM2054N	SOT-89	N	20	6	1	40	54	-	14	
SOT-223 (P.29)										
GAPM3023N	SOT-223	N	30	30	1.5	23	32	-	21	
GAPM3054N	SOT-223	N	30	12	1.5	54	90	-	12	
TSSOP-8 (P.31)										
GAPM8814	TSSOP8 (Daul)	N	20	7.5	0.7	14	15	20	14	
GAPM9926C	TSSOP8 (Daul)	N	20	6	0.7	28	32	45	14	
GAPM9926	TSSOP8	N	20	6	0.7	28	32	45	14	
GAPM6434	TSSOP8	N	30	4	1.5	23	40	-	14	
GAPM6928	TSSOP8 (Daul)	N	30	4	1.5	23	40	-	14	
SO-8 (P.31)										
GAPM4408	SO-8	N	20	21	0.9	5.5	7.5	10	45	
GAPM9424	SO-8	N	20	8	0.9	9	13	16	25	
GAPM9428	SO-8	N	20	7	0.9	-	30	60	10	
GAPM9430	SO-8	N	20	4	0.9	-	54	130	6.6	
GAPM7318	SO-8 (Daul)	N	20	8	0.9	-	15	30	32	
GAPM7316	SO-8 (Daul)	N	20	6	0.9	-	35	50	10	
GAPM7312	SO-8 (Daul)	N	20	6	0.9	45	54	120	12	
GAPM9966	SO-8 (Daul)	N	20	6	0.7	25	28	38	14	
GAPM9926	SO-8 (Daul)	N	20	6	0.7	-	28	40	14	
GAPM4430	SO-8	N	30	23	1.5	5	8	-	40	
GAPM4420	SO-8	N	30	12.5	1.5	9	13	-	30	
GAPM4410	SO-8	N	30	11.5	1.5	11	16	-	20	
GAPM4890	SO-8	N	30	10	1.5	11	16	-	20	
GAPM4800	SO-8	N	30	6	1.5	16	25	-	14	
GAPM4416	SO-8	N	30	9	1.5	20	32	-	14	
GAPM9410	SO-8	N	30	8	1.5	20	32	-	14	

Part NO.	Package	Type	BV - Volt	ID - Amp	Vt - Volt	R _{DSon} (Vg_10V)	R _{DSon} (Vg_4.5V)	R _{DSon} (Vg_2.5V)	Qg(Vg=4.5V)	Available
						Max(Typ)-mohm	Max(Typ)-mohm	Max(Typ)-mohm	Typ-nC	
GAPM7314	SO-8 (Daul)	N	30	6	1.5	24	32	-	15	
GAPM7313	SO-8 (Daul)	N	30	6	1.5	28	40	-	14	
GAPM4463	SO-8	P	-20	10	-1	14	20	-	24	
GAPM4461	SO-8	P	-20	7	-1	30	40	60	24	
GAPM4435	SO-8	P	-30	8	-1.5	20	35	-	24	
GAPM4431	SO-8	P	-30	7	-1.5	30	55	-	18	
GAPM4425	SO-8	P	-30	11	-1.5	14	20	-	45	
GAPM9435	SO-8	P	-30	6	-1.5	60	95	-	15	
GAPM4925	SO-8 (Daul)	P	-30	6	-1.5	32	45	-	19	
GAPM4953	SO-8 (Daul)	P	-30	4.9	-1.5	53	110	-	18	
GAPM4532	SO-8 (Daul)	N/P	-30	3.9/3.5	1.5/-1.5	53/80	75/135	-	14/15	
GAPM9932	SO-8 (Daul)	N/P	20/-20	9/-6	1/-1	18/-	27/45	- / 65	22/25	
GAPM9930	SO-8 (Daul)	N/P	-20	9/3.4	1/-1	15/80	30/150	-	20/14	
GAPM9928	SO-8 (Daul)	N/P	-20	5/3.4	1/-1	45/90	60/120	-	-	
TO-263 (P.30) / TO-252 (P.30) / TO-251 (P.28)										
GAPM2004N	TO-252	N	20	80	1	5	6	10	48	
GAPM2007N	TO-252	N	20	70	1	9	11	18	36	
GAPM2012N	TO-252	N	20	30	1	12	18	24	25	
GAPM2014N	TO-252	N	20	10	1	-	14	22	24	
GAPM2030N	TO-252	N	20	6	0.7	-	32	45	30	
GAPM2054N	TO-252	N	20	12	1	40	54	130	14	
GAPM2055N	TO-252	N	20	12	0.9	70	90	160	7	
GAPM3005N	TO-252	N	30	80	1.5	5	8	-	40	
GAPM3007N	TO-252	N	30	75	1.5	7	11	-	31	
GAPM3009N	TO-252	N	30	70	1.5	9	15	-	20	
GAPM3011N	TO-252	N	30	70	1.5	11	18	-	20	
GAPM3023N	TO-252	N	30	30	1.5	23	32	-	21	
GAPM3054N	TO-252	N	30	12	1.5	54	90	-	12	
GAPM3055L	TO-252	N	30	12	1.5	100	200	-	12	
GAPM3005N	TO-263	N	30	80	1.5	5	8	-	40	
GAPM3007N	TO-263	N	30	75	1.5	7	11	-	31	
GAPM3009N	TO-263	N	30	70	1.5	9	14	-	20	
GAPM2070P	TO-252	P	-20	12	1	70	100	-	12	
GAPM2095P	TO-252	P	-20	8	0.7		80	105	9	
GAPM3010P	TO-252	P	-30	30	-1.5	10	-	14	35	
GAPM3020P	TO-252	P	-30	30	-1.5	20	30	-	22	
GAPM3030P	TO-252	P	-30	20	-1.5	30	-	42	17	
GAPM3040P	TO-252	P	-30	12	-1.5	40	-	56	15	
GAPM3095P	TO-252	P	-30	6	-1.5	95	160	-	12	
GAPM6020N	TO-263/220	N	55	10	1.5	20	30	-	15	
SER5305	TO-252	P	55	30	2	65	85	120	63	
SEB/U4060	TO-263/252	N	60	15	2	85	-	-	10	
SEB/U6060	TO-263/252	N	60	60	3	25	-	-	36	
GM01N60D/U	TO-251/252	N	600	1	-	8 ohm	-	-	10	
GM02N60D/U	TO-251/252	N	600	1	-	5 ohm	-	-	36	
TO-220 (P.30)										
SEP4060	TO-220	N	60	15	2	85	-	-	10	
SEP6060	TO-220	N	60	60	3	25	-	-	36	
GEF9Z34N	TO-220	P	55	-19	-2	100	-	-	12	
GM01N60D/U	TO-251/252	N	600	1	-	8 ohm	-	-	10	
GM02N60D/U	TO-251/252	N	600	1	-	5 ohm	-	-	36	
GAP03N70	TO-220	N	600	3	-	3.6 ohm	-	-	11.4	
GAP04N70	TO-220	N	600	4	-	2.4 ohm	-	-	16.7	
GAP07N70	TO-220	N	600	7	-	1.2 ohm	-	-	32	

