VOLTAGE REGULATOR DIODES FOR SURFACE MOUNTING

Silicon planar diodes designed for use as low-voltage stabilizers or voltage references. They are available in the international standardized E24 (± 5%) range, and also in tolerance ranges of 2% and 3%. The series consists of 37 types with nominal working voltages ranging from 2,4 V to 75 V.

The SM diode is a leadless diode in a hermetically sealed glass SOD80C envelope with tin plated metal discs at each end. It is suitable for "automatic placement" and as such it can withstand immersion soldering.

The diodes are delivered in "super 8" tape.

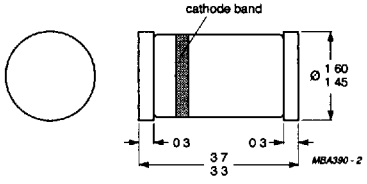
QUICK REFERENCE DATA

Working voltage range	V_Z	nom.	2,4 to 75	V
Total power dissipation up to flange temperature of 50 °C	P_{tot}	max.	500	mW
Non-repetitive peak reverse power dissipation	P_{ZSM}	max.	30	W
Junction temperature	T_j	max.	200	°C
Thermal resistance from junction to tie-point	$R_{th\ j\text{-}tp}$	=	0,30	K/mW

MECHANICAL DATA

Dimensions in mm

Fig.1 SOD80C.



The BZV55 cathode is indicated by a yellow band.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134).

Average forward current (averaged over any 20 ms period)	$I_{F(AV)}$	max.	250 mA
Repetitive peak forward current	I_{FRM}	max.	250 mA
Total power dissipation up to T_{flange} = 50 °C	P_{tot}	max.	500 mW
up to T_{amb} = 50 °C and mounted on a ceramic substrate of 10 mm x 10 mm x 0,6 mm	P_{tot}	max.	400 mW
Non-repetitive peak reverse power dissipation t = 100 μs; T_j = 150 °C	P_{ZSM}	max.	30 W
Storage temperature	T_{stg}	−65 to	+200 °C
Junction temperature	T_j	max.	200 °C

THERMAL RESISTANCE

From junction to tie-point (flanges)	$R_{th\ j\text{-}tp}$	=	0,30 K/mW
From junction to ambient when mounted on a ceramic substrate of 10 mm x 10 mm x 0,6 mm	$R_{th\ j\text{-}a}$	=	0,38 K/mW

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage I_F = 10 mA		V_F	<	0,9	V
Reverse current					
BZV55-.2V4	V_R = 1 V	I_R	<	50	μA
.2V7	V_R = 1 V	I_R	<	20	μA
.3V0	V_R = 1 V	I_R	<	10	μA
.3V3	V_R = 1 V	I_R	<	5	μA
.3V6	V_R = 1 V	I_R	<	5	μA
.3V9	V_R = 1 V	I_R	<	3	μA
.4V3	V_R = 1 V	I_R	<	3	μA
.4V7	V_R = 2 V	I_R	<	3	μA
.5V1	V_R = 2 V	I_R	<	2	μA
.5V6	V_R = 2 V	I_R	<	1	μA
.6V2	V_R = 4 V	I_R	<	3	μA
.6V8	V_R = 4 V	I_R	<	2	μA
.7V5	V_R = 5 V	I_R	<	1	μA
.8V2	V_R = 5 V	I_R	<	700	nA
.9V1	V_R = 6 V	I_R	<	500	nA
.10	V_R = 7 V	I_R	<	200	nA
.11 to .13	V_R = 8 V	I_R	<	100	nA
.15 to .75	V_R = 0,7 V_{Znom}	I_R	<	50	nA

. = C for E24 (± 5%) tolerance
. = B for ± 2%
. = F for ± 3%.

