

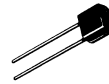
**MBD101**  
**MMBD101**  
**MMBD101L**

**SILICON HOT-CARRIER DIODE**  
**(SCHOTTKY BARRIER DIODE)**

... designed primarily for UHF mixer applications but suitable also for use in detector and ultra-fast switching circuits. Supplied in an inexpensive plastic package for low-cost, high-volume consumer requirements. Also available in Surface Mount package.

- The Rugged Schottky Barrier Construction Provides Stable Characteristics by Eliminating the "Cat-Whisker" Contact
- Low Noise Figure — 6.0 dB Typ @ 1.0 GHz
- Very Low Capacitance — Less Than 1.0 pF @ Zero Volts
- High Forward Conductance — 0.50 Volts (Typ) @  $I_F = 10$  mA

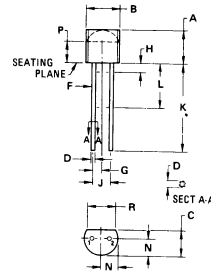
**SILICON HOT-CARRIER**  
**UHF MIXER DIODE**



**CASE 182-02**  
**TO-226AC**



**CASE 318-02**  
**TO-236AA**  
**SOT-23**

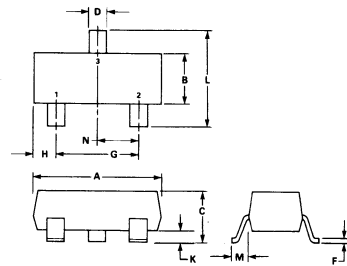


STYLE 1:  
 PIN 1, ANODE  
 2, CATHODE

**CASE 182-02**  
**TO-226AC**

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	5.33	0.170	0.210
B	4.46	5.21	0.175	0.205
C	3.18	4.19	0.125	0.165
D	0.398	0.533	0.014	0.021
F	0.407	0.492	0.016	0.019
G	1.27	BSC	0.050	BSC
H	—	1.27	—	0.050
J	—	2.54	—	0.100
K	12.70	BSC	0.500	BSC
L	6.35	—	0.250	—
N	2.03	2.68	0.080	0.105
P	2.93	—	0.115	—
R	3.43	—	0.135	—

All JEDEC dimensions and notes apply



STYLE 8:  
 PIN 1, ANODE  
 2, NO CONNECTION  
 3, CATHODE

**CASE 318-02**  
**TO-236AA**  
**SOT-23**

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.04	0.1132	0.1197
B	1.90	1.60	0.0472	0.0631
C	0.85	1.20	0.033	0.0472
D	0.97	0.50	0.0150	0.020
F	0.095	0.130	0.0034	0.0051
G	1.78	2.04	0.0701	0.0807
H	0.45	0.60	0.0177	0.0236
K	0.10	0.25	0.0040	0.0098
L	2.10	2.50	0.0826	0.0984
M	0.45	0.60	0.0180	0.0236
N	0.89	1.02	0.0350	0.0401
K	0.013	0.10	0.0005	0.0040

\*Low Profile = CASE 318-02 TO-236AB

**MAXIMUM RATINGS**

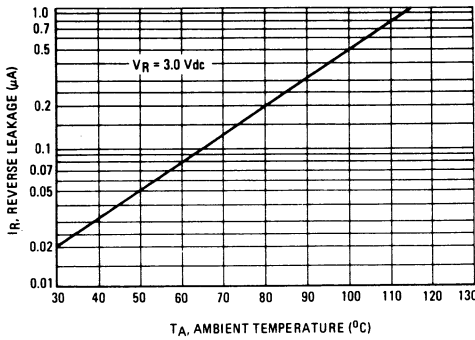
Rating	Symbol	MBD101		Unit
		Value	MMBD101,L	
Reverse Voltage	$V_R$	4.0		Volts
Forward Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_F$	280	200	mW
		2.8	2.0	
Junction Temperature	$T_J$	+125		$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150		$^\circ\text{C}$

**ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

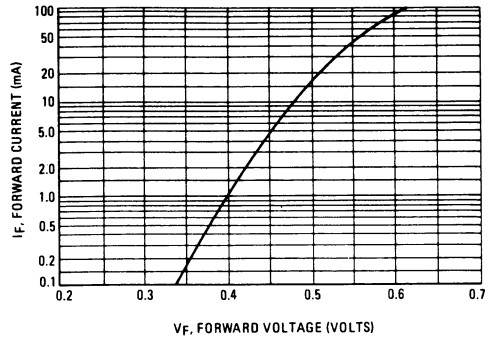
Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage ( $I_R = 10 \mu\text{A}$ )	$V_{(BR)R}$	4.0	5.0	—	Volts
Diode Capacitance ( $V_R = 0$ , $f = 1.0$ MHz, Note 1)	$C_T$	—	0.88	1.0	pF
Forward Voltage (1) ( $I_F = 10$ mA)	$V_F$	—	0.50	0.60	Volts
Noise Figure ( $f = 1.0$ GHz, Note 2)	NF	—	6.0	—	dB
Reverse Leakage ( $V_R = 3.0$ V)	$I_R$	—	0.02	0.25	$\mu\text{A}$

**TYPICAL CHARACTERISTICS**  
( $T_A = 25^\circ\text{C}$  unless noted)

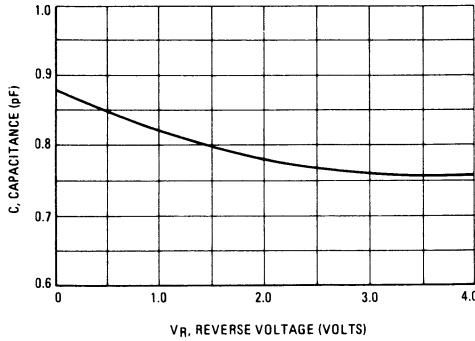
**FIGURE 1 – REVERSE LEAKAGE**



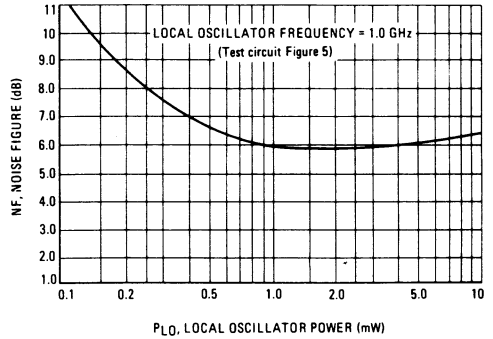
**FIGURE 2 – FORWARD VOLTAGE**



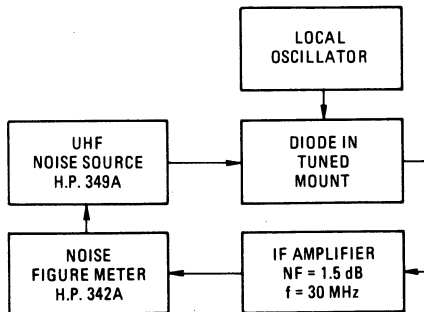
**FIGURE 3 – CAPACITANCE**



**FIGURE 4 – NOISE FIGURE**



**FIGURE 5 – NOISE FIGURE TEST CIRCUIT**



**NOTES ON TESTING AND SPECIFICATIONS**

- Note 1 –  $C_C$  and  $C_T$  are measured using a capacitance bridge (Boonton Electronics Model 75A or equivalent).
- Note 2 – Noise figure measured with diode under test in tuned diode mount using UHF noise source and local oscillator (LO) frequency of 1.0 GHz. The LO power is adjusted for 1.0 mW. IF amplifier NF = 1.5 dB,  $f = 30$  MHz, see Figure 5.
- Note 3 –  $L_S$  is measured on a package having a short instead of a die, using an impedance bridge (Boonton Radio Model 250A RX Meter).

