

**DESCRIPTION**

The UES704 series of ultrafast high-efficiency rectifiers is specifically designed for operation in power switching circuits operating at frequencies of 20 kHz or higher. The low thermal resistance and forward voltage drop of this series allows the user to replace DO-5 size devices in many applications. These devices have also been demonstrated capability in passing power-stress testing to 25 thousand cycles with full-rated forward current turned on and off without a heat sink. This forces case temperature increases of 75 °C at which time the current is removed to simulate worst case applications. The switching times increase relatively little with temperature or at different currents.

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**APPEARANCE**

DO-4



**FEATURES**

- Very Low Forward Voltage
- Very Fast Recovery Times
- Low Thermal Resistance
- High Reliability Screening Option with HR2 Suffix (ie. UES704HR2)
- Mechanically rugged
- Standard Polarity is Cathode to Stud. For Reverse Polarity, Add Suffix R (ie. UES704R)

**APPLICATIONS / BENEFITS**

- Power Switching Circuits 20 kHz and above with minimal parasitic switching losses
- Catch Diodes for Switching Regulators
- Output Rectifiers for High Frequency Square-Wave Inverters
- Extremely Robust in Power Cycling
- High Surge Capability
- Hermetically Sealed
- Marking: Part Number and Logo

**ABSOLUTE MAXIMUM RATINGS**

- Peak Inverse Voltage, UES704, UES704HR2.....200 V
- Peak Inverse Voltage, UES705, UES705HR2.....300 V
- Peak Inverse Voltage, UES706, UES706HR2.....400 V
- Average DC Output Current,  $I_o$  @  $T_c = 100^\circ\text{C}$ .....20 A
- Surge Current, 8.3 ms.....300 A
- Thermal Resistance, Junction to Case.....1.5°C/W
- Operating and Storage Temp. Range.....-55°C to +150°C

**MECHANICAL AND PACKAGING**

- Industry Standard DO-4 (DO-203AA) Package with 7/16 inch Hex and 10-32 Threaded Stud
- Hermetically Sealed Metal and Glass Case Body
- Metal Surface Finish: Tin Plated
- Weight: 10 grams (approximate)
- Maximum unlubricated stud Torque: 15 inch pounds
- Angular Orientation of Terminal is Undefined
- Marking: Part Number

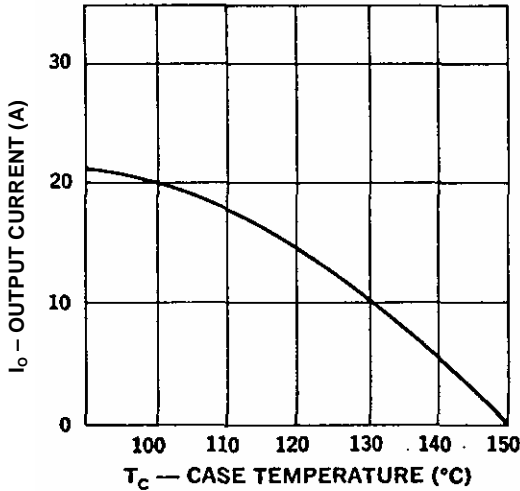
**ELECTRICAL CHARACTERISTICS @ 25°C unless otherwise stated**

Microsemi Part Number		Working Peak Reverse Voltage $V_{RWM}$	Maximum Forward Voltage		Maximum Reverse Current		Maximum Reverse Recovery Time* $t_{rr}$
			$V_F$ @ 20 A $t_p = 300 \mu\text{s}$		$I_R$ @ $V_{RWM}$		
			$T_c = 25^\circ\text{C}$	$T_c = 125^\circ\text{C}$	$T_c = 25^\circ\text{C}$	$T_c = 125^\circ\text{C}$	
UES704	UES704HR2	200 V	1.25 V	1.15 V	50 $\mu\text{A}$	10 mA	50 ns
UES705	UES705HR2	300 V					
UES706	UES706HR2	400 V					