T_j = 25 °C
± 2% tolerance range

BZV55B	working voltage V_Z (V) at I_{Ztest} = 5 mA		differential resistance r_{diff} (Ω) at I_{Ztest} = 5 mA		temperature coefficient S_Z (mV/K) at I_{Ztest} = 5 mA			differential resistance r_{diff} (Ω) at I_Z = 1 mA	
	min.	max.	typ.	max.	min.	typ.	max.	typ.	max.
B2V4	2,35	2,45	70	100	−3,5	−1,6	0	275	600
B2V7	2,65	2,75	75	100	−3,5	−2,0	0	300	600
B3V0	2,94	3,06	80	95	−3,5	−2,1	0	325	600
B3V3	3,23	3,37	85	95	−3,5	−2,4	0	350	600
B3V6	3,53	3,67	85	90	−3,5	−2,4	0	375	600
B3V9	3,82	3,98	85	90	−3,5	−2,5	0	400	600
B4V3	4,21	4,39	80	90	−3,5	−2,5	0	410	600
B4V7	4,61	4,79	50	80	−3,5	−1,4	0,2	425	500
B5V1	5,00	5,20	40	60	−2,7	−0,8	1,2	400	480
B5V6	5,49	5,71	15	40	−2,0	1,2	2,5	80	400
B6V2	6,08	6,32	6	10	0,4	2,3	3,7	40	150
B6V8	6,66	6,94	6	15	1,2	3,0	4,5	30	80
B7V5	7,35	7,65	6	15	2,5	4,0	5,3	30	80
B8V2	8,04	8,36	6	15	3,2	4,6	6,2	40	80
B9V1	8,92	9,28	6	15	3,8	5,5	7,0	40	100
B10	9,80	10,20	8	20	4,5	6,4	8,0	50	150
B11	10,80	11,20	10	20	5,4	7,4	9,0	50	150
B12	11,80	12,20	10	25	6,0	8,4	10,0	50	150
B13	12,70	13,30	10	30	7,0	9,4	11,0	50	170
B15	14,70	15,30	10	30	9,2	11,4	13,0	50	200
B16	15,70	16,30	10	40	10,4	12,4	14,0	50	200
B18	17,60	18,40	10	45	12,4	14,4	16,0	50	225
B20	19,60	20,40	15	55	14,4	16,4	18,0	60	225
B22	21,60	22,40	20	55	16,4	18,4	20,0	60	250
B24	23,50	24,50	25	70	18,4	20,4	22,0	60	250
	at I_{Ztest} = 2 mA		at I_{Ztest} = 2 mA		at I_{Ztest} = 2 mA			at I_Z = 0,5 mA	
B27	26,50	27,50	25	80	21,4	23,4	25,3	65	300
B30	29,40	30,60	30	80	24,4	26,6	29,4	70	300
B33	32,30	33,70	35	80	27,4	29,7	33,4	75	325
B36	35,30	36,70	35	90	30,4	33,0	37,4	80	350
B39	38,20	39,80	40	130	33,4	36,4	41,2	80	350
B43	42,10	43,90	45	150	37,6	41,2	46,6	85	375
B47	46,10	47,90	50	170	42,0	46,1	51,8	85	375
B51	50,00	51,00	60	180	46,6	51,0	57,2	90	400
B56	54,90	57,10	70	200	52,2	57,0	63,8	100	425
B62	60,80	63,20	80	215	58,8	64,4	71,6	120	450
B68	66,60	69,40	90	240	65,6	71,7	79,8	150	475
B75	73,50	76,50	95	255	73,4	80,2	88,6	170	500

T_j = 25 °C
± 3% tolerance range

BZV55F	working voltage V_Z (V) at I_{Ztest} = 5 mA		differential resistance r_{diff} (Ω) at I_{Ztest} = 5 mA		temperature coefficient S_Z (mV/K) at I_{Ztest} = 5 mA		
	min.	max.	typ.	max.	min.	typ.	max.
F2V4	2,33	2,47	70	100	−3,5	−1,6	0
F2V7	2,62	2,78	75	100	−3,5	−2,0	0
F3V0	2,91	3,09	80	100	−3,5	−2,1	0
F3V3	3,20	3,40	85	100	−3,5	−2,4	0
F3V6	3,49	3,71	85	100	−3,5	−2,4	0
F3V9	3,78	4,02	85	100	−3,5	−2,5	0
F4V3	4,17	4,43	80	100	−3,5	−2,5	0
F4V7	4,56	4,84	50	100	−3,5	−1,4	0,2
F5V1	4,95	5,25	40	80	−2,7	−0,8	1,2
F5V6	5,43	5,77	15	40	−2,0	1,2	2,5
F6V2	6,01	6,39	6	30	0,4	2,3	3,7
F6V8	6,60	7,00	6	20	1,2	3,0	4,5
F7V5	7,28	7,72	6	20	2,5	4,0	5,3
F8V2	7,95	8,45	6	20	3,2	4,6	6,2
F9V1	8,83	9,37	6	20	3,8	5,5	7,0
F10	9,70	10,30	8	25	4,5	6,4	8,0
F11	10,67	11,33	10	25	5,4	7,4	9,0
F12	11,64	12,36	10	25	6,0	8,4	10,0
F13	12,61	13,39	10	35	7,0	9,4	11,0
F15	14,55	15,45	10	40	9,2	11,4	13,0
F16	15,50	16,50	10	45	10,4	12,4	14,0
F18	17,50	18,50	10	50	12,4	14,4	16,0
F20	19,40	20,60	15	60	14,4	16,4	18,0
F22	21,30	22,70	20	70	16,4	18,4	20,0
F24	23,30	24,70	25	80	18,4	20,4	22,0
	at I_{Ztest} = 2 mA		at I_{Ztest} = 2 mA		at I_{Ztest} = 2 mA		
F27	26,20	27,80	25	80	21,4	23,4	25,3
F30	29,10	30,90	30	100	24,4	26,6	29,4
F33	32,00	34,00	35	120	27,4	29,7	33,4
F36	34,90	37,10	35	140	30,4	33,0	37,4
F39	37,80	40,20	40	150	33,4	36,4	41,2
F43	41,70	44,30	45	160	37,6	41,2	46,6
F47	45,60	48,40	50	170	42,0	46,1	51,8
F51	49,50	52,50	60	180	46,6	51,0	57,2
F56	54,30	57,70	70	200	52,2	57,0	63,8
F62	60,10	63,90	80	220	58,8	64,4	71,6
F68	66,00	70,00	90	240	65,6	71,7	79,8
F75	72,80	77,20	95	255	73,4	80,2	88,6