Other Package Outline Dimensions

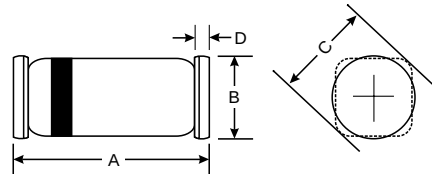
All Dimensions in mm

MiniMELF / MELF



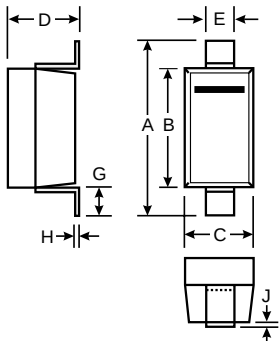
Dim	MiniMELF		MELF	
	Min	Max	Min	Max
A	3.30	3.70	4.80	5.20
B	1.30	1.60	2.40	2.60
C	0.28	0.50	0.55 Nominal	

QuadroMELF / MicroMELF



Dim	QuadroMELF		MicroMELF	
	Min	Max	Min	Max
A	3.3	3.7	1.8	2.0
B	1.4	1.6	1.20	1.25
C	1.7Ø Typical		1.35Ø Typical	
D	0.3 Typical		—	

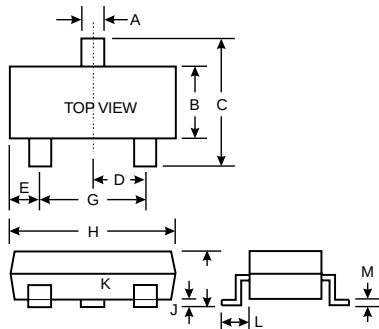
SOD-123 / SOD-323 / SOD-523 / SOD-723



Dim	SOD-123		SOD-323	
	Min	Max	Min	Max
A	3.55	3.85	2.30	2.70
B	2.55	2.85	1.60	1.80
C	1.40	1.70	1.15	1.35
D	—	1.35	0.80	1.10
E	0.55 Typical		0.25	0.40
G	0.25	—	0.15	0.45
H	0.15 Typical		0.10	0.25
J	—	0.10	—	0.10

