



## HIGH EFFICIENCY RECTIFIERS 30A Center-Tap

*High-Reliability  
screening available*

### DESCRIPTION

The UES2604 through UES2606 series is specifically designed for operation in power switching circuits operating at frequencies of at least 20 kHz. This series combines two high efficiency devices into one package, simplifying installation, reducing heat sink requirements and the need to purchase matched components. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.



**TO-204AA (TO-3)  
Package**

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

### FEATURES

- Very low forward voltage (see [Figure 3](#)).
- Very fast recovery times (50 nsec).
- High surge capability.
- Low thermal resistance.
- High-reliability screening option.
- Both polarities available.
- RoHS compliant devices available.

### APPLICATIONS / BENEFITS

- Catch diodes for switching regulators.
- Output rectifiers for high frequency square-wave inverters.
- Low-profile package.
- Mechanically rugged.

### MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	$T_J$ and $T_{STG}$	-55 to +150	°C
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1	°C/W
Repetitive Peak Inverse Voltage	$V_{RRM}$	200	V
UES2604(HR2)		300	
UES2605(HR2)		400	
UES2606(HR2)			
Maximum Average DC Output Current @ $T_C = 100\text{ }^\circ\text{C}$	$I_O$	30	A
Non-Repetitive Sinusoidal Surge Current (8.3 ms)	$I_{FSM}$	300	A

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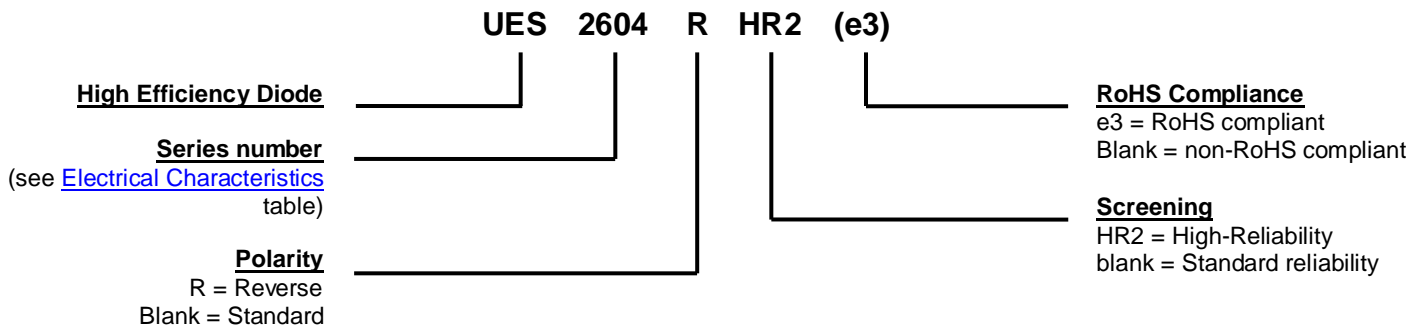
**MECHANICAL and PACKAGING**

- CASE: TO-204AA (TO-3) metal can.
- TERMINALS: Tin-lead plating over nickel. RoHS compliant matte-tin plating is also available.
- MARKING: MSC part number, date code, polarity symbol.
- POLARITY: STANDARD (Positive Output) Anode 1 is pin #1, Anode 2 is pin #2, Common Cathode is the case. REVERSE (Negative Output) Cathode 1 is pin #1, Cathode 2 is pin #2, Common Anode is the case.
- WEIGHT: Approximately 12.7 grams.
- See [Package Dimensions](#) on last page.

**OPTIONAL HIGH RELIABILITY (HR2) SCREENING**

The following tests are performed on 100% of the devices specified UES2604HR2, 5HR2, 6HR.

SCREEN	MIL-STD-750 METHOD	CONDITIONS
1. High Temperature	1032	24 Hours @ $T_A = 150\text{ }^\circ\text{C}$
2. Thermal Shock (Temperature Cycling)	1051	G, 20 Cycles, -55 to +150 $^\circ\text{C}$ . No dwell required @ 25 $^\circ\text{C}$ , $t \geq 1$ minute @ extremes
3. Hermetic Seal a. Fine b. Gross	1071	H, Helium C, Liquid
4. Thermal Impedance		Sage Test
5. Interim Electrical Parameters	GO/NO GO	$V_F$ and $I_R$ @ 25 $^\circ\text{C}$
6. High Temperature Reverse Blocking	Similar to Method 1040	$\frac{1}{2}$ Sine Reverse, $t = 48$ hours, $T_C = 125\text{ }^\circ\text{C}$ , $V_{RWM} = \text{rating}$ , $f = 50\text{-}60$ Hz, $I_O = 0$ A
7. Final Electrical Parameters	GO/NO GO	$V_F + I_R$ @ 25 $^\circ\text{C}$ PDA = 10% (Final Electricals)