T_j = 25 °C
± 5% tolerance range

BZV55C	working voltage V_Z (V) at I_{Ztest} = 5 mA		differential resistance r_{diff} (Ω) at I_{Ztest} = 5 mA		temperature coefficient S_Z (mV/K) at I_{Ztest} = 5 mA			differential resistance r_{diff} (Ω) at I_Z = 1 mA	
	min.	max.	typ.	max.	min.	typ.	max.	typ.	max.
C2V4	2,20	2,60	70	100	−3,5	−1,6	0	275	600
C2V7	2,50	2,90	75	100	−3,5	−2,0	0	300	600
C3V0	2,80	3,20	80	95	−3,5	−2,1	0	325	600
C3V3	3,10	3,50	85	95	−3,5	−2,4	0	350	600
C3V6	3,40	3,80	85	90	−3,5	−2,4	0	375	600
C3V9	3,70	4,10	85	90	−3,5	−2,5	0	400	600
C4V3	4,00	4,60	80	90	−3,5	−2,5	0	410	600
C4V7	4,40	5,00	50	80	−3,5	−1,4	0,2	425	500
C5V1	4,80	5,40	40	60	−2,7	−0,8	1,2	400	480
C5V6	5,20	6,00	15	40	−2,0	1,2	2,5	80	400
C6V2	5,80	6,60	6	10	0,4	2,3	3,7	40	150
C6V8	6,40	7,20	6	15	1,2	3,0	4,5	30	80
C7V5	7,00	7,90	6	15	2,5	4,0	5,3	30	80
C8V2	7,70	8,70	6	15	3,2	4,6	6,2	40	80
C9V1	8,50	9,60	6	15	3,8	5,5	7,0	40	100
C10	9,40	10,60	8	20	4,5	6,4	8,0	50	150
C11	10,40	11,60	10	20	5,4	7,4	9,0	50	150
C12	11,40	12,70	10	25	6,0	8,4	10,0	50	150
C13	12,40	14,10	10	30	7,0	9,4	11,0	50	170
C15	13,80	15,60	10	30	9,2	11,4	13,0	50	200
C16	15,30	17,10	10	40	10,4	12,4	14,0	50	200
C18	16,80	19,10	10	45	12,4	14,4	16,0	50	225
C20	18,80	21,20	15	55	14,4	16,4	18,0	60	225
C22	20,80	23,30	20	55	16,4	18,4	20,0	60	250
C24	22,80	25,60	25	70	18,4	20,4	22,0	60	250
	at I_{Ztest} = 2 mA		at I_{Ztest} = 2 mA		at I_{Ztest} = 2 mA			at I_Z = 0,5 mA	
C27	25,10	28,90	25	80	21,4	23,4	25,3	65	300
C30	28,00	32,00	30	80	24,4	26,6	29,4	70	300
C33	31,00	35,00	35	80	27,4	29,7	33,4	75	325
C36	34,00	38,00	35	90	30,4	33,0	37,4	80	350
C39	37,00	41,00	40	130	33,4	36,4	41,2	80	350
C43	40,00	46,00	45	150	37,6	41,2	46,6	85	375
C47	44,00	50,00	50	170	42,0	46,1	51,8	85	375
C51	48,00	54,00	60	180	46,6	51,0	57,2	90	400
C56	52,00	60,00	70	200	52,2	57,0	63,8	100	425
C62	58,00	66,00	80	215	58,8	64,4	71,6	120	450
C68	64,00	72,00	90	240	65,6	71,7	79,8	150	475
C75	70,00	79,00	95	255	73,4	80,2	88,6	170	500

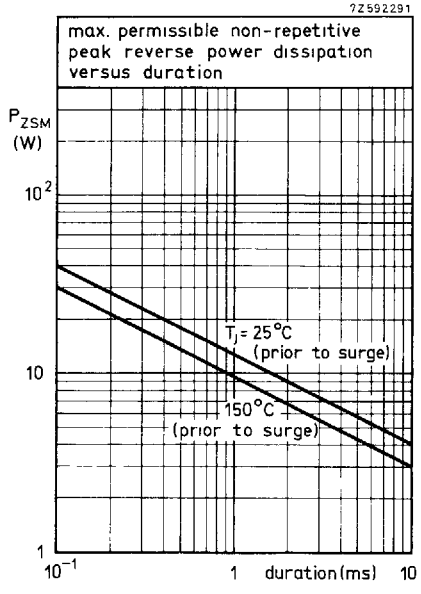

7Z59229.1
max. permissible non-repetitive peak reverse power dissipation versus duration
P_{ZSM} (W)
10^2
10
1
10^{-1}
1
duration (ms)
10
T_j = 25 °C (prior to surge)
150 °C (prior to surge)

Fig. 2.

