



# DATA SHEET

SEMICONDUCTOR

1N4728A~1N4764A

## 1 Watt DO-41G Hermetically Sealed Glass Zener Voltage Regulators

### Maximum Ratings

Rating	Symbol	Value	Unit
Maximum Steady State Power Dissipation @ $T_L \leq 50^\circ\text{C}$ , Lead Length = 3/8"	$P_D$	1.0	W
Derate Above 50°C		6.67	mW/°C
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to +200	°C

### Specification Features

- Zener Voltage Range = 3.3 V to 100 V
- ESD Rating of Class 3 (>16 KV) per Human Body Model
- DO-41G Package
- Double Slug Type Construction
- Metallurgical Bonded Construction
- Oxide Passivated Die

### Mechanical Characteristics

**Case** : Double slug type, hermetically sealed glass

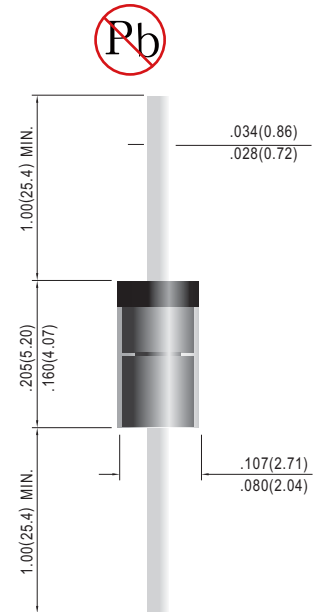
**Finish** : All external surfaces are corrosion resistant and leads are readily solderable.

**Polarity** : Cathode indicated by polarity band

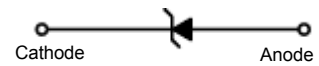
**Mounting**: Any

### Maximum Lead Temperature for Soldering Purposes

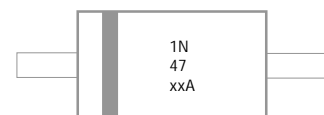
260°C, 1/16" from the case for 10 seconds



AXIAL LEAD  
DO41G



### MARKING DIAGRAM

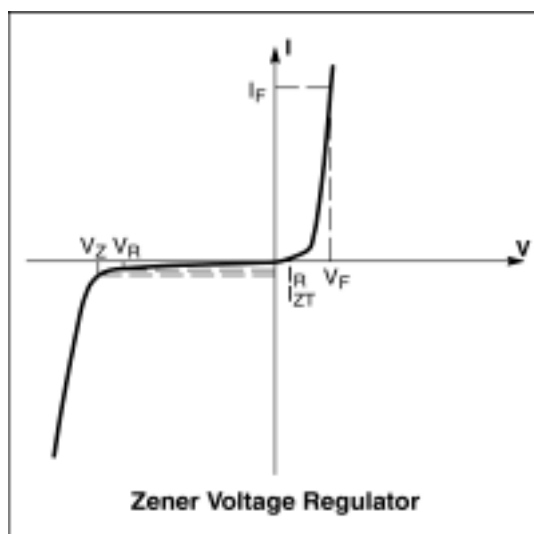


1N47xxA = Device Code

# 1N4728A~1N4764A

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted.  $V_F = 1.2\text{ V Max @ } I_F = 200\text{mA}$  for all types)

Symbol	Parameter
$V_Z$	Reverse Zener Voltage @ $I_{ZT}$
$I_{ZT}$	Reverse Zener Current
$Z_{ZT}$	Maximum Zener Impedance @ $I_{ZT}$
$I_{ZK}$	Reverse Zener Current
$Z_{ZK}$	Maximum Zener Impedance @ $I_{ZK}$
$I_R$	Reverse Leakage Current @ $V_R$
$V_R$	Reverse Voltage
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$
$I_s$	Surge Current @ $T_A = 25^\circ\text{C}$