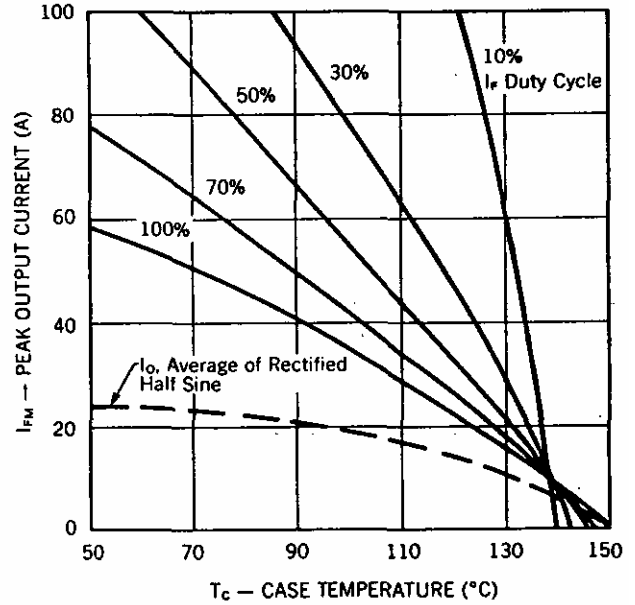
\* Measured in circuit  $I_F = 0.5 \text{ A}$ ,  $I_R = 1 \text{ A}$ ,  $I_{REC} = 0.25 \text{ A}$

OUTLINE AND CIRCUIT

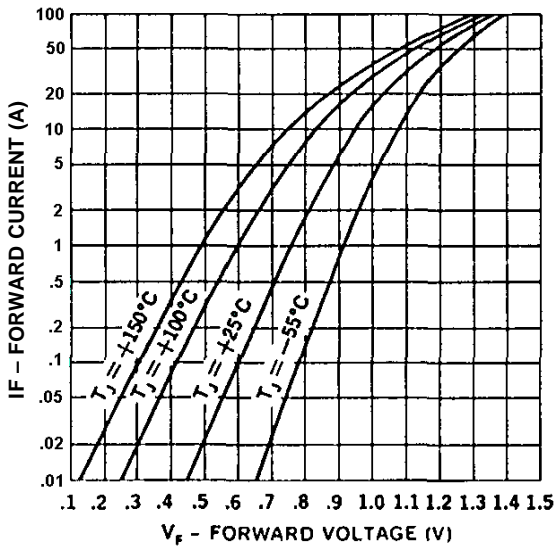
Output Current vs. Case Temperature



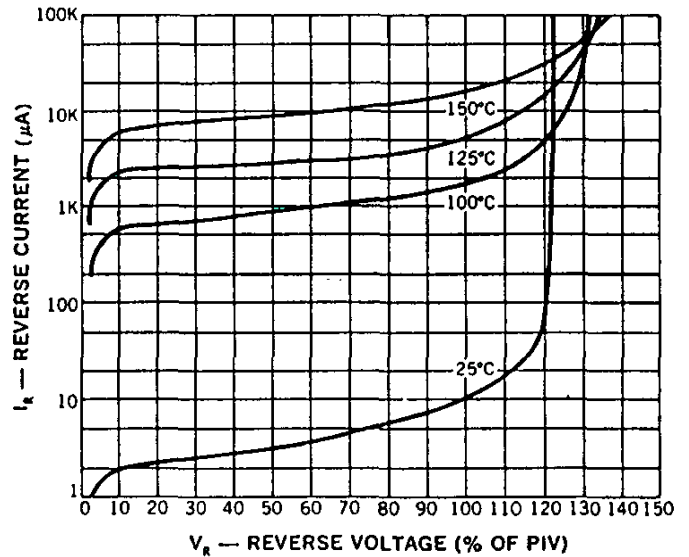
Peak Output Current vs. Case Temperature



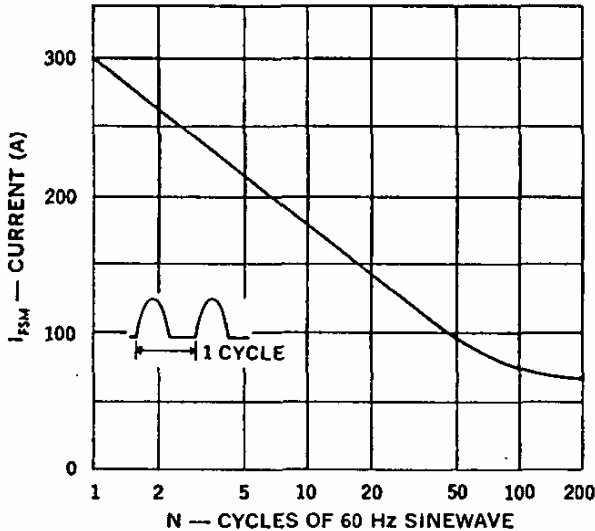
Typical Forward Current vs. Forward Voltage