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**MBD201 MMBD201, L**  
**MBD301 MMBD301, L**

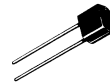


**SILICON HOT-CARRIER DIODE**  
**(SCHOTTKY BARRIER DIODE)**

... designed primarily for high-efficiency UHF and VHF detector applications. Readily adaptable to many other fast switching RF and digital applications. Supplied in an inexpensive plastic package for low-cost, high-volume consumer and industrial/commercial requirements. Also available in Surface Mount package.

- The Schottky Barrier Construction Provides Ultra-Stable Characteristics By Eliminating the "Cat-Whisker" or "S-Bend" Contact
- Extremely Low Minority Carrier Lifetime — 15 ps (Typ)
- Very Low Capacitance — 1.5pF (Max) @  $V_R = 15$  V
- Two Voltage Ranges — 20 V — MBD201, MMBD201, L  
 — 30 V — MBD301, MMBD301, L
- Low Reverse Leakage —  $I_R = 10$  nAdc (Typ) MBD201, MMBD201, L  
 = 13 nAdc (Typ) MBD301, MMBD301, L

**SILICON HOT-CARRIER DETECTOR AND SWITCHING DIODES**  
 20-30 VOLTS



**CASE 182-02**  
**TO-226AC**



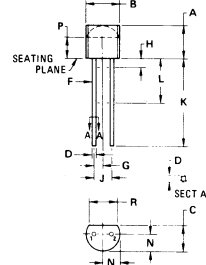
**CASE 318-02**  
**TO-236AA**  
**SOT-23**

**MAXIMUM RATING** ( $T_J = 125^\circ\text{C}$  unless otherwise noted)

		MBD201	MMBD201, L		
		MBD301	MMBD301, L		
Rating	Symbol	Value		Unit	
Reverse Voltage	$V_R$	20		Volts	
	MBD201	30			
	MBD301				
Forward Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_F$	280	200	mW	
		2.8	2.0	mW/°C	
Operating Junction Temperature Range	$T_J$	-55 to +125		°C	
Storage Temperature Range	$T_{stg}$	-65 to +150		°C	

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

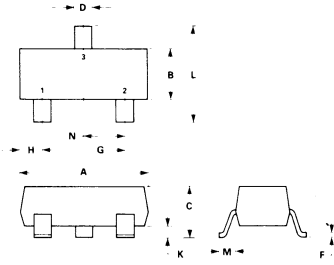
Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage ( $I_R = 10 \mu\text{Adc}$ )	$V_{(BR)R}$	20	—	—	Volts
	MBD201, MMBD201, L	30	—	—	
	MBD301, MMBD301, L				
Total Capacitance, Figure 1 ( $V_R = 15$ Volts, $f = 1.0$ MHz)	$C_T$	—	0.9	1.5	pF
Minority Carrier Lifetime, Figure 2 ( $I_F = 5.0$ mA, Krakauer Method)	$\tau$	—	15	—	ps
Reverse Leakage, Figure 3 ( $V_R = 15$ V)	$I_R$	—	10	200	nAdc
	MBD201, MMBD201, L	—	13	200	
	MBD301, MMBD301, L				
Forward Voltage, Figure 4 ( $I_F = 10$ mAdc)	$V_F$	—	0.5	0.6	Vdc



STYLE 1:  
 PIN 1 ANODE  
 PIN 2 CATHODE  
**CASE 182-02**  
**TO-226AC**

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	5.33	0.170	0.210
B	4.45	5.21	0.175	0.205
C	3.18	4.19	0.125	0.165
D	0.356	0.453	0.014	0.021
F	0.407	0.482	0.016	0.019
G	1.27	BSC	0.050	BSC
H	—	1.27	—	0.050
J	2.54	BSC	0.100	BSC
K	12.70	—	0.500	—
L	6.35	—	0.250	—
N	2.03	2.66	0.080	0.105
P	2.93	—	0.115	—
R	3.43	—	0.135	—