**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 1.2\text{ V Max @ } I_F = 200\text{mA}$  for all types)

Device (Note 2.)	Device Marking	Zener Voltage (Note 3 & 4.)				Zener Impedance (Note 5.)			Leakage Current		$I_s$ (Note 6.)
		$V_Z$ (Volts)			@ $I_{ZT}$	$Z_{ZT}$ @ $I_{ZT}$	$Z_{ZK}$ @ $I_{ZK}$	$I_R$ @ $V_R$			
		Min	Nom	Max	(mA)	( $\Omega$ )	( $\Omega$ )	(mA)	( $\mu\text{A Max}$ )	(Volts)	
1N4728A	1N4728A	3.135	3.3	3.465	76	10	400	1	100	1	1380
1N4729A	1N4729A	3.42	3.6	3.78	69	10	400	1	100	1	1260
1N4730A	1N4730A	3.705	3.9	4.095	64	9	400	1	50	1	1190
1N4731A	1N4731A	4.085	4.3	4.515	58	9	400	1	10	1	1070
1N4732A	1N4732A	4.465	4.7	4.935	53	8	500	1	10	1	970
<b>1N4733A</b>	<b>1N4733A</b>	<b>4.845</b>	<b>5.1</b>	<b>5.355</b>	<b>49</b>	<b>7</b>	<b>550</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>890</b>
<b>1N4734A</b>	<b>1N4734A</b>	<b>5.32</b>	<b>5.6</b>	<b>5.88</b>	<b>45</b>	<b>5</b>	<b>600</b>	<b>1</b>	<b>10</b>	<b>2</b>	<b>810</b>
<b>1N4735A</b>	<b>1N4735A</b>	<b>5.89</b>	<b>6.2</b>	<b>6.51</b>	<b>41</b>	<b>2</b>	<b>700</b>	<b>1</b>	<b>10</b>	<b>3</b>	<b>730</b>
<b>1N4736A</b>	<b>1N4736A</b>	<b>6.46</b>	<b>6.8</b>	<b>7.14</b>	<b>37</b>	<b>3.5</b>	<b>700</b>	<b>1</b>	<b>10</b>	<b>4</b>	<b>660</b>
1N4737A	1N4737A	7.125	7.5	7.875	34	4	700	0.5	10	5	605
1N4738A	1N4738A	7.79	8.2	8.61	31	4.5	700	0.5	10	6	550
1N4739A	1N4739A	8.645	9.1	9.555	28	5	700	0.5	10	7	500
<b>1N4740A</b>	<b>1N4740A</b>	<b>9.5</b>	<b>10</b>	<b>10.5</b>	<b>25</b>	<b>7</b>	<b>700</b>	<b>0.25</b>	<b>10</b>	<b>7.6</b>	<b>454</b>
<b>1N4741A</b>	<b>1N4741A</b>	<b>10.45</b>	<b>11</b>	<b>11.55</b>	<b>23</b>	<b>8</b>	<b>700</b>	<b>0.25</b>	<b>5</b>	<b>8.4</b>	<b>414</b>
<b>1N4742A</b>	<b>1N4742A</b>	<b>11.4</b>	<b>12</b>	<b>12.6</b>	<b>21</b>	<b>9</b>	<b>700</b>	<b>0.25</b>	<b>5</b>	<b>9.1</b>	<b>380</b>

## 2. TOLERANCE AND TYPE NUMBER DESIGNATION ( $V_Z$ )

The type numbers listed have a standard tolerance on the nominal zener voltage of  $\pm 5\%$ .

## 3. SPECIALS AVAILABLE INCLUDE

Nominal zener voltages between the voltages shown and tighter voltage tolerances. For detailed information on price, availability and delivery, contact your nearest YEASHIN representative.

## 4. ZENER VOLTAGE ( $V_Z$ ) MEASUREMENT

Nominal zener voltage is measured with the device junction in the thermal equilibrium at the lead temperature ( $T_L$ ) at  $30^\circ\text{C} \pm 1^\circ\text{C}$  and  $3/8"$  lead length.

## 5. ZENER IMPEDANCE ( $Z_Z$ ) DERIVATION

The zener impedance is derived from the 60 cycle AC voltage, which results when an AC current having an RMS value equal to 10% of the DC zener current ( $I_{ZT}$  or  $I_{ZK}$ ) is superimposed on  $I_{ZT}$  or  $I_{ZK}$ .