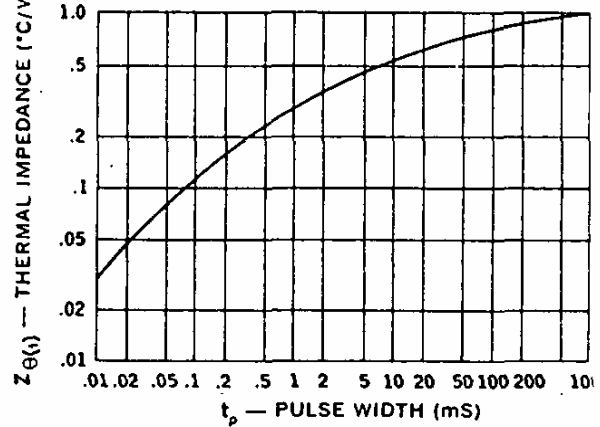
Typical Reverse Current vs. Reverse Voltage



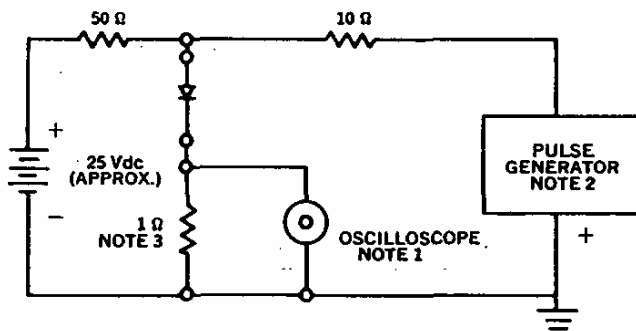
**Maximum Forward Surge vs. Number of Cycles**



**Thermal Impedance vs. Pulse Width**



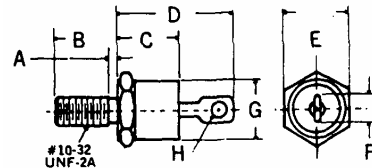
**Reverse-Recovery Circuit**



**NOTES:**

- Oscilloscope: Rise time  $\leq 3$  ns; input impedance = 50  $\Omega$ .
- Pulse Generator: Rise time  $\leq 8$  ns; source impedance 10  $\Omega$ .
- Current viewing resistor, non-inductive, coaxial recommended.

**MECHANICAL SPECIFICATIONS**



	INCHES	MM
A	.078 MAX	1.98 MAX.
B	.437 +/- .015	11.10 +/- 0.38
C	.405 MAX	10.29 MAX.
D	.800 MAX	20.32 MAX.
E	.430 +/- .010	10.92 +/- 0.25
F	.250 MAX	6.35 MAX.
G	.424 MAX	10.77 MAX.
H	.066 MIN. DIA	1.68 MIN. DIA

**Notes:**

- Cathode is stud.
- All metal surfaces tin plated.
- Maximum unlubricated stud torque: 10 inch pounds.
- Angular Orientation of terminal is undefined.

**OPTIONAL HIGH RELIABILITY (HR2) SCREENING**

The following tests are performed on 100% of the devices.

SCREEN	MIL-STD-750 METHOD	CONDITIONS
1. High Temperature	1032	24 Hours @ TA = 150°C
2. Temperature Cycle	1051	F, 20 Cycles, -55 to +150°C. No dwell required @ 25°C, T <sub>≥</sub> 10 min. @ extremes
3. Hermetic Seal a. Fine Leak b. Gross Leak	1071	H, Helium C, Liquid
4. Thermal Impedance	3101	
5. Interim Electrical Parameters	GO/NO GO	As applicable
6. High Temperature Reverse Blocking	As Applicable	t = 48 hours, Tc = 125°C with applicable bias conditions
7. Final Electrical Parameters	GO/NO GO	As applicable