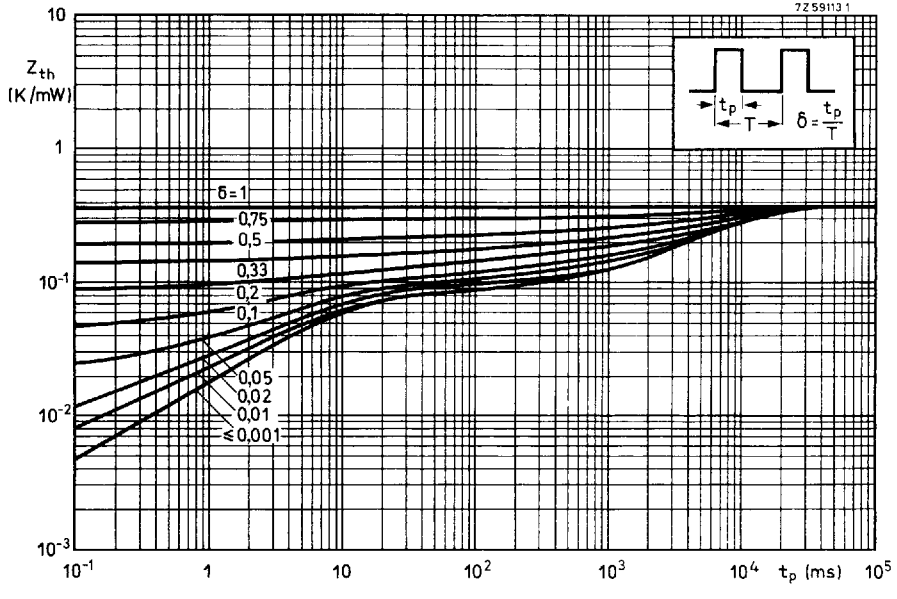

7Z59113.1
Z_{th} (K/mW)
10
1
10^{-1}
10^{-2}
10^{-3}
10^{-1}
1
10
10^2
10^3
10^4
t_p (ms)
10^5
t_p
T
$\delta = \frac{t_p}{T}$
δ = 1
0,75
0,5
0,33
0,2
0,1
0,05
0,02
0,01
≤ 0,001

Fig. 3.

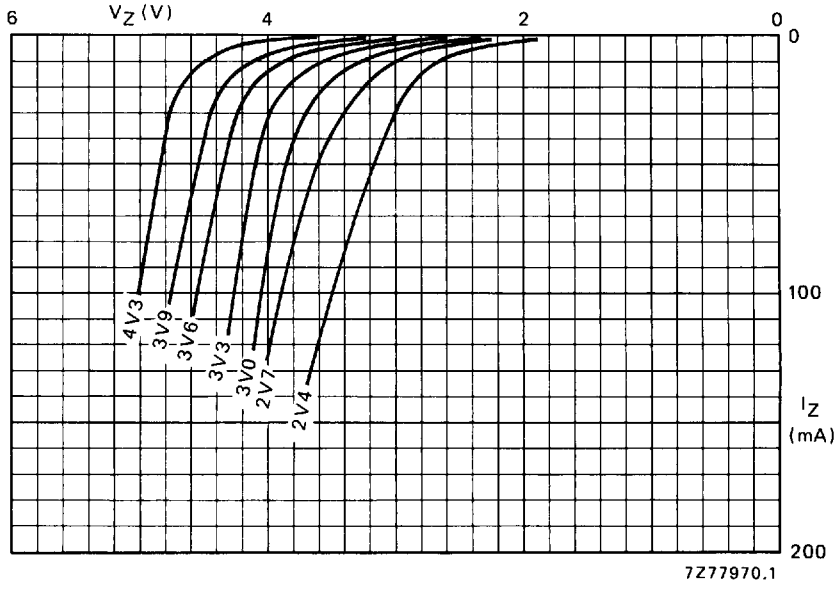


Fig. 4 Static characteristics; typical values; T_{amb} = 25 °C.

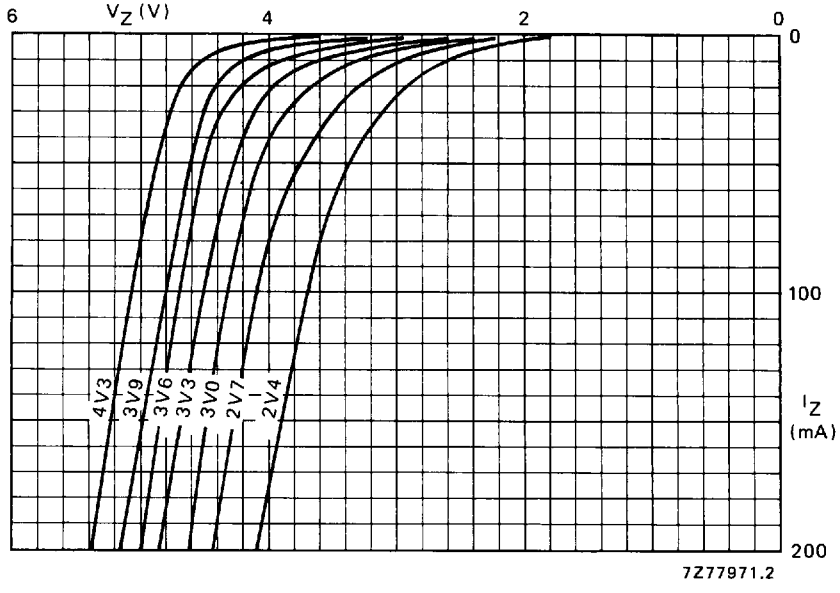


Fig. 5 Dynamic characteristics; typical values; T_j = 25 °C.