**PART NOMENCLATURE**


**SYMBOLS & DEFINITIONS**

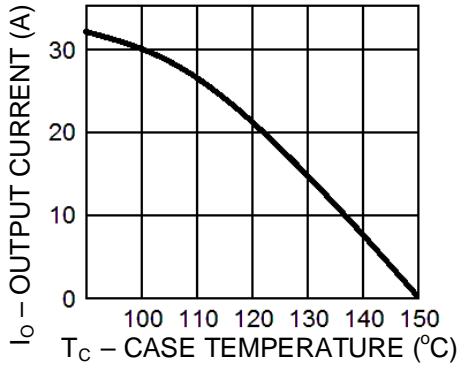
Symbol	Definition
$I_F$	Forward Current: The forward current dc value, no alternating component.
$I_{FM}$	Maximum Peak Forward Current: The peak total value of the forward current dc value.
$I_{FSM}$	Maximum Forward Surge Current: The forward current, surge peak or rated forward surge current.
$I_O$	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 per Leg**

Type	PIV	Maximum Forward Voltage – $V_F$ @		Maximum Reverse Current – $I_R$ @		Maximum Reverse Recovery Time - $t_{rr}$ (Note 1)
		$T_C = 25^\circ\text{C}$	$T_C = 125^\circ\text{C}$	$T_C = 25^\circ\text{C}$	$T_C = 125^\circ\text{C}$	
UES2604/2604HR2	200 V	1.25 V	1.15 V	50 $\mu\text{A}$	10 mA	50 ns
UES2605/2605HR2	300 V	@ 15 A	@ 15 A			
UES2606/2606HR2	400 V	$T_P = 300 \mu\text{s}$	$T_P = 300 \mu\text{s}$			

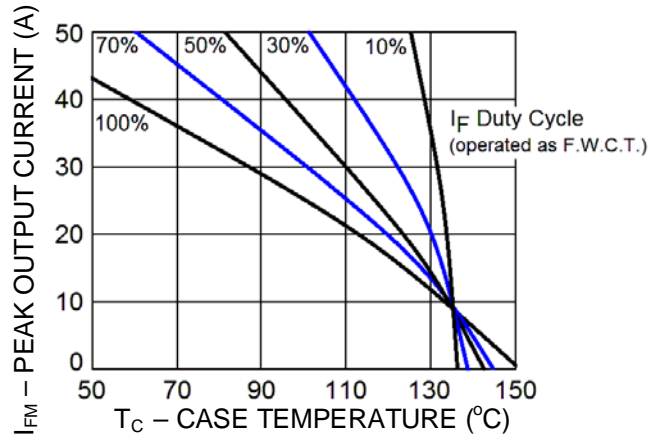
**NOTES:** 1. Measured in circuit  $I_F = 0.5 \text{ A}$ ,  $I_R = 1 \text{ A}$ ,  $I_{REC} = 0.25 \text{ A}$ .