## 6. SURGE CURRENT ( $I_s$ ) NON-REPETITIVE

The rating listed in the electrical characteristics table is maximum peak, non-repetitive, reverse surge current of  $1/2$  square wave or equivalent sine wave pulse of  $1/120$  second duration superimposed on the test current  $I_{ZT}$  per JEDEC registration; however, actual device capability is as described in figure 5 of the General Data DO-41 Glass.

# 1N4728A~1N4764A

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted, V<sub>F</sub> = 1.2 V Max @ I<sub>F</sub> = 200mA for all types)

Device (Note 7.)	Device Marking	Zener Voltage (Note 8 & 9.)				Zener Impedance (Note 10.)			Leakage Current		I <sub>r</sub> (Note 11.)
		V <sub>Z</sub> (Volts)			@ I <sub>ZT</sub>	Z <sub>ZT</sub> @ I <sub>ZT</sub>	Z <sub>ZK</sub> @ I <sub>ZK</sub>		I <sub>R</sub> @ V <sub>R</sub>		
		Min	Nom	Max	(mA)	(Ω)	(Ω)	(mA)	(μA Max)	(Volts)	(mA)
1N4743A	1N4743A	12.35	13	13.65	19	10	700	0.25	5	9.9	344
<b>1N4744A</b>	<b>1N4744A</b>	<b>14.25</b>	<b>15</b>	<b>15.75</b>	<b>17</b>	<b>14</b>	<b>700</b>	<b>0.25</b>	<b>5</b>	<b>11.4</b>	<b>304</b>
<b>1N4745A</b>	<b>1N4745A</b>	<b>15.2</b>	<b>16</b>	<b>16.8</b>	<b>15.5</b>	<b>16</b>	<b>700</b>	<b>0.25</b>	<b>5</b>	<b>12.2</b>	<b>285</b>
<b>1N4746A</b>	<b>1N4746A</b>	<b>17.1</b>	<b>18</b>	<b>18.9</b>	<b>14</b>	<b>20</b>	<b>750</b>	<b>0.25</b>	<b>5</b>	<b>13.7</b>	<b>250</b>
<b>1N4747A</b>	<b>1N4747A</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>12.5</b>	<b>22</b>	<b>750</b>	<b>0.25</b>	<b>5</b>	<b>15.2</b>	<b>225</b>
<b>1N4748A</b>	<b>1N4748A</b>	<b>20.9</b>	<b>22</b>	<b>23.1</b>	<b>11.5</b>	<b>23</b>	<b>750</b>	<b>0.25</b>	<b>5</b>	<b>16.7</b>	<b>205</b>
<b>1N4749A</b>	<b>1N4749A</b>	<b>22.8</b>	<b>24</b>	<b>25.2</b>	<b>10.5</b>	<b>25</b>	<b>750</b>	<b>0.25</b>	<b>5</b>	<b>18.2</b>	<b>190</b>
<b>1N4750A</b>	<b>1N4750A</b>	<b>25.65</b>	<b>27</b>	<b>28.35</b>	<b>9.5</b>	<b>35</b>	<b>750</b>	<b>0.25</b>	<b>5</b>	<b>20.6</b>	<b>170</b>
<b>1N4751A</b>	<b>1N4751A</b>	<b>28.5</b>	<b>30</b>	<b>31.5</b>	<b>8.5</b>	<b>40</b>	<b>1000</b>	<b>0.25</b>	<b>5</b>	<b>22.8</b>	<b>150</b>
<b>1N4752A</b>	<b>1N4752A</b>	<b>31.35</b>	<b>33</b>	<b>34.65</b>	<b>7.5</b>	<b>45</b>	<b>1000</b>	<b>0.25</b>	<b>5</b>	<b>25.1</b>	<b>135</b>
1N4753A	1N4753A	34.2	36	37.8	7	50	1000	0.25	5	27.4	125
1N4754A	1N4754A	37.05	39	40.95	6.5	60	1000	0.25	5	29.7	115
1N4755A	1N4755A	40.85	43	45.15	6	70	1500	0.25	5	32.7	110
1N4756A	1N4756A	44.65	47	49.35	5.5	80	1500	0.25	5	35.8	95
1N4757A	1N4757A	48.45	51	53.55	5	95	1500	0.25	5	38.8	90
1N4758A	1N4758A	53.2	56	58.8	4.5	110	2000	0.25	5	42.6	80
1N4759A	1N4759A	58.9	62	65.1	4	125	2000	0.25	5	47.1	70
1N4760A	1N4760A	64.6	68	71.4	3.7	150	2000	0.25	5	51.7	65
1N4761A	1N4761A	71.25	75	78.75	3.3	175	2000	0.25	5	56	60
1N4762A	1N4762A	77.9	82	86.1	3	200	3000	0.25	5	62.2	55
1N4763A	1N4763A	86.45	91	95.55	2.8	250	3000	0.25	5	69.2	50
1N4764A	1N4764A	95	100	105	2.5	350	3000	0.25	5	76	45