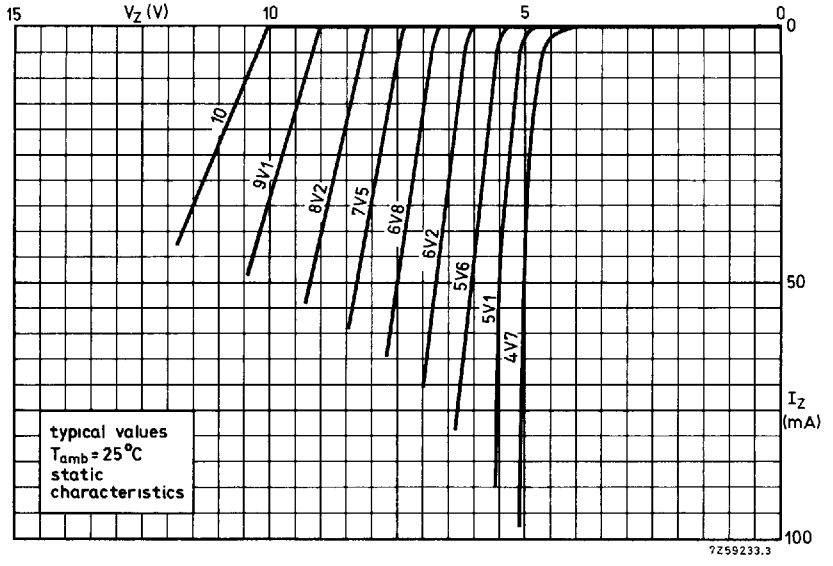

15
V_Z (V)
10
5
0
0
10
9V1
8V2
7V5
6V8
6V2
5V6
5V1
4V7
50
I_Z
(mA)
100
typical values
T_{amb} = 25°C
static
characteristics
7Z59233.3

Fig. 6.

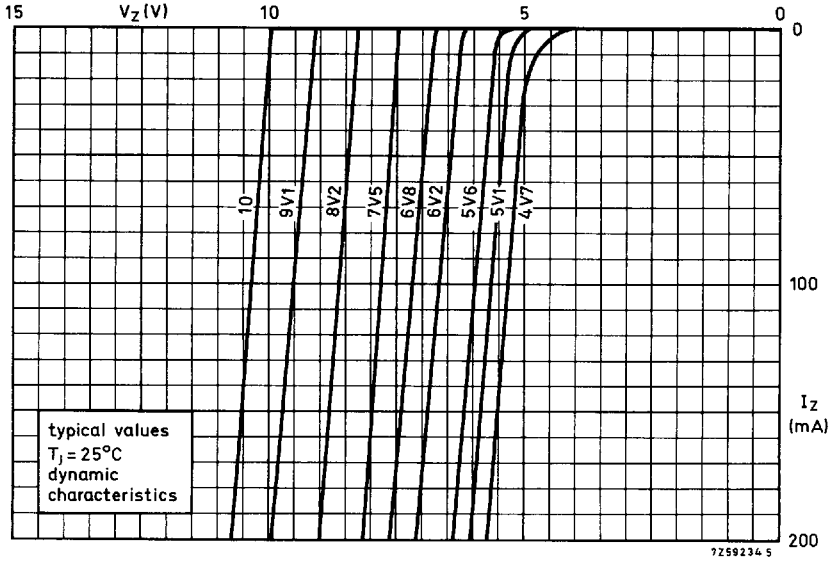

15
V_Z (V)
10
5
0
0
10
9V1
8V2
7V5
6V8
6V2
5V6
5V1
4V7
100
I_Z
(mA)
200
typical values
T_j = 25°C
dynamic
characteristics
7Z59234.5

Fig. 7.