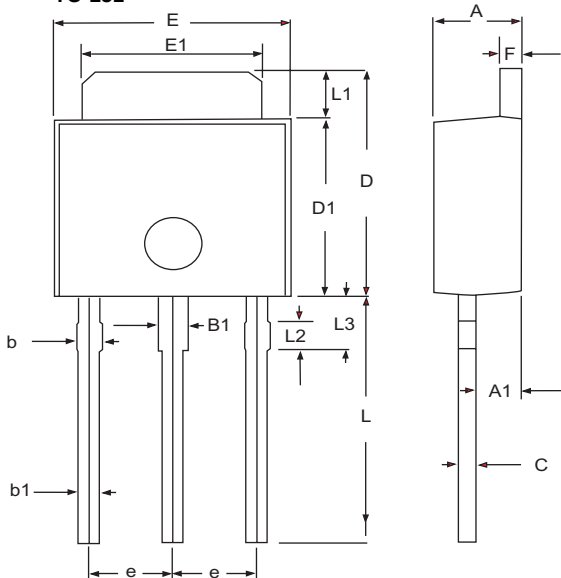
SOD-523		
Dim	Min	Max
A	1.50	1.70
B	1.10	1.30
C	0.25	0.35
D	0.70	0.90
E	0.10	0.20
G	0.50	0.70
All Dimensions in mm		

SOT-23 / SC-59 / SOT-323 / SOT-523

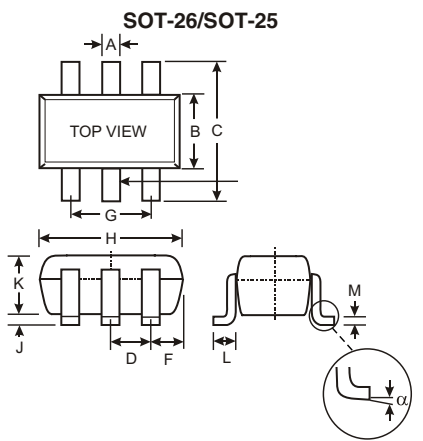


Dim	SOT-23		SC-59		SOT-323 / SOT-523	
	Min	Max	Min	Max	Min	Max
A	0.37	0.51	0.30	0.50	0.30 / 0.15	0.40 / 0.22
B	1.19	1.40	1.40	1.80	1.15 / 0.75	1.35 / 0.85
C	2.10	2.50	2.50	3.00	2.00 / 1.45	2.20 / 1.75
D	0.89	1.05	0.85	1.05	0.65 / 0.5	
E	0.45	0.61	0.30	0.70	0.30 / -	0.40 / -
G	1.78	2.05	1.70	2.10	1.20 / 0.9	1.40 / 1.1
H	2.65	3.05	2.70	3.10	1.80 / 1.5	2.20 / 1.7
J	0.013	0.15	—	0.10	-	0.10
K	0.89	1.10	1.00	1.40	0.90 / 0.6	1.00 / 0.8
L	0.45	0.61	0.55	0.70	0.25 / 0.1	0.40 / 0.3
M	0.076	0.178	0.10	0.35	0.10 / 0.1	0.25 / 0.2

TO-251



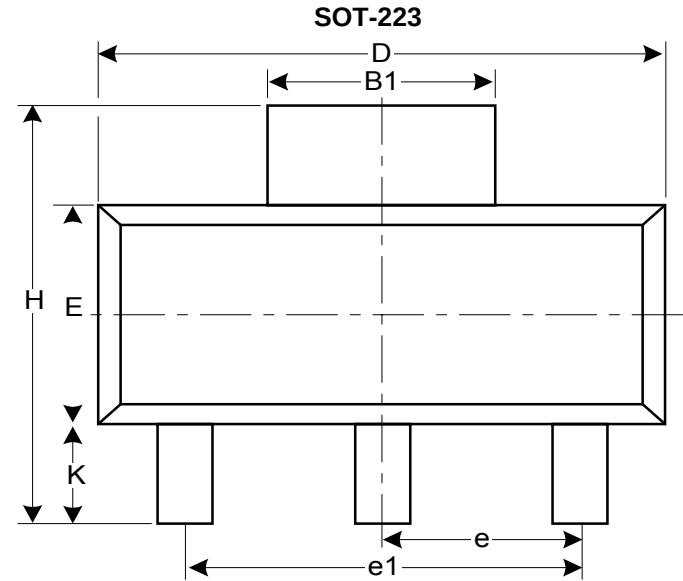
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.40	0.087	0.095
A1	1.100	1.300	0.043	0.051
B1	0.650	1.050	0.026	0.041
b	0.500	0.900	0.020	0.035
b1	0.400	0.800	0.016	0.32
C	0.400	0.600	0.016	0.024
D	6.700	7.300	0.264	0.287
D1	5.400	5.650	0.213	0.222
E	6.40	6.650	0.252	0.262
e	2.100	2.500	0.083	0.098
F	0.400	0.600	0.016	0.024
L	7.000	8.000	0.276	0.315
L1	1.300	1.700	0.051	0.067
L2	0.700	0.900	0.028	0.035
L3	1.400	1.800	0.055	0.071



