

**SOLID STATE INC.**46 FARRAND STREET
BLOOMFIELD, NEW JERSEY 07003

www.solidstateinc.com

**1N3879 thru 1N3883
MR1366****STUD MOUNTED
FAST RECOVERY POWER RECTIFIERS**

... designed for special applications such as dc power supplies, inverters, converters, ultrasonic systems, choppers, low RF interference, sonar power supplies and free wheeling diodes. A complete line of fast recovery rectifiers having typical recovery time of 150 nanoseconds providing high efficiency at frequencies to 250 kHz.

**FAST RECOVERY
POWER RECTIFIERS
50-600 VOLTS
6 AMPERES****DO 4
(Metal)*****MAXIMUM RATINGS**

Rating	Symbol	1N3879	1N3880	1N3881	1N3882	1N3883	MR1366	Unit
Peak Repetitive Reverse Voltage	VRRM	50	100	200	300	400	600	Volts
Working Peak Reverse Voltage	VRWM							
DC Blocking Voltage	VR							
Non-Repetitive Peak Reverse Voltage	VRSM	75	150	250	350	450	650	Volts
RMS Reverse Voltage	VR(RMS)	35	70	140	210	280	420	Volts
Average Rectified Forward Current (Single phase, resistive load, TC = 100°C)	IO	← 6.0 →						Amps
Non-Repetitive Peak Surge Current (Surge applied at rated load continuous)	IFSM	← 150 → (one cycle)						Amps
Operating Junction Temperature Range	TJ	← -65 to +150 →						°C
Storage Temperature Range	Tstg	← -65 to +175 →						°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	RθJC	3.0	°C/W

Motorola guarantees the listed value, although parts having higher values of thermal resistance will meet the current rating. Thermal resistance is not required by the JEDEC registration.

***ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	Min	Typ	Max	Unit
Instantaneous Forward Voltage (IF = 19 Amp, TJ = 150°C)	VF	-	1.2	1.5	Volts
Forward Voltage (IF = 6.0 Amp, TC = 25°C)	VF	-	1.0	1.4	Volts
Reverse Current (rated dc voltage) TC = 25°C TC = 100°C	IR	-	10 0.5	15 1.0	μA mA

REVERSE RECOVERY CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Recovery Time *(IFM = 1.0 Amp to VR = 30 Vdc, Figure 16) IFM = 36 Amp, di/dt = 25 A/μs, Figure 17)	trr	-	150 200	200 400	ns
Reverse Recovery Current *(IF = 1.0 Amp to VR = 30 Vdc, Figure 16)	IRM(REC)	-	-	2.0	Amp

*Indicates JEDEC Registered Data for 1N3879 Series.

MECHANICAL CHARACTERISTICS**CASE:** Welded, hermetically sealed**FINISH:** All external surfaces corrosion
resistant and readily solderable**POLARITY:** Cathode to Case**WEIGHT:** 5.6 Grams (approximately)**MOUNTING TORQUE:** 15 in-lbs max.

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FIGURE 1 – FORWARD VOLTAGE

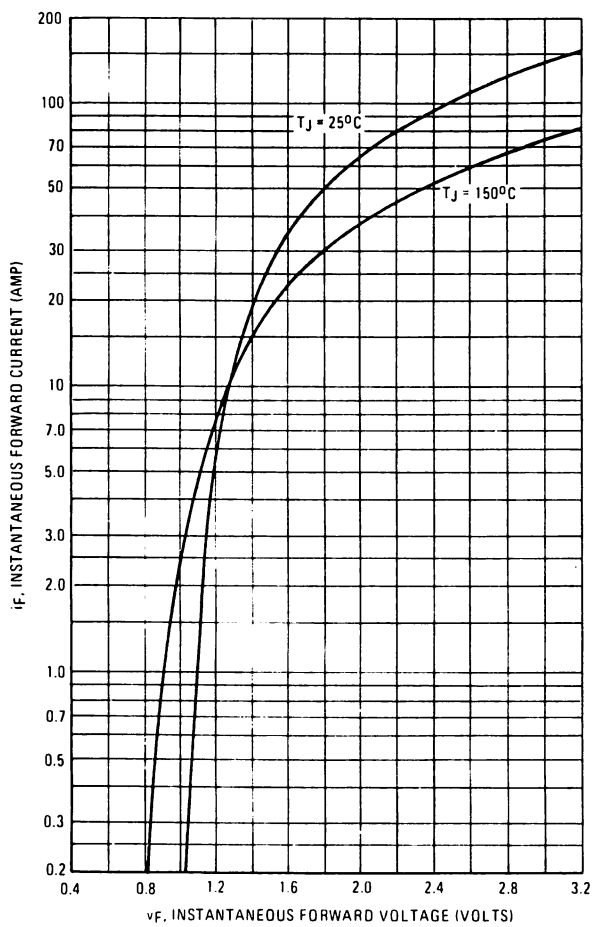
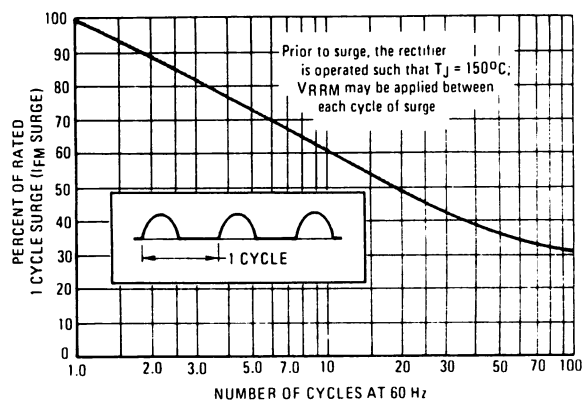