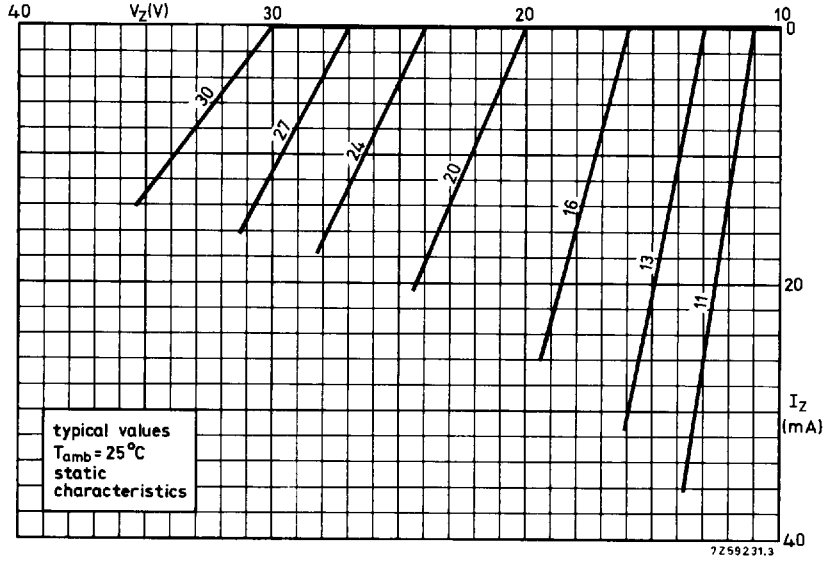

40
V_Z(V)
30
20
10
0
30
27
24
20
16
13
11
20
I_Z
(mA)
typical values
T_{amb} = 25°C
static
characteristics
40
7Z59231.3

Fig. 8.

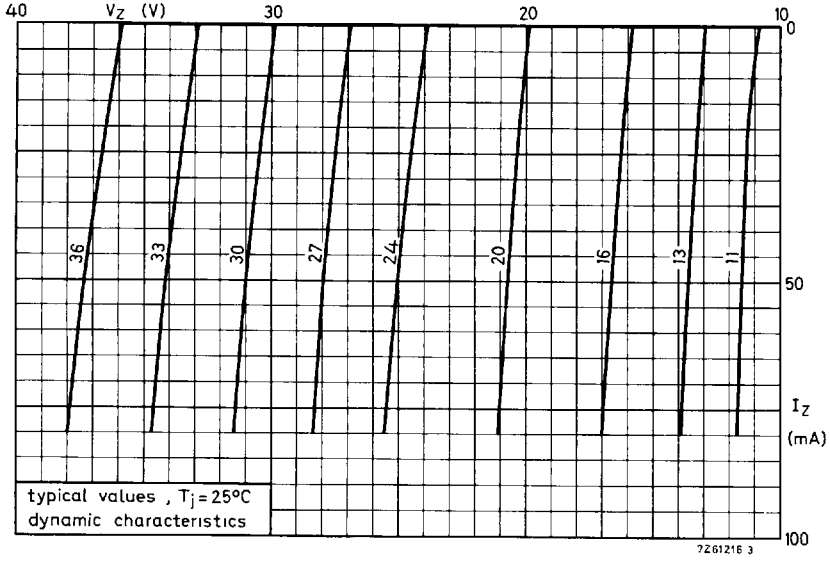

40
V_Z (V)
30
20
10
0
36
33
30
27
24
20
16
13
11
50
I_Z
(mA)
typical values , T_j = 25°C
dynamic characteristics
100
7Z61216 3

Fig. 9.

6653931 0025741 367 APX
N AMER PHILIPS/DISCRETE 67E D

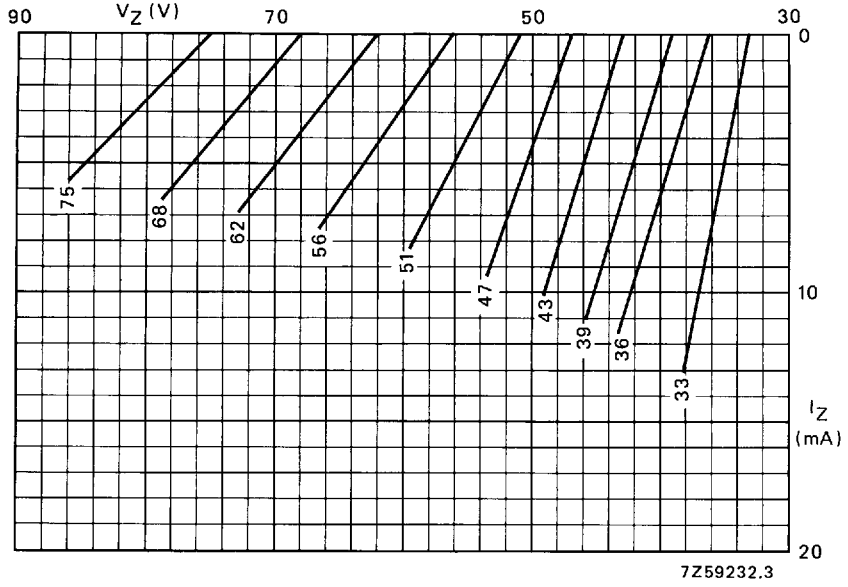


Fig. 10 Static characteristics; typical values; T_{amb} = 25 °C.