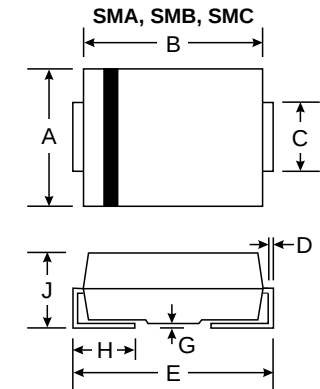
SOT-363/353		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
H	1.80	2.20
J	—	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.25
α	0°	8°

SOT-26/25			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
F	—	—	0.55
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—

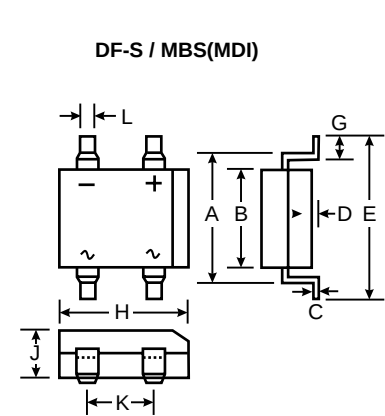
SOT-563			
Dim	Min	Max	Typ
A	0.15	0.30	0.25
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	0.50		
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.56	0.60	0.60
L	0.15	0.25	0.20
M	0.10	0.18	0.11
All Dimensions in mm			



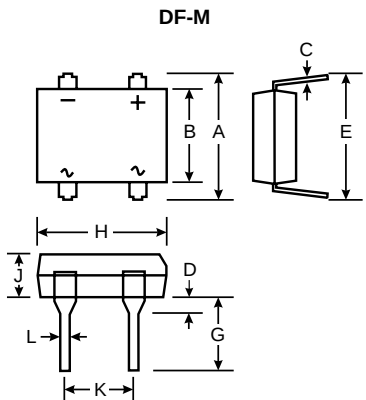
Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A(Thin)	1.50	1.65	1.80
A1	0.02	0.05	0.08
B	0.60	0.70	0.80
B1	2.90	-	3.15(Ref.)
c	0.28	0.30	0.32
D	6.30	6.50	6.70
E	3.30	3.50	3.70
e	2.3 Basic		
e1	4.6 Basic		
H	6.70	7.00	7.30
L	0.91	1.00	1.10
K	1.50	1.75	2.00
α	0°	5°	10°
β	-	13°	-



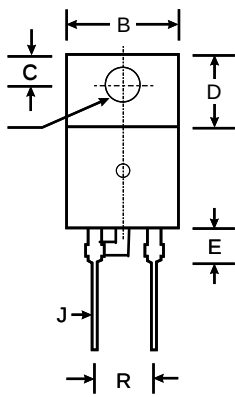
Dim	SMA		SMB		SMC	
	Min	Max	Min	Max	Min	Max
A	2.29	2.92	3.30	3.94	5.59	6.22
B	4.00	4.60	4.06	4.57	6.60	7.11
C	1.27	1.63	1.96	2.21	2.75	3.18
D	0.15	0.31	0.15	0.31	0.15	0.31
E	4.80	5.59	5.00	5.59	7.75	8.13
G	0.10	0.20	0.10	0.20	0.10	0.20
H	0.76	1.52	0.76	1.52	0.76	1.52
J	2.01	2.62	2.00	2.62	2.00	2.62



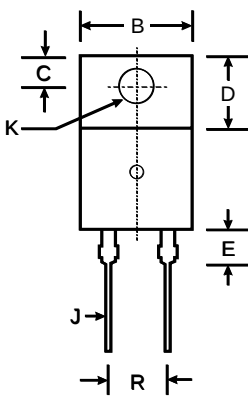
Dim	DF-S		MBS (MDI)		DF-M	
	Min	Max	Min	Max	Min	Max
A	7.40	7.90	5.43	5.75	7.40	7.90
B	6.20	6.50	3.6	4.0	6.20	6.50
C	0.22	0.30	0.15	0.35	0.22	0.30
D	0.076	0.33	0.05	0.20	1.27	2.03
E	—	10.40	—	7.0	7.60	8.90
G	1.02	1.53	0.70	1.10	3.81	4.69
H	8.13	8.51	4.5	4.9	8.13	8.51
J	2.40	3.40	2.8	2.9	2.40	3.40
K	5.00	5.20	2.5	2.7	5.00	5.20
L	1.00	1.20	0.50	0.80	0.46	0.58