FIGURE 2 – MAXIMUM SURGE CAPABILITY



NOTE 1

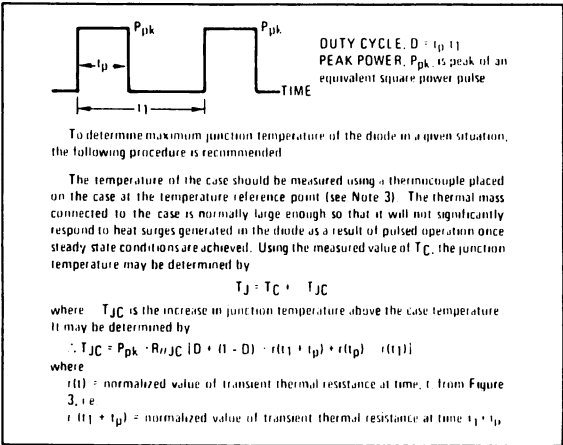
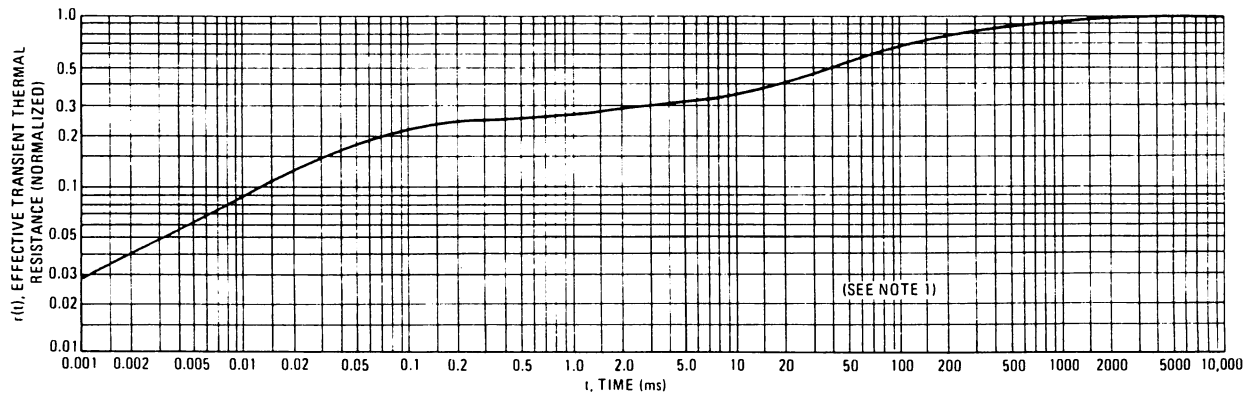