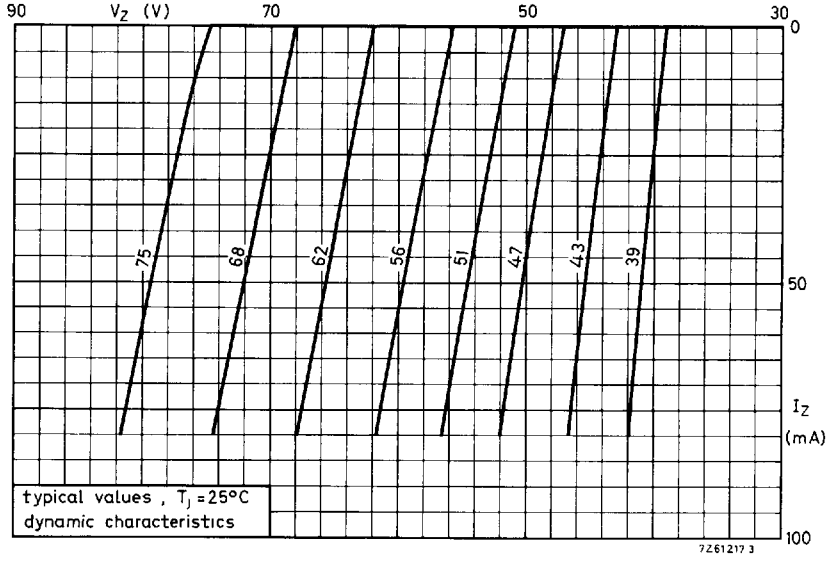


Fig. 11.

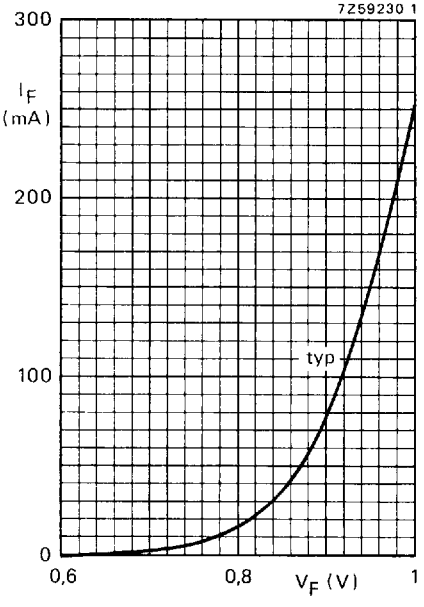


Fig. 12 T_j = 25 °C.

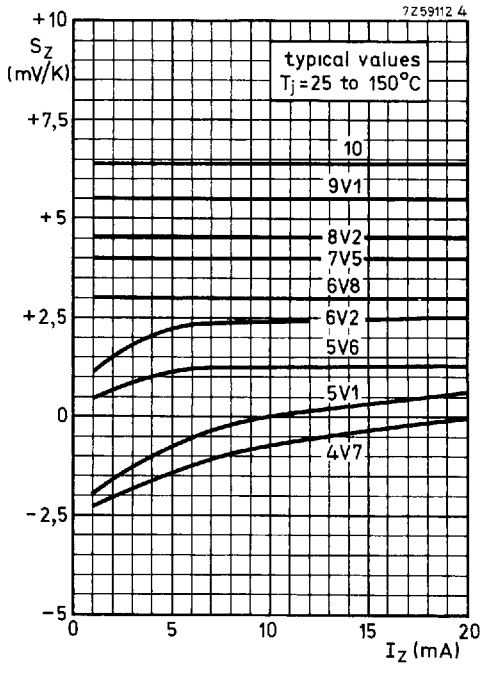


Fig. 13.

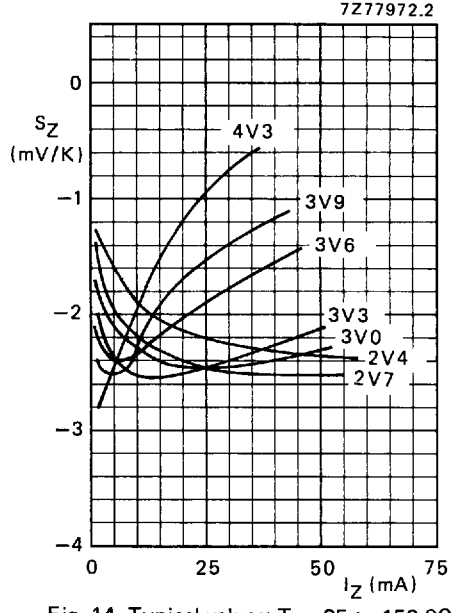


Fig. 14 Typical values; T_j = 25 to 150 °C.