TO-220AC-P

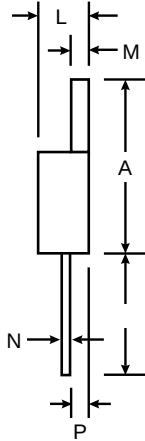


TO-220AC



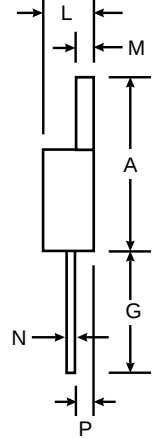
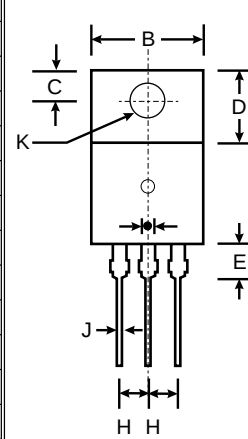
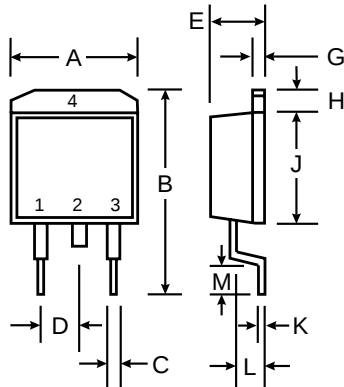
Case Positive

Case Negative



Dim	Min	Max
A	14.22	15.88
B	9.65	10.67
C	2.54	3.43
D	5.84	6.86
E	—	6.35
G	12.70	14.73
H	2.29	2.79
J	0.51	1.14
K	3.53 $\varnothing$	4.09 $\varnothing$
L	3.56	4.83
M	1.14	1.40
N	0.30	0.64
P	2.03	2.92
R	4.83	5.33

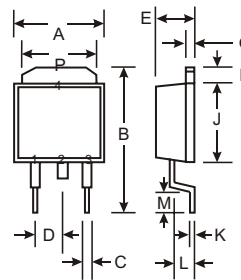
TO-220AB

TO-263 / D²PAK

PIN 1
PIN 3

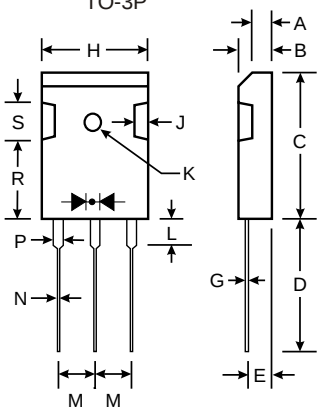
Dim	Min	Max
A	9.65	10.69
B	14.60	15.88
C	0.51	1.14
D	2.29	2.79
E	4.37	4.83
G	1.14	1.40
H	1.14	1.40
J	8.25	9.25
K	0.30	0.64
L	2.03	2.92
M	2.29	2.79

TO-252 / DPAK



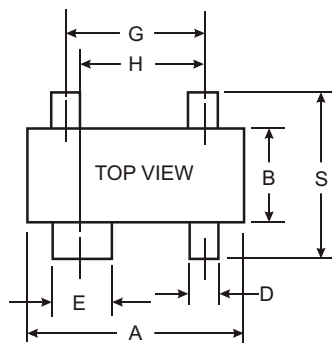
Dim	Min	Max
A	6.3	6.7
B	—	10
C	0.3	0.8
D	2.3 Nominal	
E	2.1	2.5
G	0.4	0.6
H	1.2	1.6
J	5.3	5.7
K	0.5 Nominal	
L	1.3	1.8
M	1.0	—
P	5.1	5.5

TO-3P



Dim	Min	Max
A	3.20	3.50
B	4.59	5.16
C	20.80	21.30
D	19.70	20.20
E	2.10	2.40
G	0.51	0.76
H	15.90	16.40
J	1.70	2.70
K	3.10 $\varnothing$	3.30 $\varnothing$
L	3.50	4.51
M	5.20	5.70
N	1.12	1.22
P	2.90	3.30
R	11.70	12.80
S	4.30 Typical	

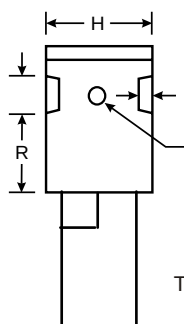
SOT-343 / SOT-143



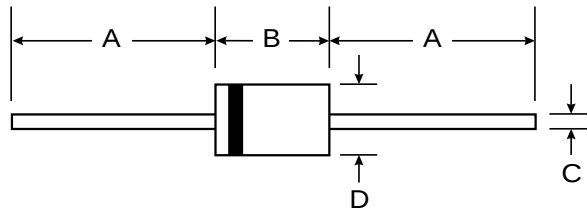
SOT-143		
Dim	Min	Max
A	2.80	3.04
B	1.20	1.40
C	0.80	1.20
D	0.37	0.46
E	0.76	0.89
G	1.92 BSC	
H	1.72 BSC	
J	0.085	0.130
K	0.051	0.127
L	0.25	0.55
M	1.00	1.69
S	2.10	2.64

All Dimensions in mm

TO-3P-P

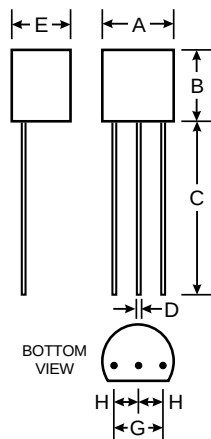


Axial Devices (Through-Hole)