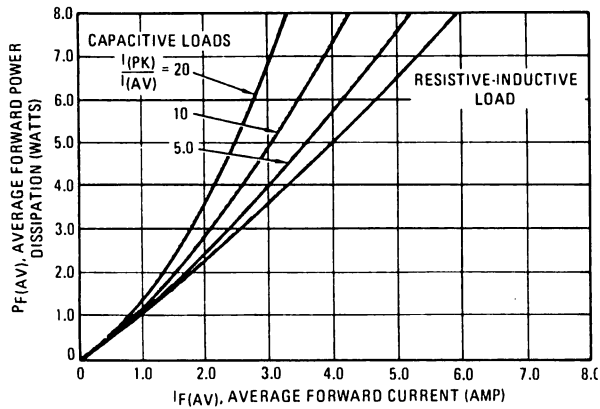
FIGURE 3 – THERMAL RESPONSE



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SINE WAVE INPUT

FIGURE 4 – FORWARD POWER DISSIPATION



SQUARE WAVE INPUT

FIGURE 5 – FORWARD POWER DISSIPATION

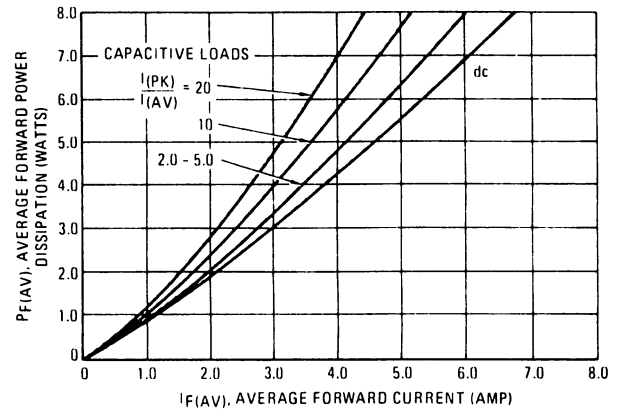


FIGURE 6 – CURRENT DERATING

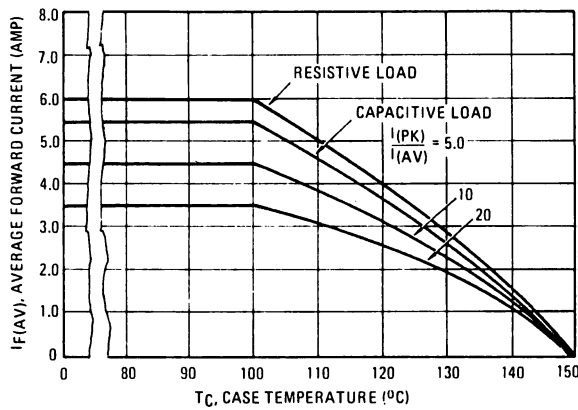


FIGURE 7 – CURRENT DERATING

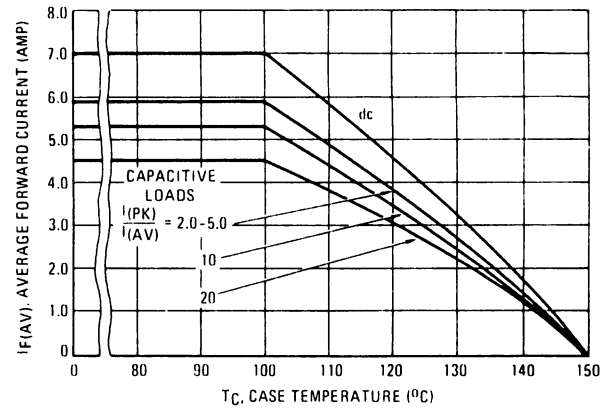


FIGURE 8 – TYPICAL REVERSE CURRENT

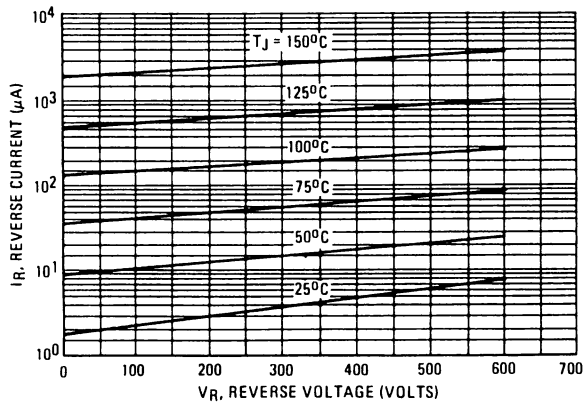
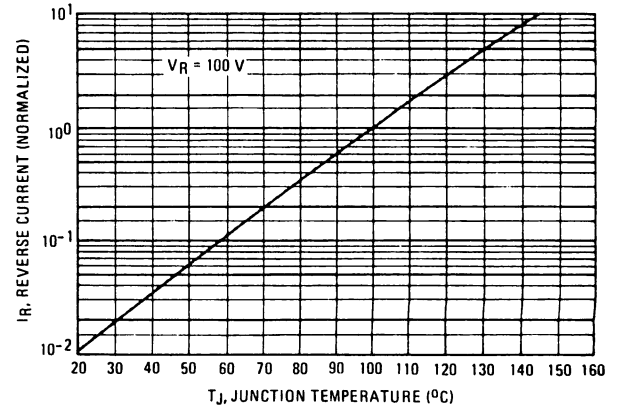


