



**THE DATASHEET OF  
US1MDFQ-13**



**Product Summary (@T<sub>A</sub> = +25°C)**

<b>V<sub>RRM</sub> (V)</b>	<b>I<sub>O</sub> (A)</b>	<b>V<sub>F(MAX)</sub> (V)</b>	<b>I<sub>R(MAX)</sub> (μA)</b>
600, 1000	1	1.7	5

**Features and Benefits**

- Glass Passivated Die Construction
- Ultra-Fast Recovery Time for High Efficiency
- Surge Overload Rating to 30A Peak
- High Current Capability
- Low Profile Design, Package Height Less than 1.1mm
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Description and Applications**

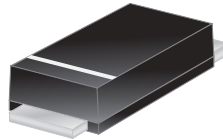
The US1JDFQ and US1MDFQ are rectifiers packaged in the low profile D-FLAT package. Providing ultra-fast recovery time for high efficiency, this device is ideal for use in applications such as:

- Reverse Protection
- Switching
- Blocking

**Mechanical Data**

- Case: D-FLAT
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Polarity: Cathode Band
- Weight: 0.035 grams (Approximate)

D-FLAT

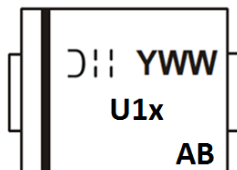


Top View

**Ordering Information (Note 5)**

Part Number	Qualification	Case	Packaging
US1JDFQ-13	Automotive	D-FLAT	10,000/Tape & Reel
US1MDFQ-13	Automotive	D-FLAT	10,000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


- U1J or U1M = Product Type Marking Code  
 ⌋:: = Manufacturers' Code Marking  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 6 for 2016)  
 WW = Week Code (01 to 53)  
 AB = Foundry and Assembly Code

### Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

Characteristic	Symbol	US1JDFQ	US1MDFQ	Unit
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>			
Working Peak Reverse Voltage	V <sub>RWM</sub>	600	1000	V
DC Blocking Voltage	V <sub>R</sub>			
RMS Reverse Voltage	V <sub>R(RMS)</sub>	420	700	V
Average Rectified Output Current @T <sub>T</sub> = +25°C	I <sub>O</sub>		1.0	A
Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load	I <sub>FSM</sub>		30	A

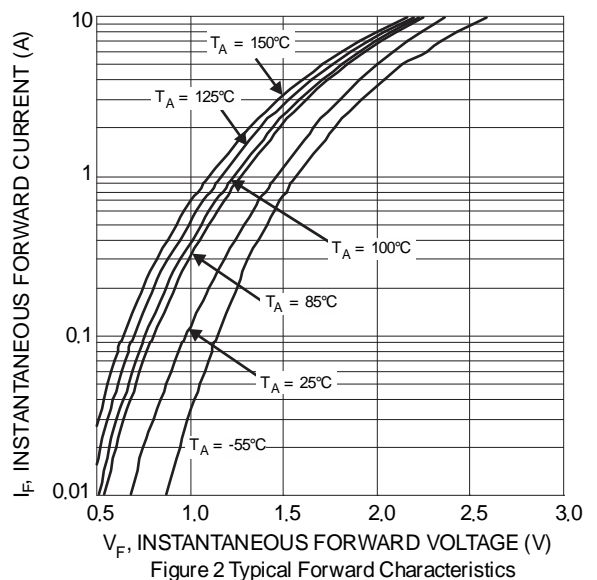
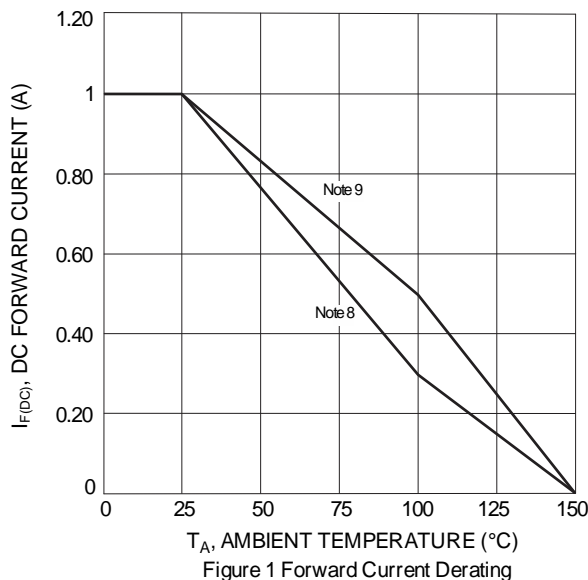
### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Typical Thermal Resistance, Junction to Terminal (Note 8)	R <sub>θJT</sub>	44	°C/W
Typical Thermal Resistance, Junction to Ambient (Note 8)	R <sub>θJA</sub>	80	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	US1JDFQ	US1MDFQ	Unit
Minimum Reverse Breakdown Voltage (Note 6) @I <sub>R</sub> = 5μA	V <sub>(BR)R</sub>	600	1000	V
Maximum Forward Voltage Drop @I <sub>F</sub> = 1.0A	V <sub>F</sub>		1.7	V
Peak Reverse Current @T <sub>A</sub> = +25°C	I <sub>R</sub>		5.0	μA
at Rated DC Blocking Voltage (Note 6) @T <sub>A</sub> = +100°C	I <sub>R</sub>		100	μA
Maximum Reverse Recovery Time (Note 7)	t <sub>RR</sub>		75	ns
Typical Total Capacitance (Note 10)	C <sub>T</sub>		10	pF