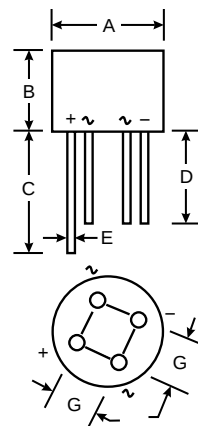
	A		B		C		D	
Dim	Min	Max	Min	Max	Min	Max	Min	Max
A-405	25.40	—	4.10	5.20	0.53	0.64	2.00	2.70
DO-35	25.40	—	—	4.00	—	0.60	—	2.00
DO-41 Plastic	25.40	—	4.06	5.21	0.71	0.864	2.00	2.72
DO-41 Glass	25.40	—	—	4.70	—	0.863	—	2.71
DO-15	25.40	—	5.50	7.62	0.686	0.889	2.60	3.60
DO-201	25.40	—	8.50	9.53	0.96	1.06	4.80	5.21
DO-201AD	25.40	—	7.20	9.50	1.20	1.30	4.80	5.30
R-6	25.40	—	8.60	9.10	1.20	1.30	8.60	9.10
T-1	25.40	—	2.60	3.20	0.53	0.64	2.20	2.60
5W	25.40	—	8.38	8.89	0.94	1.09	3.30	3.68
5KP	25.40	—	—	8.60	0.95	1.07	—	9.53
5KW	25.40	—	—	9.00	1.20	1.30	—	8.00

TO-92



Dim	Min	Max
A	4.32	4.83
B	4.32	4.78
C	12.50	15.62
D	0.36	0.56
E	3.15	3.94
G	2.29	2.79
H	1.14	1.40