FIGURE 9 – NORMALIZED REVERSE CURRENT



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TYPICAL DYNAMIC CHARACTERISTICS

FIGURE 10 – FORWARD RECOVERY TIME

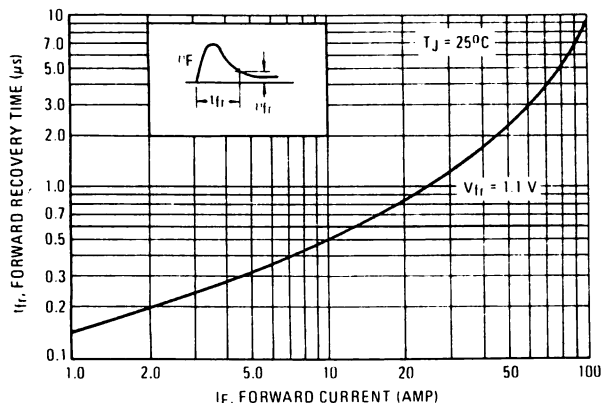
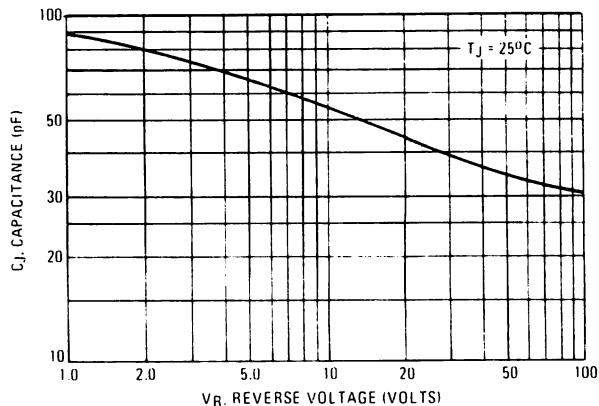


FIGURE 11 – JUNCTION CAPACITANCE



TYPICAL RECOVERED STORED CHARGE DATA

FIGURE 12 – $T_J = 25^\circ C$

(SEE NOTE 2)