All JEDEC dimensions and notes apply



STYLE 8:  
 PIN 1 ANODE  
 NO CONNECTION  
 CATHODE  
**CASE 318-02**  
**TO-236AA**  
**SOT-23**

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.04	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.85	1.20	0.033	0.047
D	0.27	0.50	0.010	0.020
F	0.085	0.190	0.003	0.007
G	1.78	2.04	0.070	0.080
H	0.45	0.60	0.017	0.023
K	0.10	0.25	0.004	0.009
L	2.10	2.50	0.080	0.098
M	0.45	0.60	0.018	0.023
N	0.89	1.02	0.035	0.040
K	0.013	0.10	0.0005	0.0040

\*Low Profile = CASE 318-03 TO-236AB

TYPICAL ELECTRICAL CHARACTERISTICS

FIGURE 1 – TOTAL CAPACITANCE

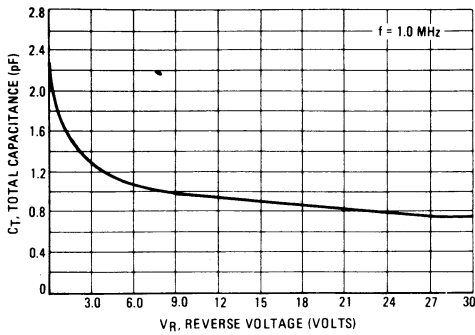


FIGURE 2 – MINORITY CARRIER LIFETIME

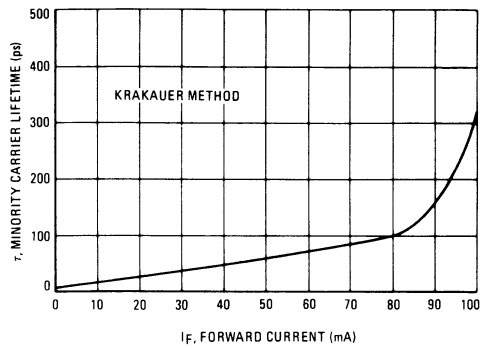


FIGURE 3 – REVERSE LEAKAGE

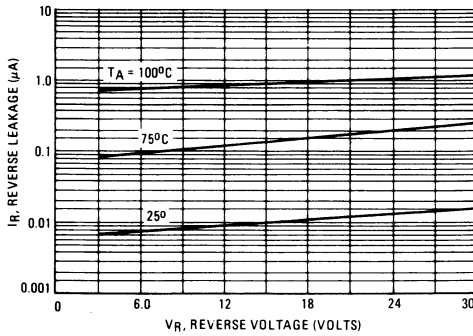
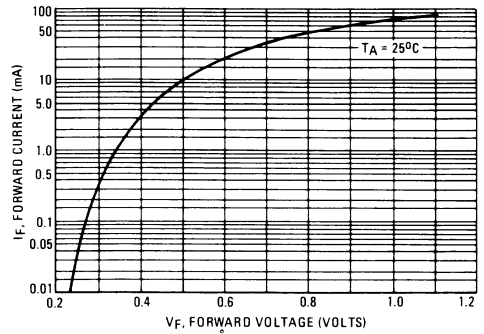
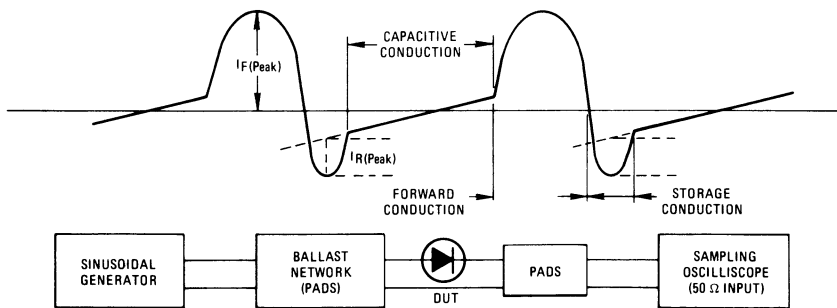


FIGURE 4 – FORWARD VOLTAGE



KRAKAUER METHOD OF MEASURING LIFE TIME



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**MBD501 MMBD501, L**  
**MBD701 MMBD701, L**

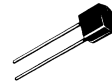


**SILICON HOT-CARRIER DIODE**  
**(SCHOTTKY BARRIER DIODE)**

... designed primarily for high-efficiency UHF and VHF detector applications. Readily adaptable to many other fast switching RF and digital applications. Supplied in an inexpensive plastic package for low-cost, high-volume consumer and industrial/commercial requirements. Also available in Surface Mount package.