WOG / AM

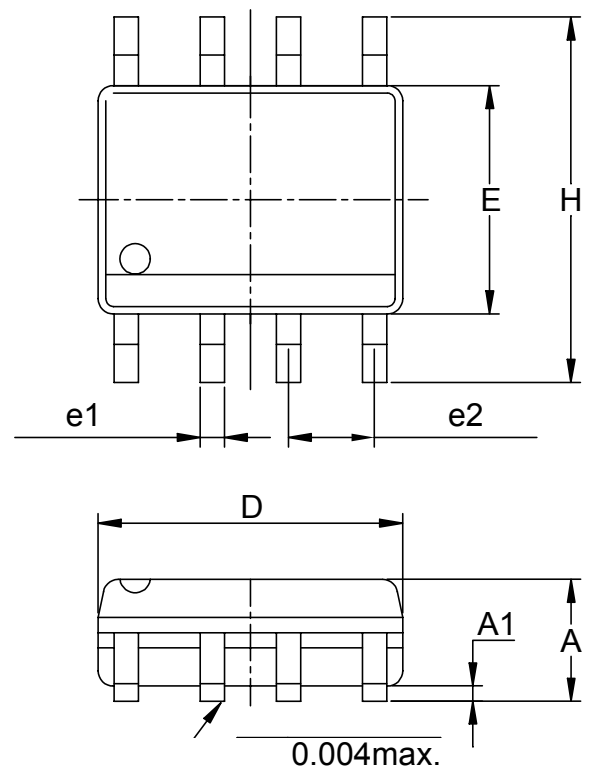


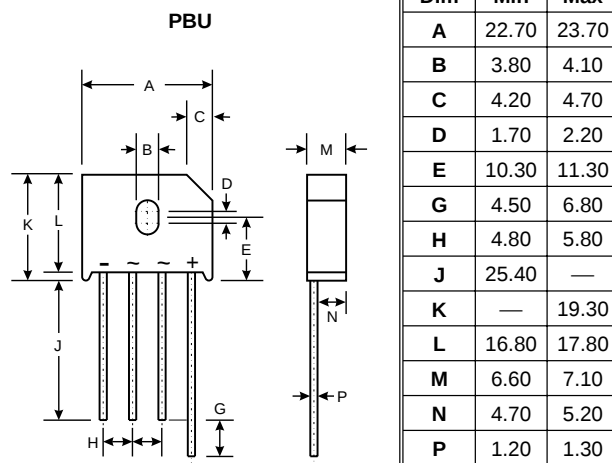
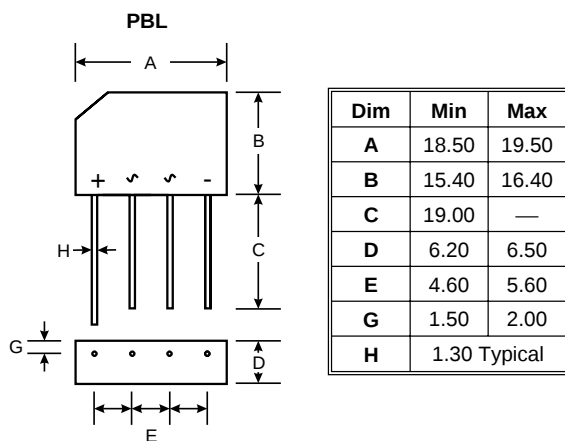
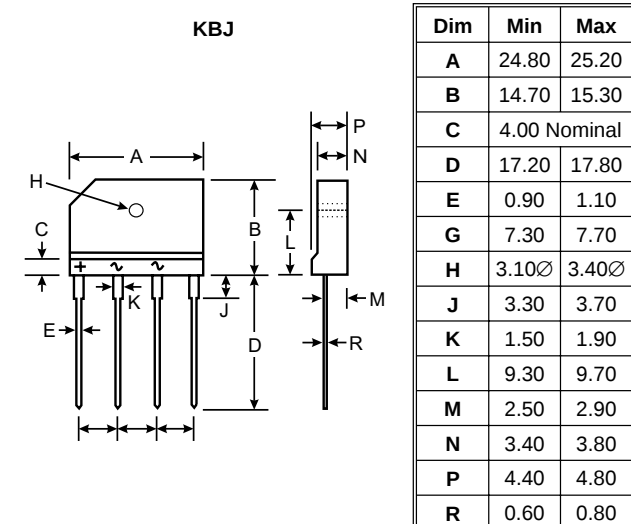
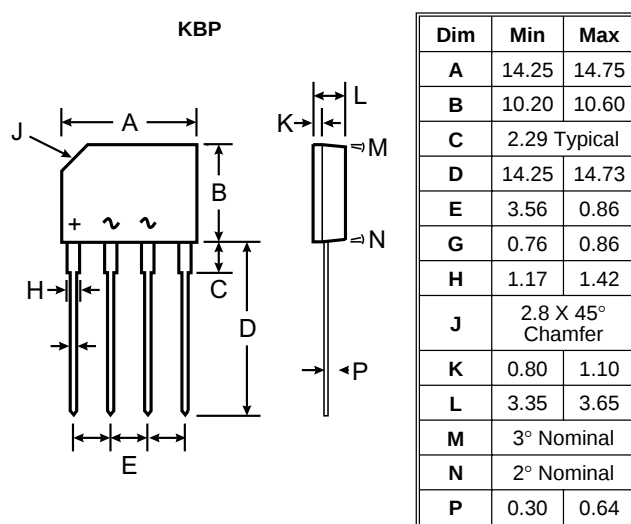
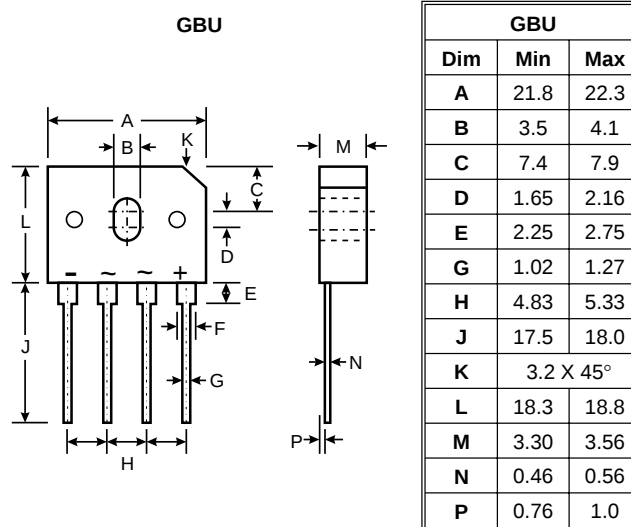
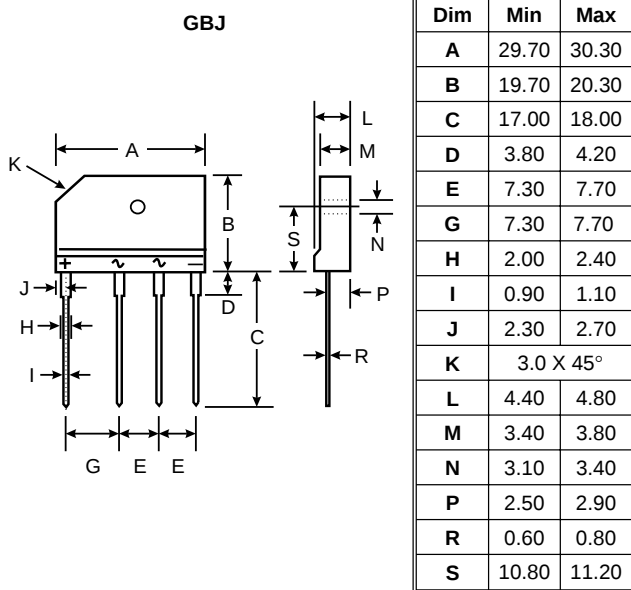
Dim	Min	Max
A	8.84	9.86
B	4.00	4.60
C	27.90	—
D	25.40	—
E	0.71	0.81
G	4.60	5.60

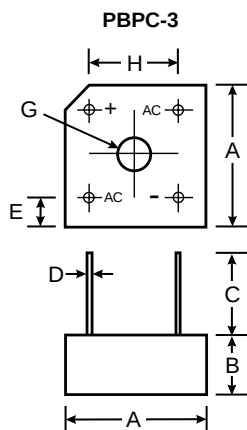
Lead configuration shown is for bulk product packaging only.
See ANSI/EIA-486 for Radial Tape specifications.