**7. TOLERANCE AND TYPE NUMBER DESIGNATION (V<sub>Z</sub>)**

The type numbers listed have a standard tolerance on the nominal zener voltage of ±5%.

**8. SPECIALS AVAILABLE INCLUDE**

Nominal zener voltages between the voltages shown and tighter voltage tolerances. For detailed information on price, availability and delivery, contact your nearest YEAHSIN representative.

**9. ZENER VOLTAGE (V<sub>Z</sub>) MEASUREMENT**

Nominal zener voltage is measured with the device junction in the thermal equilibrium at the lead temperature (T<sub>L</sub>) at 30°C ±1°C and 3/8" lead length.

**10. ZENER IMPEDANCE (Z<sub>Z</sub>) DERIVATION**

The zener impedance is derived from the 60 cycle AC voltage, which results when an AC current having an RMS value equal to 10% of the DC zener current (I<sub>ZT</sub> or I<sub>ZK</sub>) is superimposed on I<sub>ZT</sub> or I<sub>ZK</sub>.

**11. SURGE CURRENT (I<sub>r</sub>) NON-REPETITIVE**

The rating listed in the electrical characteristics table is maximum peak, non-repetitive, reverse surge current of ½ square wave or equivalent sine wave pulse of 1/120 second duration superimposed on the test current I<sub>ZT</sub> per JEDEC registration; however, actual device capability is as described in figure 5 of the General Data DO-41 Glass.

# DEVICE CHARACTERISTICS

## 1N4728A~1N4764A

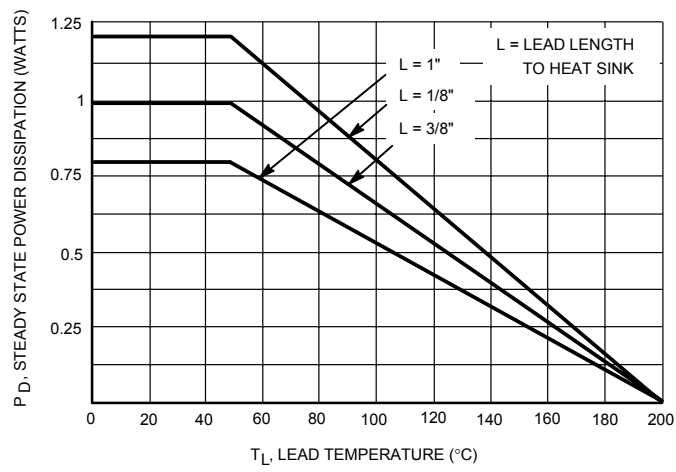
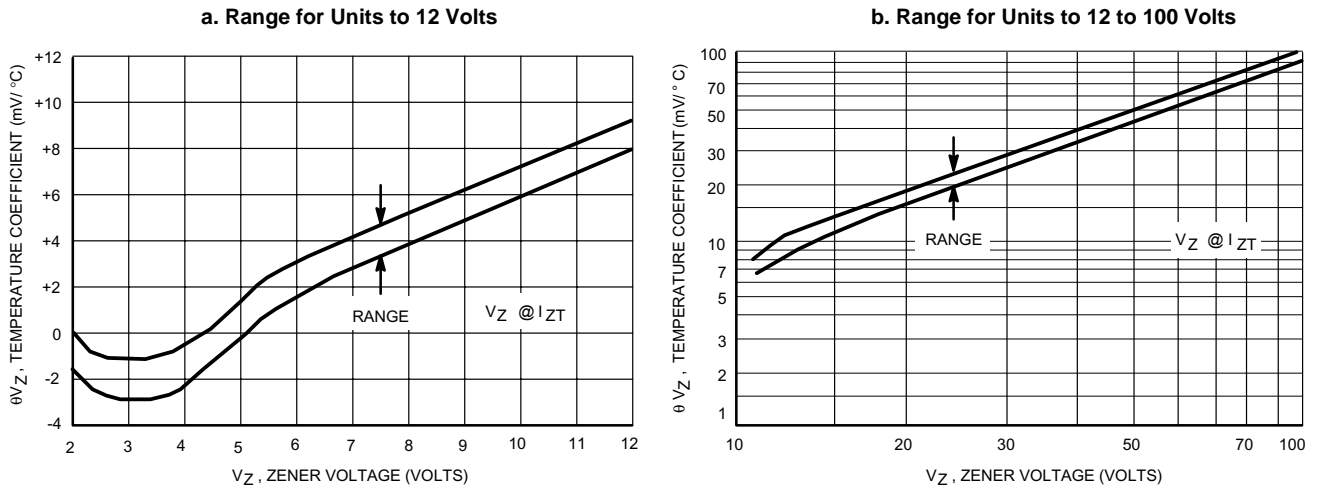