- The Schottky Barrier Construction Provides Ultra-Stable Characteristics by Eliminating the "Cat-Whisker" or "S-Bend" Contact
- Extremely Low Minority Carrier Lifetime — 15 ps (Typ)
- Very Low Capacitance — 1.0 pF @  $V_R = 20$  V
- High Reverse Voltage — to 70 Volts
- Low Reverse Leakage — 200 nA (Max)

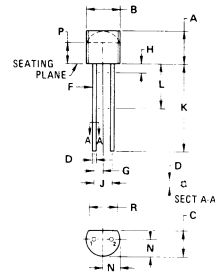
**HIGH-VOLTAGE SILICON HOT-CARRIER DETECTOR AND SWITCHING DIODES**  
 50-70 VOLTS



**CASE 182-02**  
**TO-226AC**



**CASE 318-02**  
**TO-236AA**  
**SOT-23**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	5.33	0.170	0.210
B	4.45	5.21	0.175	0.205
C	3.18	4.19	0.125	0.165
D	0.368	0.533	0.014	0.021
F	0.407	0.482	0.016	0.019
G	1.27 BSC	—	0.050 BSC	—
H	1.27	—	0.050	—
J	2.54 BSC	—	0.100 BSC	—
K	12.70	—	0.500	—
L	6.35	—	0.250	—
N	2.03	2.68	0.080	0.105
P	2.93	—	0.115	—
R	3.43	—	0.135	—

STYLE 1:  
 PIN 1: ANODE  
 2: CATHODE

**CASE 182-02**  
**TO-226AC**

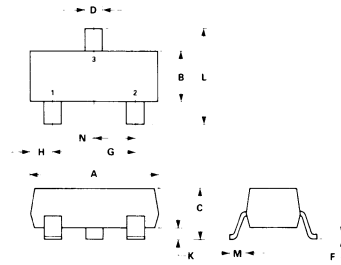
All JEDEC dimensions and notes apply

**MAXIMUM RATING** ( $T_J = 125^\circ\text{C}$  unless otherwise noted)

Rating	Symbol	Value		Unit
		MBD501 MBD701	MMBD501,L MMBD701,L	
Reverse Voltage	$V_R$	50		Volts
	MBD501 MBD701	70		
Forward Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_F$	280	200	mW
		2.8	2.0	mW/ $^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +125		$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150		$^\circ\text{C}$

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage ( $I_R = 10 \mu\text{A}$ )	$V_{(BR)R}$	50	—	—	Volts
	MBD501, MMBD501, L MBD701, MMBD701, L	70	—	—	
Total Capacitance, Figure 1 ( $V_R = 20$ Volts, $f = 1.0$ MHz)	$C_T$	—	0.5	1.0	pF
Minority Carrier Lifetime, Figure 2 ( $I_F = 5.0$ mA, Krakauer Method)	$\tau$	—	15	—	ps
Reverse Leakage, Figure 3 ( $V_R = 25$ V)	$I_R$	—	7.0	200	nA
	MBD501, MMBD501, L ( $V_R = 35$ V)	—	9.0	200	
Forward Voltage, Figure 4 ( $I_F = 10$ mA)	$V_F$	—	1.0	1.2	Vdc