GRAPHS



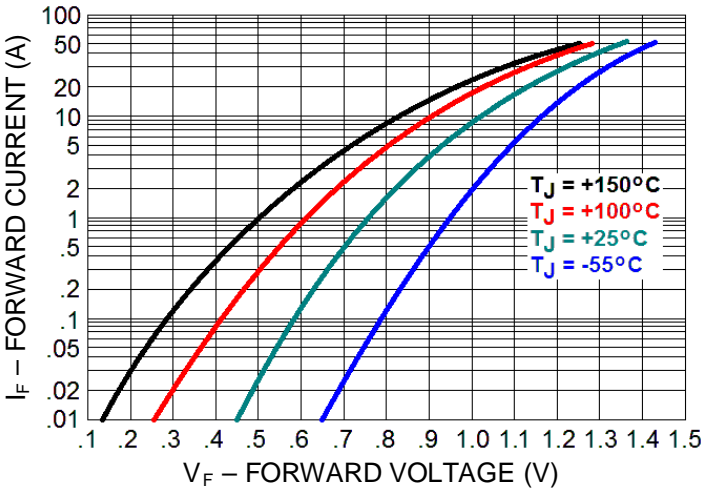
**FIGURE 1**

Output Current vs. Case Temperature



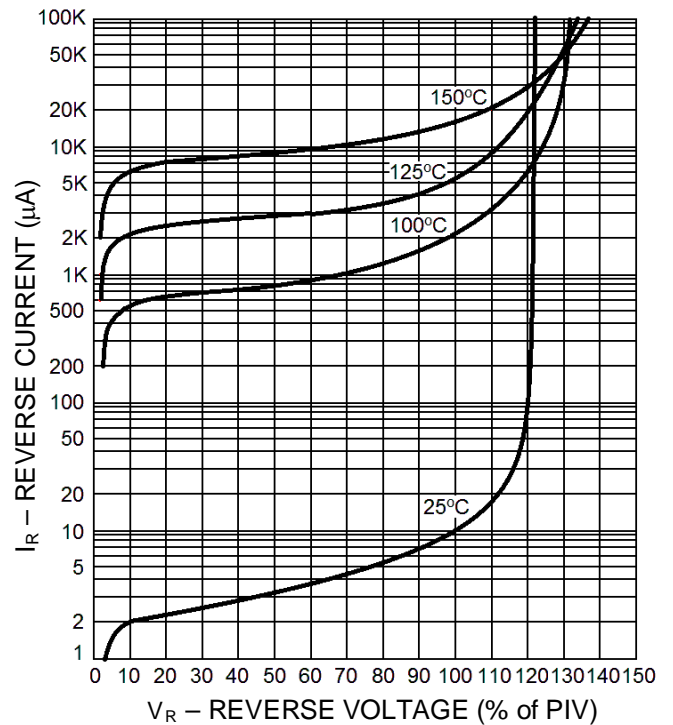
**FIGURE 2**

Peak Output Current vs. Case Temperature



**FIGURE 3**

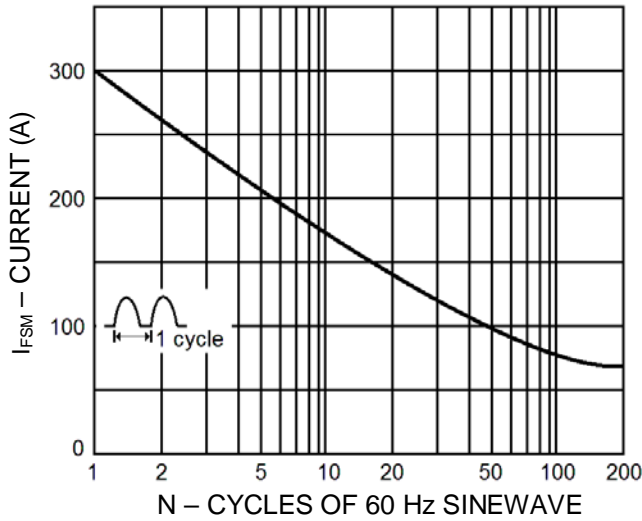
Forward Current vs. Forward Voltage



**FIGURE 4**

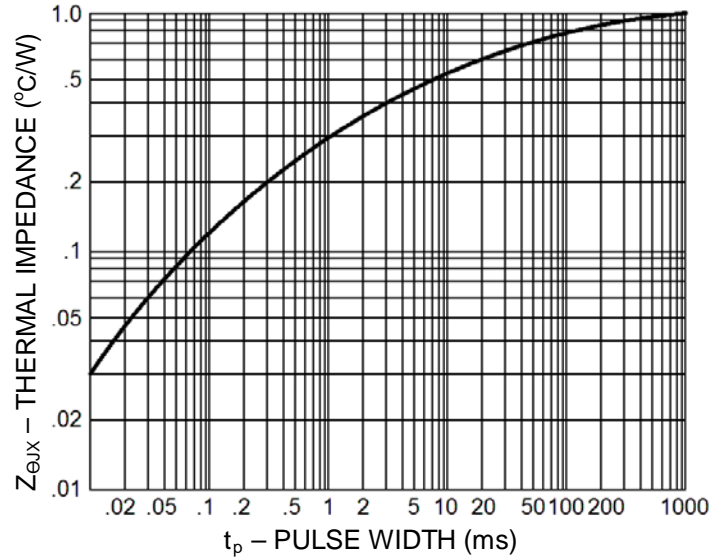
Typical Reverse Current vs. Reverse Voltage

GRAPHS (continued)