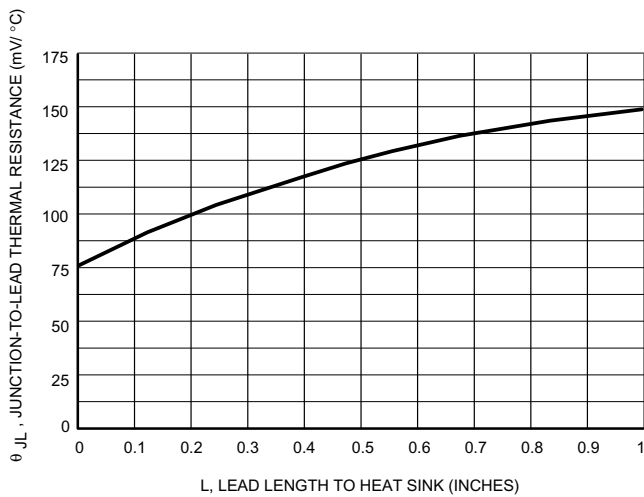
Figure 1. Power Temperature Derating Curve

# DEVICE CHARACTERISTICS

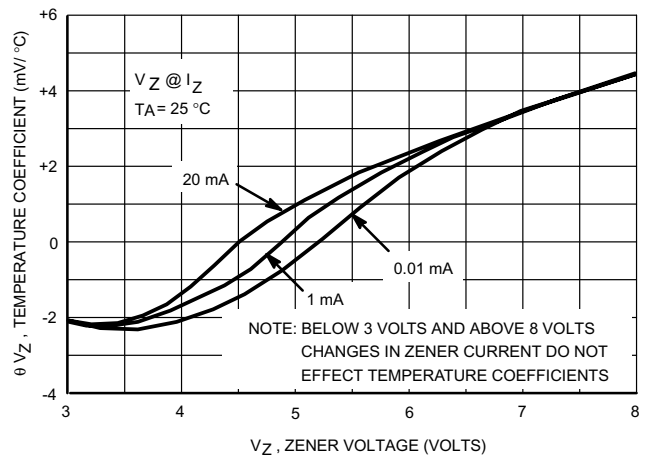
## 1N4728A~1N4764A



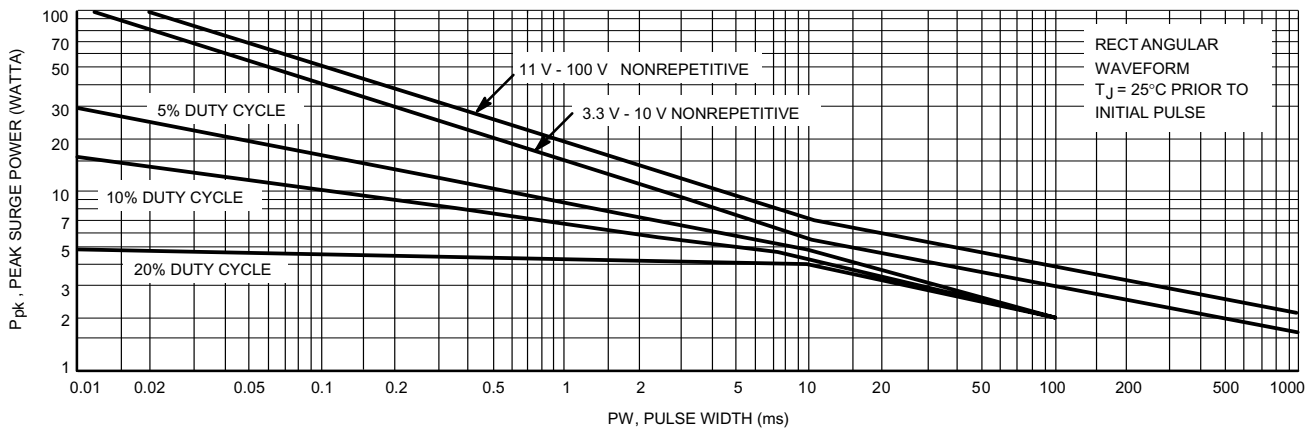
**Figure 2. Temperature Coefficients**  
 (-55 °C to +150 °C temperature range; 90% of the units are in the ranges indicated.)



**Figure 3. Typical Thermal Resistance versus Lead Length**



**Figure 4. Effect of Zener Current**



This graph represents 90 percentile data points.  
 For worst case design characteristics, multiply surge power by 2/3.