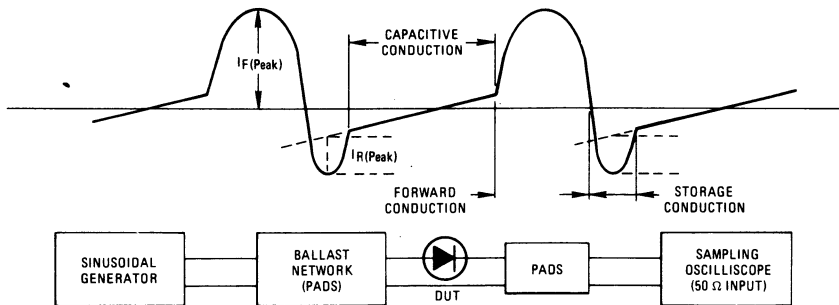
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.04	0.1102	0.1197
B	1.20	1.40	0.0472	0.0551
C	0.85	1.20	0.033	0.0472
D	0.31	0.50	0.0120	0.020
F	0.95	1.10	0.0374	0.0431
G	1.78	2.04	0.0701	0.0807
H	0.45	0.60	0.0177	0.0236
K	0.10	0.25	0.0040	0.0098
L	2.10	2.50	0.0827	0.0984
M	0.45	0.60	0.0180	0.0236
N	0.89	1.02	0.0350	0.0401
K	0.013	0.10	0.0005	0.0040

STYLE 8:  
 PIN 1: ANODE  
 2: NO CONNECTION  
 3: CATHODE

**CASE 318-02**  
**TO-236AA**  
**SOT-23**

\*Low Profile = CASE 318-01 TO-236AB

KRAKAUER METHOD OF MEASURING LIFE TIME



TYPICAL ELECTRICAL CHARACTERISTICS

FIGURE 1 – TOTAL CAPACITANCE

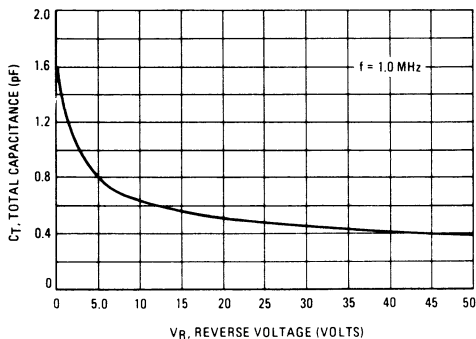


FIGURE 2 – MINORITY CARRIER LIFETIME

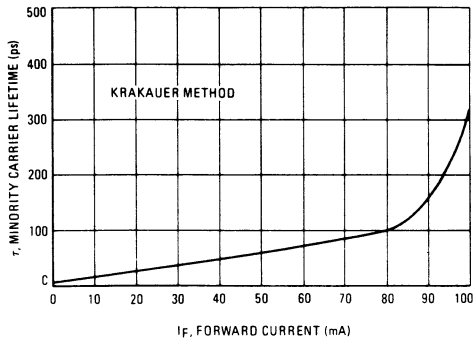


FIGURE 3 – REVERSE LEAKAGE

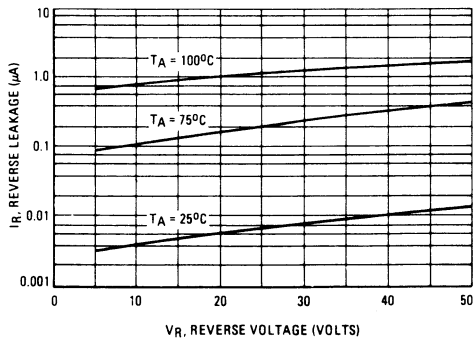
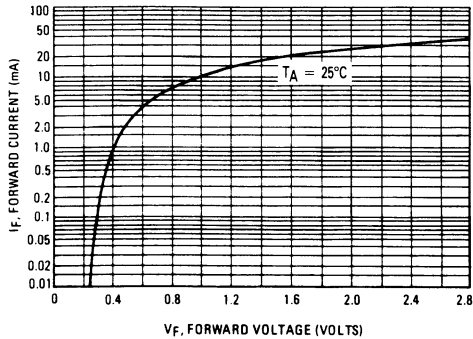


FIGURE 4 – FORWARD VOLTAGE



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