RoHS
Available on commercial versions

ULTRAFAST RECTIFIERS, High Efficiency 25A and 30A

High-Reliability screening available

DESCRIPTION

The UES701(HR2) through UES703(HR2) 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 larger DO-5 packaged devices in many applications. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

Important: For the latest information, visit our website http://www.microsemi.com.

DO-4 Package

FEATURES

- Very low forward voltage (0.825 V @ I_F = 25 A).
- Very fast recovery times (35-50 ns).
- Low thermal resistance.
- High reliability screening option.
- Mechanically rugged.
- Both polarities available.
- RoHS compliant devices available by adding “e3” suffix (commercial grade only).

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.

MAXIMUM RATINGS

Parameters/Test Conditions		Symbol	Value	Unit
Junction and Storage Temperature		T_J and T_{STG}	-55 to +175	°C
Thermal Resistance Junction-to-Case		$R_{\Theta JC}$	1.5	°C/W
Working Peak Reverse Voltage	UES701	V_{RWM}	50	V
	UES702		100	
	UES703		150	
Repetitive Peak Reverse Voltage	UES701	V_{RRM}	50	V
	UES702		100	
	UES703		150	
RMS Forward Current		$I_{F(RMS)}$	40	Amps
Non-Repetitive Sinusoidal Surge Current (8.3 ms)		I_{FSM}	400	Amps
Maximum Average DC Output Current @ T_C 100 ºC		I_O	25	Amps

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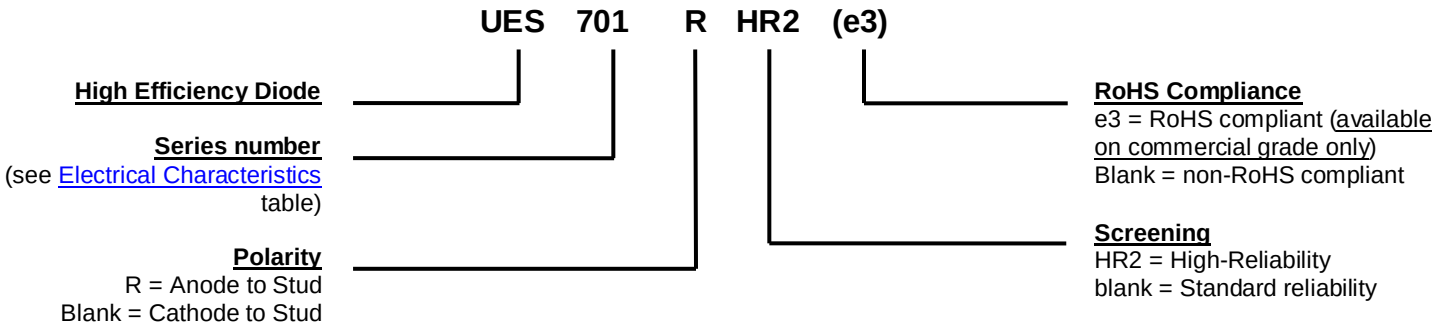
MECHANICAL and PACKAGING

- CASE: Hermetically sealed metal and glass case body with 7/16 inch hex and 10-32 threaded stud.
- TERMINALS: Tin-lead plated or RoHS compliant matte-tin plating (commercial grade only) on nIckel.
- MARKING: Part number.
- WEIGHT: 10 grams (approximate).
- Maximum Stud Torque: 10 inch pounds.
- See Package Dimensions on last page.

OPTIONAL HIGH RELIABILITY (HR2) SCREENING

SCREEN	MIL-STD-750 METHOD	CONDITIONS
1. High Temperature	1032	24 Hours @ T_A = 150°C
2. Temperature Cycle	1051	F, 20 Cycles, -55 to +150 °C. No dwell required @ 25 °C, T ≥ 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 Bias (HTRB)	As Applicable	t= 48 hours, Tc = 125 °C with applicable bias conditions
7. Final Electrical Parameters	GO/NO GO	As applicable

PART NOMENCLATURE



SYMBOLS & DEFINITIONS	
Symbol	**Definition**
I_F	Forward Current: The forward current dc value, no alternating component.
I_{FSM}	Maximum Forward Surge Current: The forward current, surge peak or rated forward surge current.
I_O	Average Rectified Output Current: The Output Current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
I_R	Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
t_{rr}	Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified decay point after a peak reverse current occurs.
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
V_R	Reverse Voltage: The reverse voltage dc value, no alternating component.
V_{RRM}	Repetitive Peak Reverse Voltage: The peak reverse voltage including all repetitive transient voltages but excluding all non-repetitive transient voltages.
V_{RWM}	Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range excluding all transient voltages (ref JESD282-B). Also sometimes known as PIV.