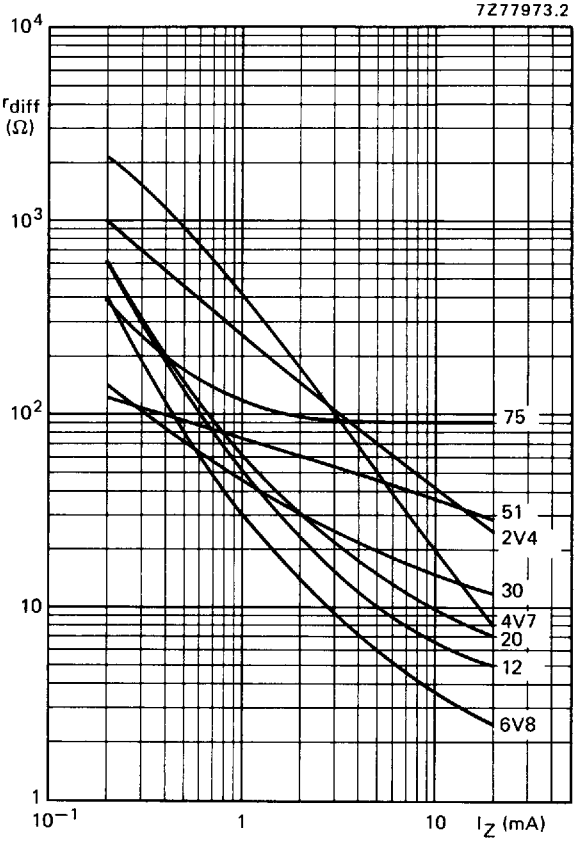


Fig. 15 Typical values; T_j = 25 °C; f = 1 kHz.

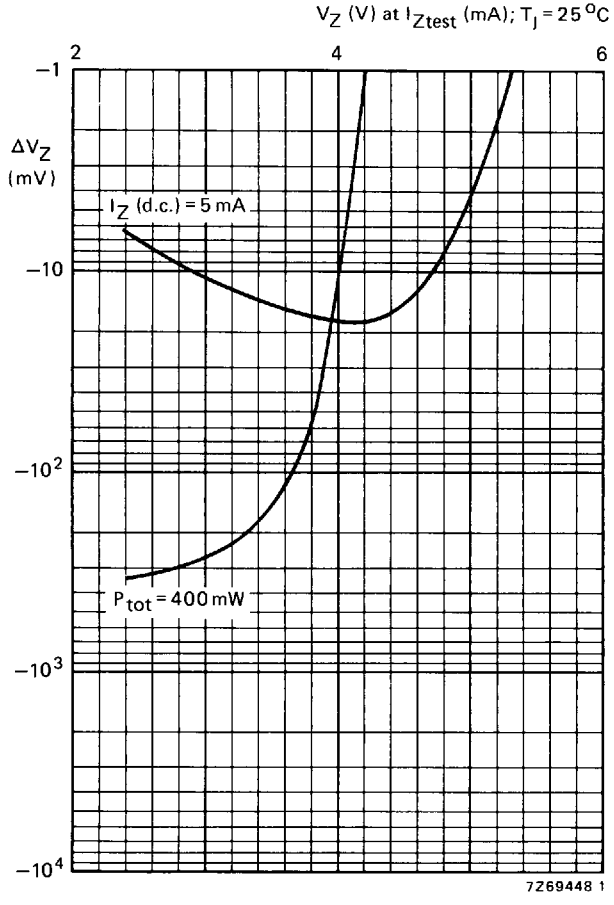


Fig. 16 Typical change of working voltage under operating conditions at T_{amb} = 25 °C.

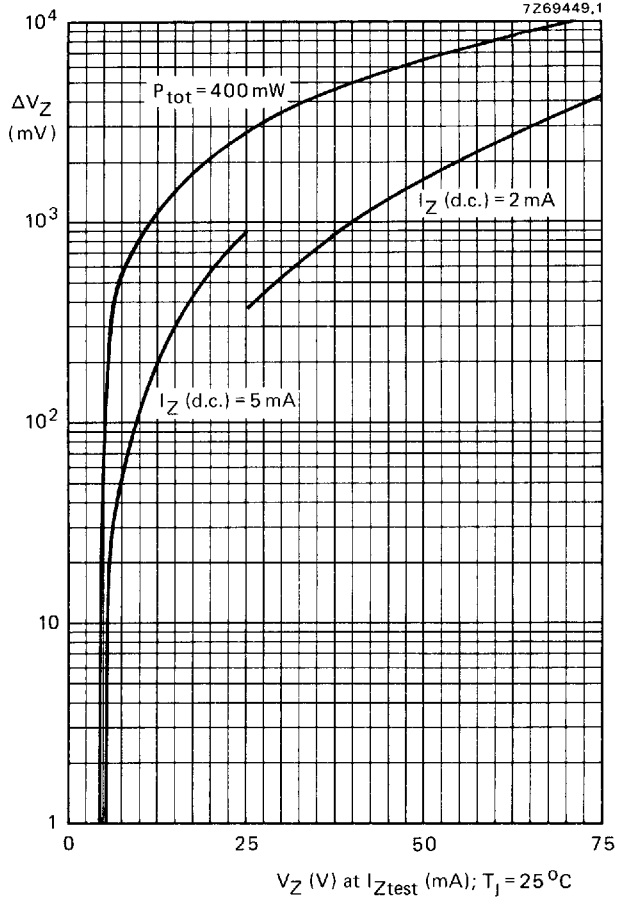


Fig. 17 Typical change of working voltage under operating conditions at T_{amb} = 25 °C.