- Notes:
6. Short duration pulse test used to minimize self-heating effect.
  7. Measured with I<sub>F</sub> = 0.5A, I<sub>R</sub> = 1.0A, I<sub>RR</sub> = 0.25A. See Figure 7.
  8. Device mounted on FR-4 substrate, 1" \* 1", 2oz, single-sided, PC boards with 0.1" \* 0.15" copper pads.
  9. Device mounted on FR-4 substrate, 0.4" \* 0.5", 2oz, single-sided, PC boards with 0.2" \* 0.25" copper pads.
  10. Measured at 1.0MHz and applied reverse voltage of 4.0V DC.



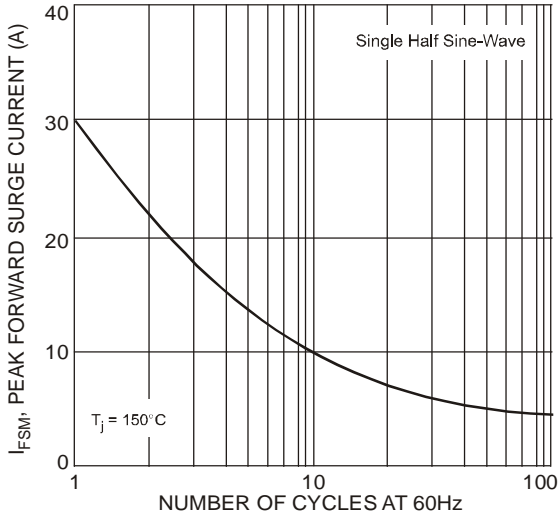


Figure 3 Forward Surge Current Derating Curve

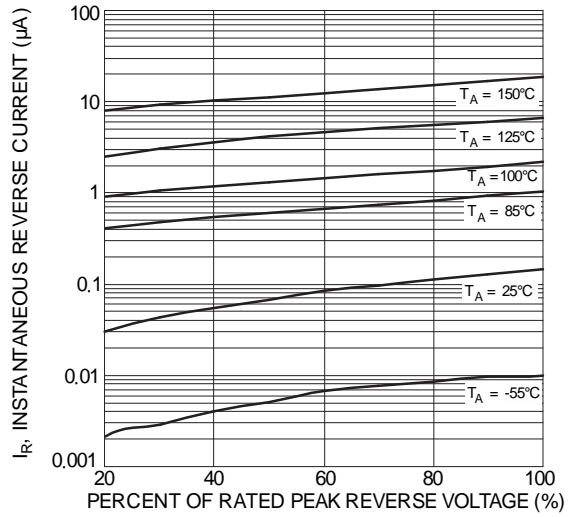


Figure 4 Typical Reverse Characteristics

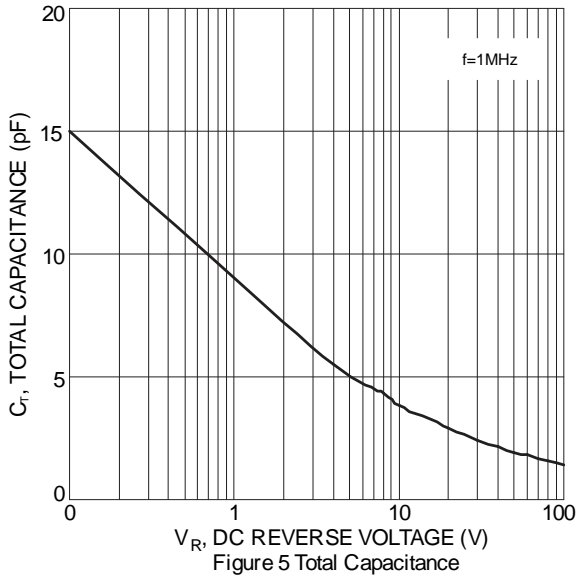


Figure 5 Total Capacitance

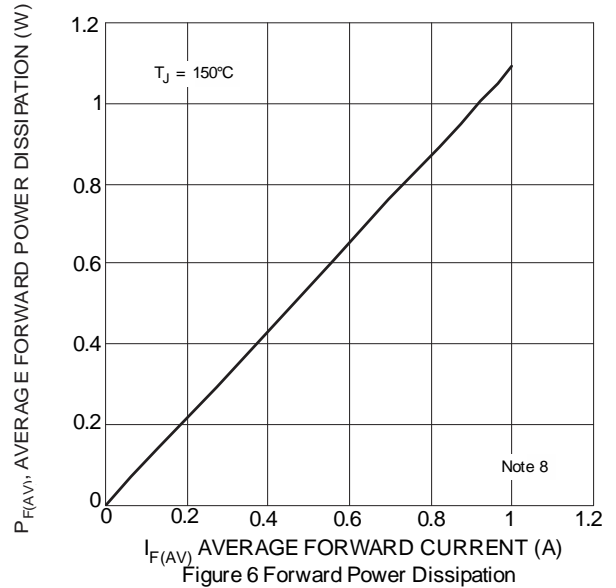
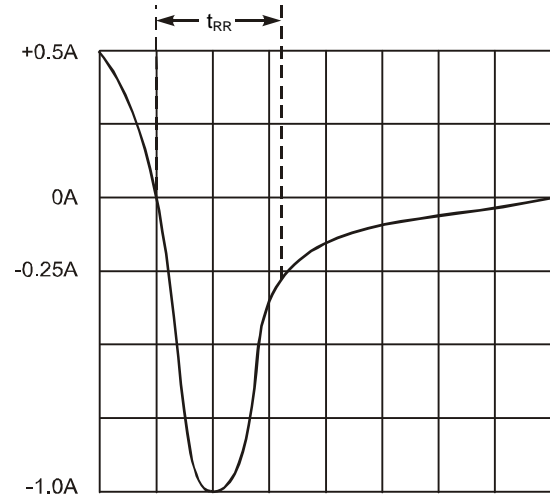