ELECTRICAL CHARACTERISTICS

Type	Maximum Forward Voltage V_F			Maximum Reverse Current I_R			Maximum Reverse Recovery Time t_{rr}
	T_C = 25°C	T_C = 100°C	T_C = 125°C	T_C = 25°C	T_C = 100°C	T_C = 125°C	
UES701 UES702 UES703	0.95 V @ I_F = 25 A	N/A	0.825 V @ I_F = 25 A	20 µA @ V_{RWM}	N/A	4 mA @ V_{RWM}	35 ns (1)

NOTES: 1. Measured in circuit I_F = 0.5 A, I_R = 1 A, I_{REC} = 0.25 A.

GRAPHS

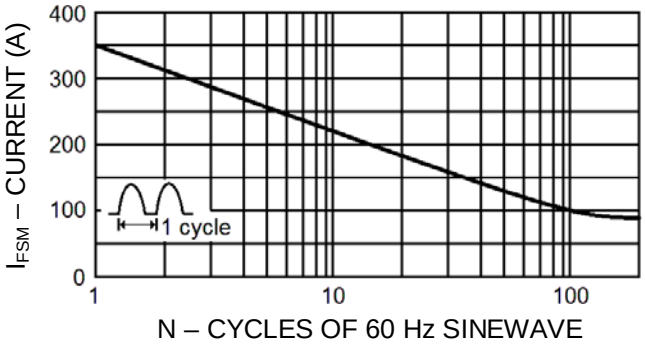


FIGURE 1
Maximum Forward Surge vs Number of Cycles

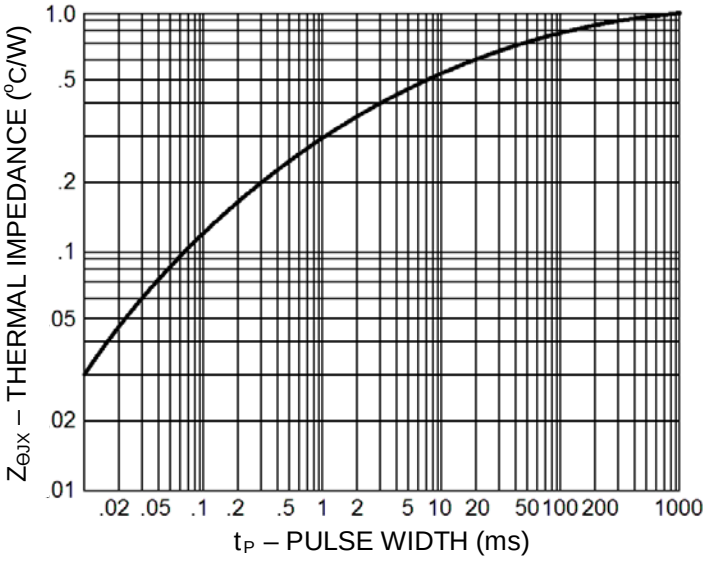


FIGURE 2
Thermal Impedance vs. Pulse Width

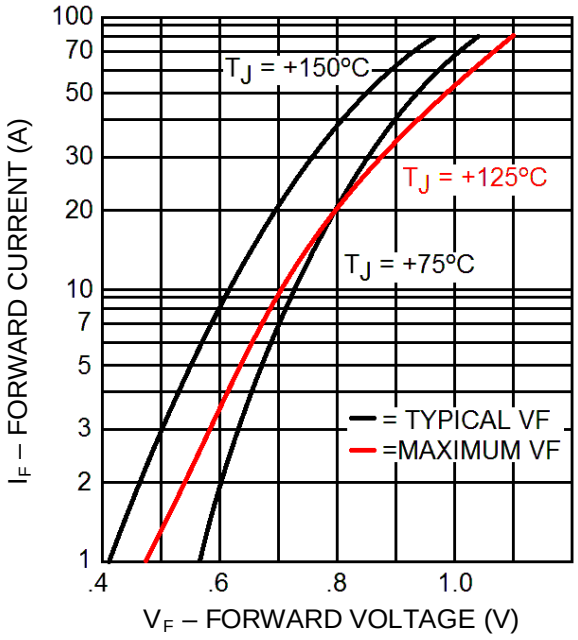


FIGURE 3
Forward Current vs. Forward Voltage

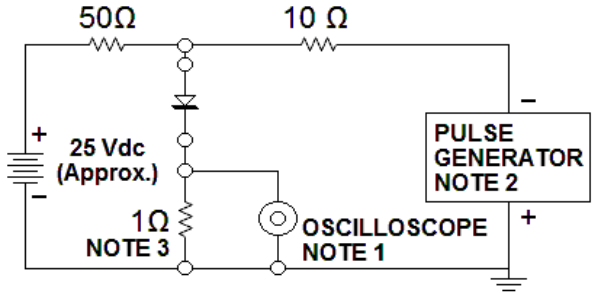


FIGURE 4
Reverse-Recovery Circuit

NOTES:

1. Oscilloscope: Rise time ≤ 3 ns; input impedance = 50 Ω.
2. Pulse Generator: Rise time ≤ 8 ns; source impedance 10 Ω.
3. Current viewing resistor, non-inductive, coaxial recommend.