SOP-8 / TSSOP-8

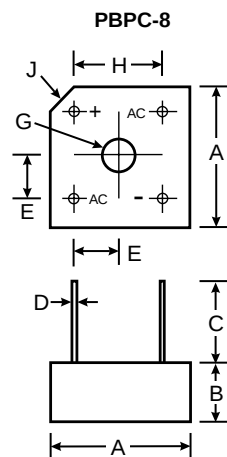
Dim	Millimeters SOP-8 / TSSOP-8	
	Min.	Max.
A	1.35 / 1.0	1.75 / 1.2
A1	0.10 / 0.1	0.25 / 0.15
D	4.80 / 2.9	5.00 / 3.1
E	3.80 / 4.3	4.00 / 4.5
H	5.80 / 6.2	6.20 / 6.6
L	0.40 / -	1.27 / -
e1	0.33 / -	0.51 / -
e2	1.27BSC / 0.65BSC	



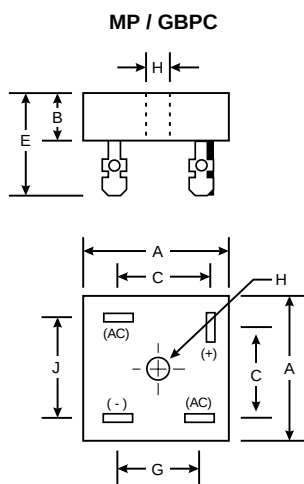




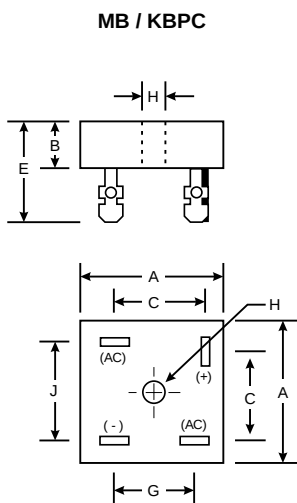
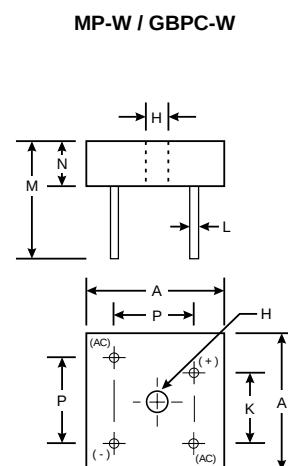
Dim	Min	Max
A	14.73	15.75
B	5.84	6.86
C	19.00	—
D	0.76Ø Typical	
E	1.70	2.70
G	Hole for #6 screw	
	3.60	4.00
H	10.30	11.30



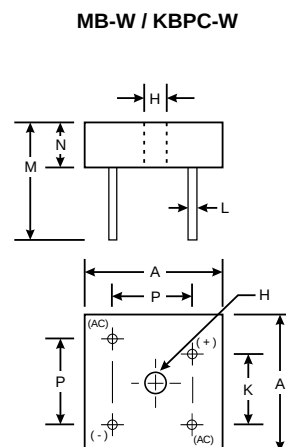
Dim	Min	Max
A	18.54	19.56
B	6.35	7.60
C	22.20	—
D	1.27Ø Typical	
E	5.33	7.37
G	3.60Ø	4.00Ø
H	12.70 Typical	
J	2.38 X 45° Typical	



Dim	Min	Max
A	28.30	28.80
B	7.40	8.00
C	16.10	17.10
E	18.80	21.30
G	13.80	14.80
H	Hole for #10 screw	
	4.85Ø	5.59Ø
J	17.60	18.60
K	10.90	11.90
L	0.97Ø	1.07Ø
M	26.4	—
N	7.40	8.00
P	17.60	18.60



Dim	Min	Max
A	28.40	28.70
B	10.97	11.23
C	15.50	17.60
E	22.86	25.40
G	13.30	15.30
H	Hole for #10 screw	
	4.85Ø	5.59Ø
J	17.10	19.10
K	10.40	12.40
L	0.97Ø Nominal	1.07Ø
M	30.50	—
N	10.97	11.23
P	17.10	19.10



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