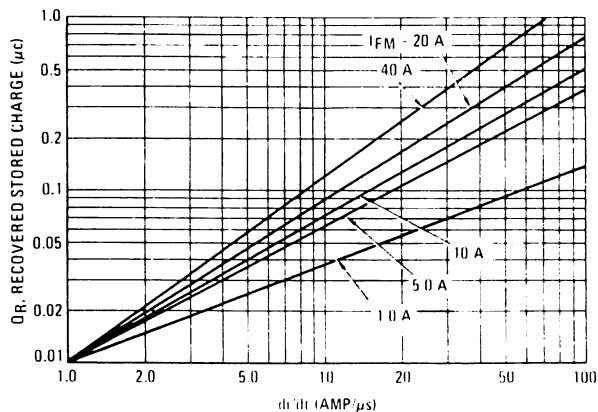


FIGURE 13 – $T_J = 75^\circ C$

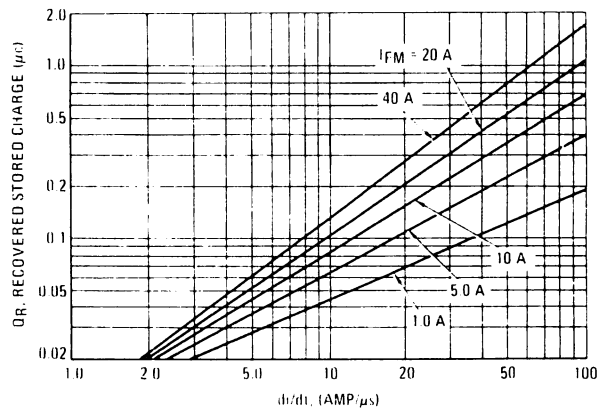


FIGURE 14 – $T_J = 100^\circ C$

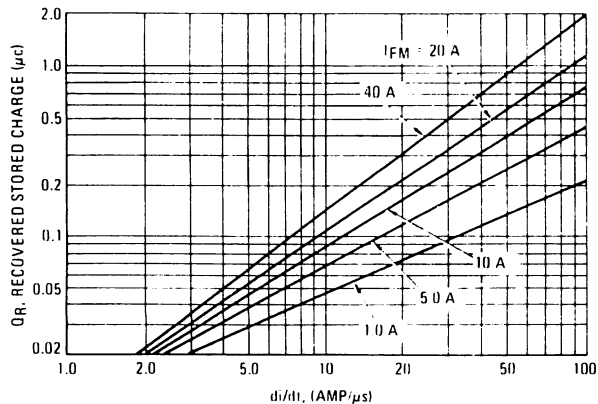
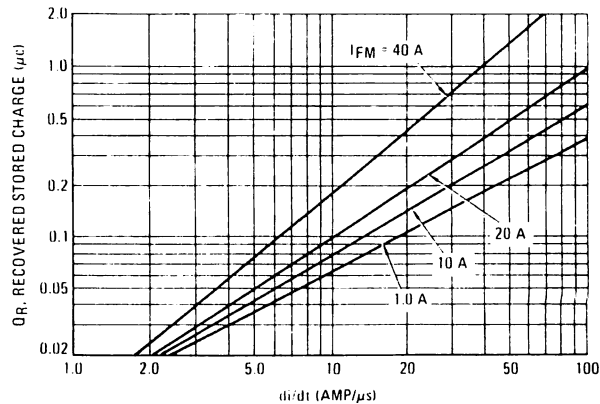


FIGURE 15 – $T_J = 150^\circ C$



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FIGURE 16 – REVERSE RECOVERY CIRCUIT

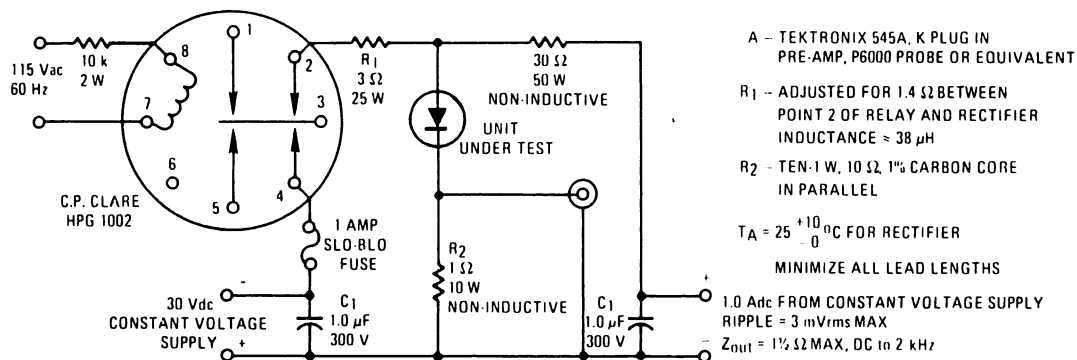
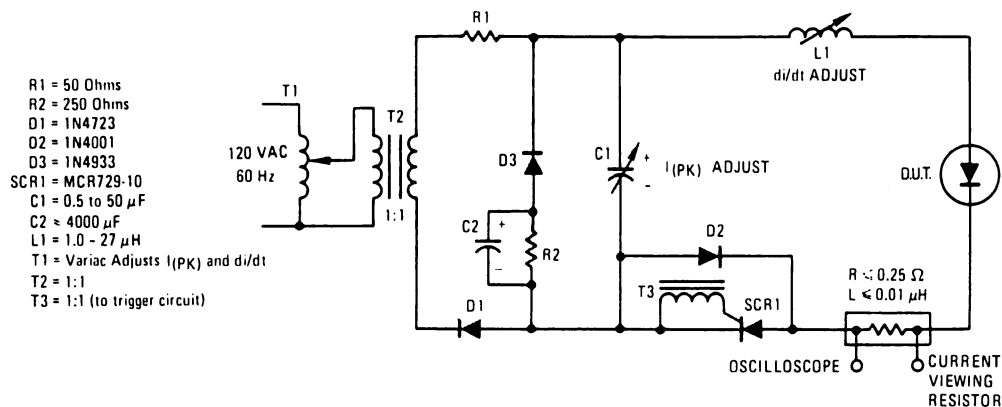


FIGURE 17 – JEDEC REVERSE RECOVERY CIRCUIT



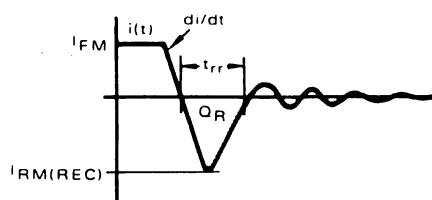
NOTE 2

Reverse recovery time is the period which elapses from the time that the current, thru a previously forward biased rectifier diode, passes thru zero going negatively until the reverse current recovers to a point which is less than 10% peak reverse current.