**Figure 5. Maximum Surge Power**

# DEVICE CHARACTERISTICS

## 1N4728A~1N4764A

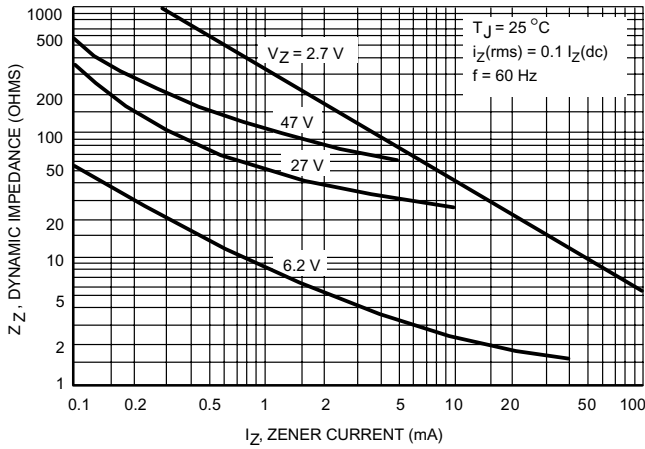


Figure 6. Effect of Zener Current on Zener Impedance

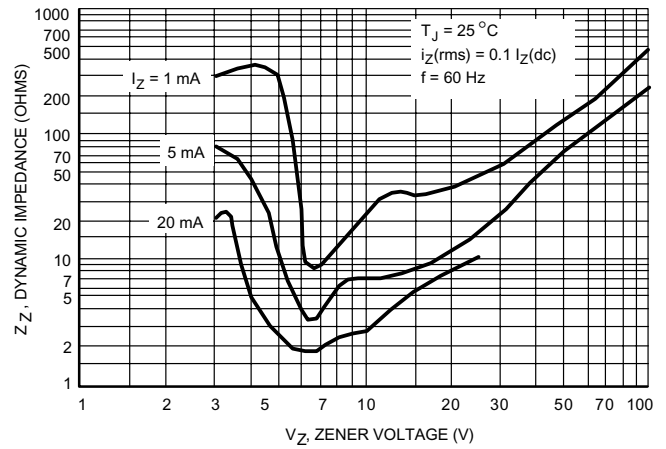


Figure 7. Effect of Zener Voltage on Zener Impedance