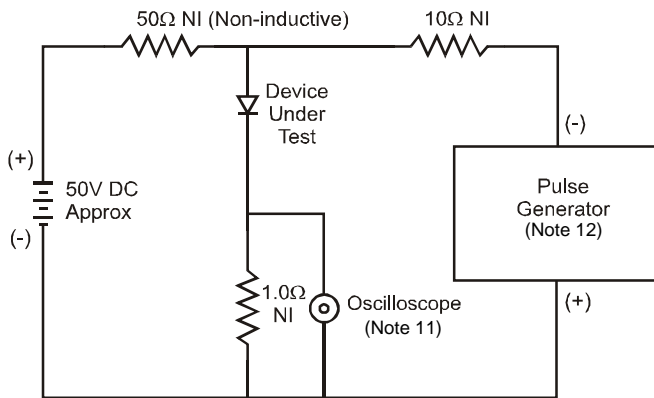


Figure 6 Forward Power Dissipation



Notes:  
11. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.  
12. Rise Time = 10ns max. Input Impedance = 50Ω.

Set time base for 50/100 ns/cm

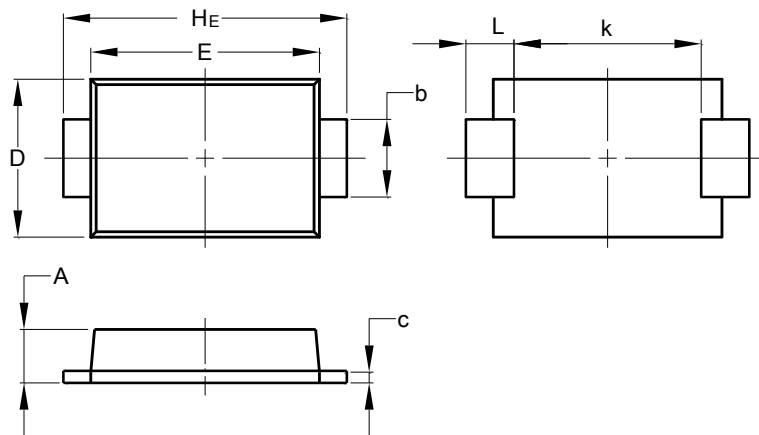
Figure 7 Reverse Recovery Time Characteristic and Test Circuit

NEW PRODUCT

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### D-FLAT

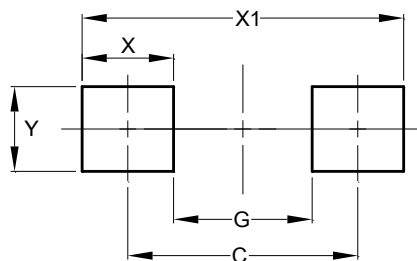


D-FLAT		
Dim	Min	Max
A	0.90	1.10
b	1.25	1.65
c	0.10	0.40
D	2.25	2.95
E	3.95	4.60
k	2.80	-
HE	5.00	5.60
L	0.50	1.30
All Dimensions in mm		

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### D-FLAT



Dimensions	Value (in mm)
C	4.65
G	2.80
X	1.85
X1	6.50
Y	1.70

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