Reverse recovery time is a direct function of the forward current prior to the application of reverse voltage.

For any given rectifier, recovery time is very circuit dependent. Typical and maximum recovery time of all Motorola fast recovery power rectifiers are rated under a fixed set of conditions using $I_F = 1.0 \text{ A}$, $V_R = 30 \text{ V}$. In order to cover all circuit conditions, curves are given for typical recovered stored charge versus commutation di/dt for various levels of forward current and for junction temperatures of 25°C , 75°C , 100°C , and 150°C .

To use these curves, it is necessary to know the forward current level just before commutation, the circuit commutation di/dt , and the operating junction temperature. The reverse recovery test current waveform for all Motorola fast recovery rectifiers is shown.



From stored charge curves versus di/dt , recovery time (t_{rr}) and peak reverse recovery current ($I_{RM}(REC)$) can be closely approximated using the following formulas:

$$t_{rr} = 1.41 \times \left[\frac{Q_R}{di/dt} \right]^{1/2}$$

$$I_{RM(REC)} = 1.41 \times [Q_R \times di/dt]^{1/2}$$



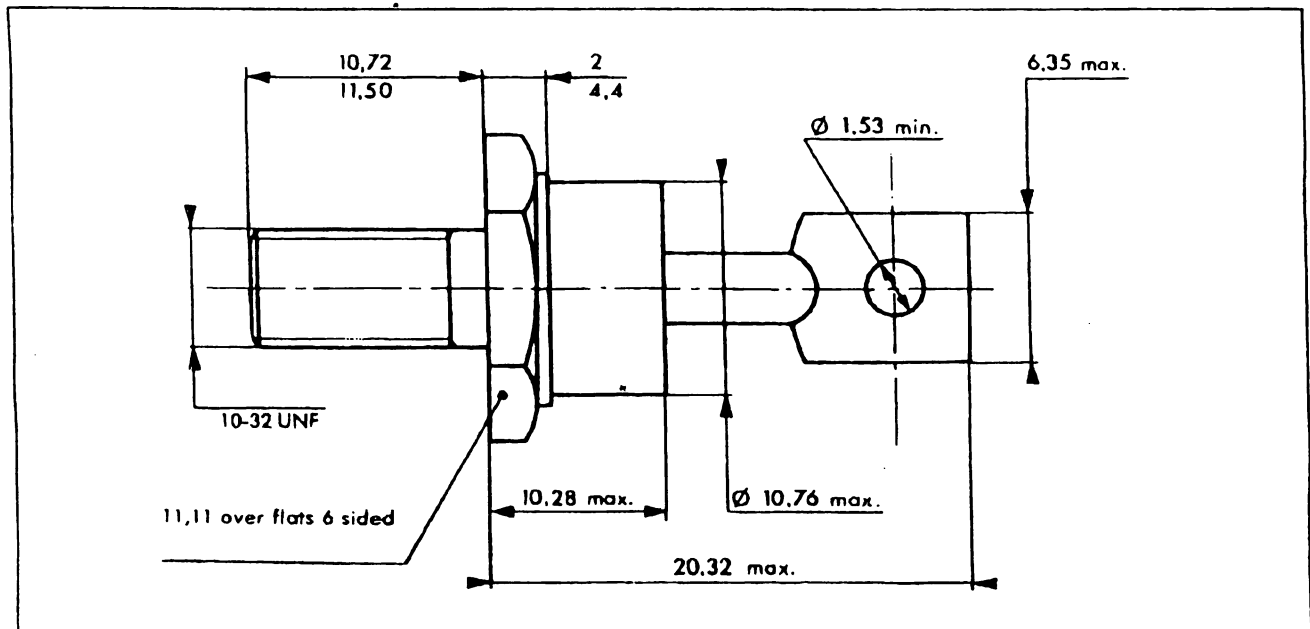
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PACKAGE MECHANICAL DATA

DO 4 Metal



Marking : Cathode connected to case : type number
Anode connected to case : type number + suffix R