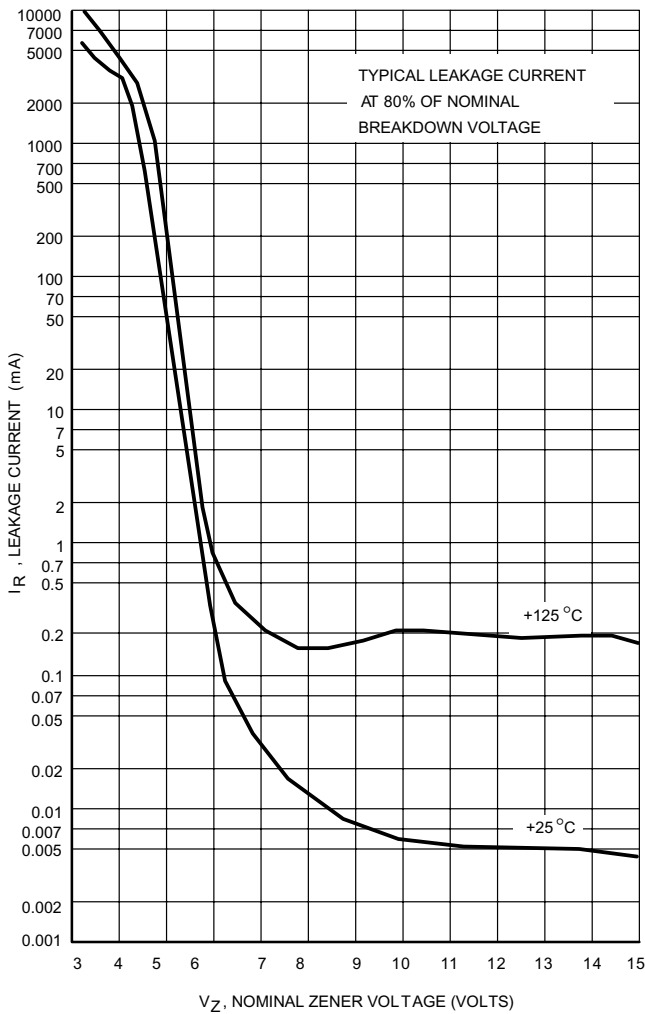


Figure 8. Typical Leakage Current

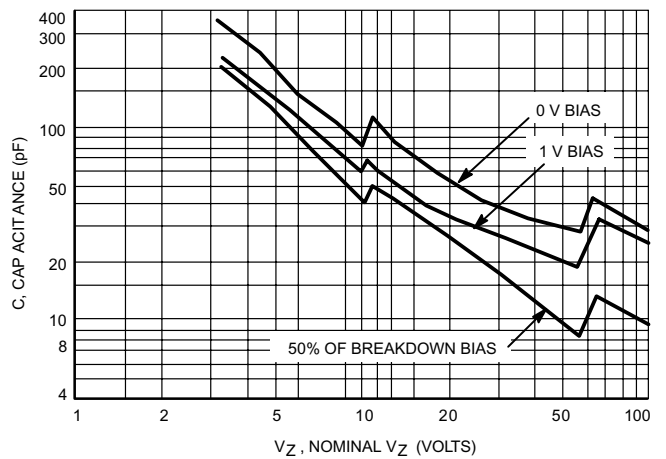


Figure 9. Typical Capacitance versus  $V_Z$

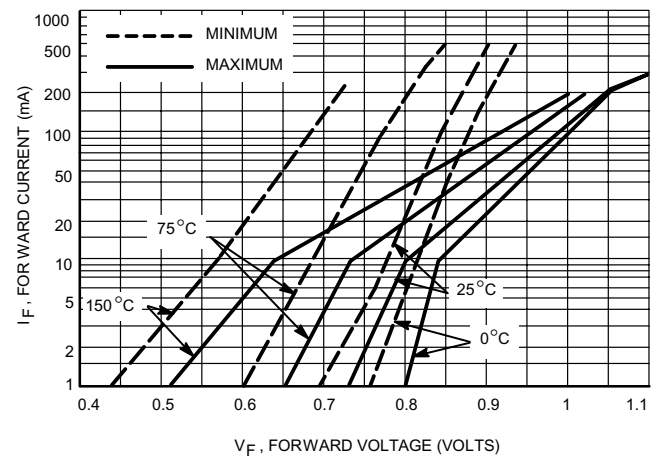


Figure 10. Typical Forward Characteristics