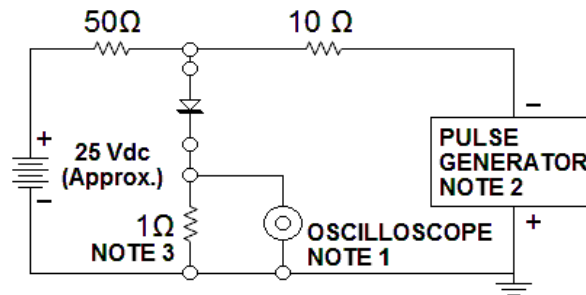
**FIGURE 5**

Maximum Forward Surge vs. Number of Cycles



**FIGURE 6**

Thermal Impedance vs. Pulse Width

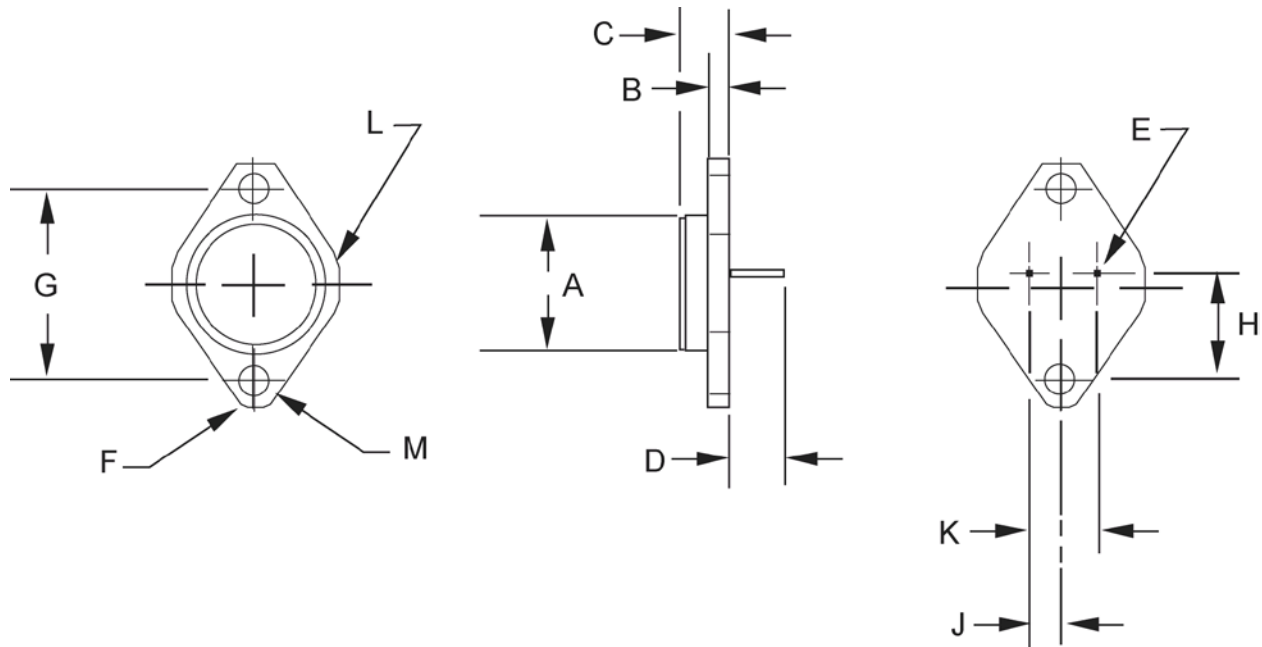


**FIGURE 7**

Reverse-Recovery Circuit

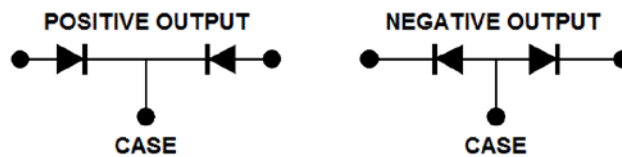
**NOTES:**

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

**PACKAGE DIMENSIONS**

**NOTE:**

Standard polarity is positive output.  
 For reverse polarity (negative output) add suffix "R", i.e. UES2604R.  
 (See schematic below.)

DIM	INCH	MILLIMETERS
A	.875 MAX.	22.23 MAX.
B	.135 MAX.	3.43 MAX.
C	.250-.450	6.35-11.43
D	.312 MIN.	7.92 MIN.
E	.038-.043 DIA.	0.97-1.09 DIA.
F	.188 MAX. RAD.	4.78 MAX. RAD.
G	1.177-1.197	29.90-30.40
H	.655-.675	16.64-17.15
J	.205-.225	5.21-5.72
K	.420-.440	10.67-11.18
L	.525 MAX. RAD.	13.34 MAX. RAD.
M	.151-.161 DIA.	3.84-4.09 DIA.

**SCHEMATIC**


**Cathode to Case**  
 (Standard)

**Anode to Case**  
 (Reverse)