GRAPHS (continued)

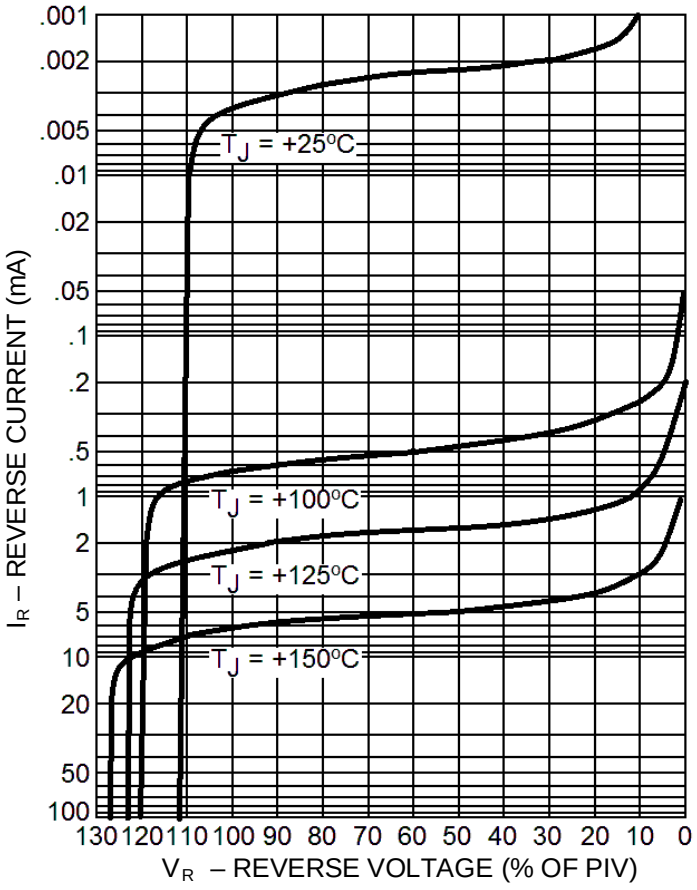


FIGURE 5
Typical Reverse Current vs. Reverse Voltage

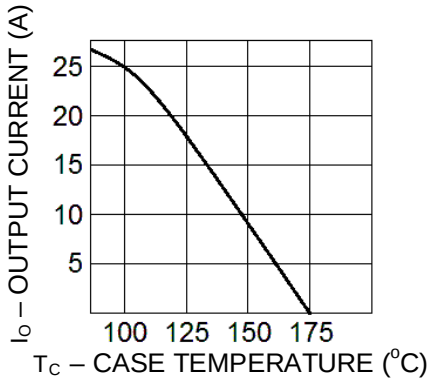
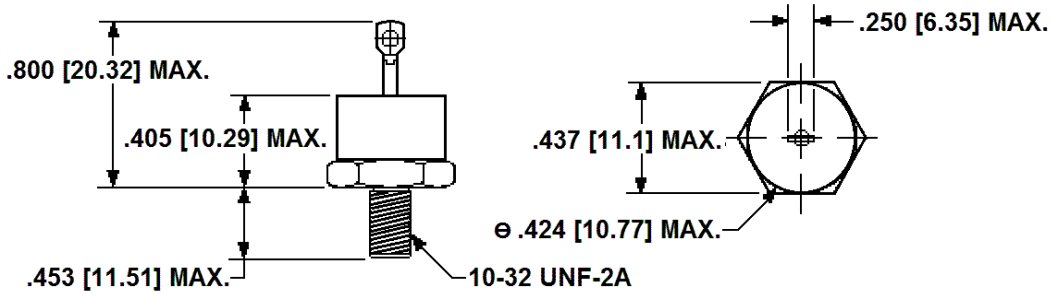


FIGURE 6
Output Current vs. Case Temperature

PACKAGE DIMENSIONS



NOTES:

1. Dimensions in inch [mm].
2. All metal surfaces tin-lead plated.
3. Maximum stud torque: 10 inch pounds.