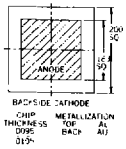
RECTIFIERS
High Efficiency, 70A

1N6304—1N6306
JAN, JANTX, JANTXV

4

FEATURES
- High Continuous Current Rating
- Very Low Forward Voltage
- Very Fast Switching Speeds
- High Surge Capability
- Low Thermal Resistance
- Mechanically Rugged
- Both Polarities Available
- Qualified to MIL-S-19500/550



DESCRIPTION
The 1N6304 Series is specifically designed for operation in power switching circuits operating at frequencies of at least 20KHz. The very low forward voltage and very fast recovery time make them particularly suited for switching type power supplies.

ABSOLUTE MAXIMUM RATINGS

Peak Inverse Voltage, 1N6304	50V
Peak Inverse Voltage, 1N6305	100V
Peak Inverse Voltage, 1N6306	150V
Maximum Average D.C. Output Current at T_C = 100°C	70A
Non-Repetitive Sinusodal Surge Current 8.3ms	800A
Thermal Resistance, Junction to Case	0.8°C/W
Operating and Storage Temperature Range	-65°C to +175°C
Operating and Storage Temperature Range (JEDEC types)	-55°C to +175°C

POWER CYCLING

These devices possess the unique ability to pass many thousands of cycles of a stress test designed to evaluate the integrity of the bonding systems used in the construction of power rectifiers.

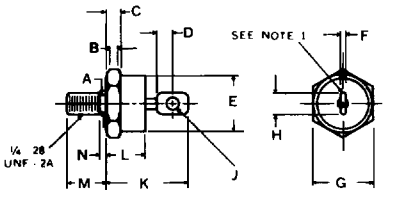
In this stress test, the case of the device is not heat sunk. Full rated forward current is supplied to force a case temperature increase at least 75°C, at which time, the current is removed and the case allowed to cool. The cycle is repeated a minimum of 5,000 times to simulate equipment being turned on and off. Extended power cycling tests demonstrate a product capability in excess of 25,000 cycles.

SWITCHING CHARACTERISTICS

The switching times of these ultra-fast rectifiers increase relatively little, with temperature or at different currents. Even in severe applications, such as catch diodes for switching regulators and output rectifiers for high frequency square wave inverters, these devices switch many times faster than the fastest associated transistors. Thus, the stresses on and powers dissipated in the switching transistors are substantially less than when using other rectifiers.

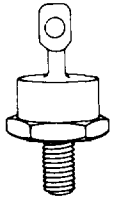
MECHANICAL SPECIFICATIONS

1N6304-1N6306



	ins.	mm
A	225 ± 005	5 72 ± 0 13
B	060 MIN	1 52 MIN
C	156 ± 020	3 96 ± 0 51
D	156 MIN FLAT	3 96 MIN FLAT
E	667 DIA MAX	16 94 DIA MAX
F	090 MAX	2 29 MAX
G	677 ± 010	17 20 ± 0 25
H	375 MAX	9 53 MAX
J	140 MIN DIA	3 56 MIN DIA
K	1 000 MAX	25 40 MAX
L	450 MAX	11 43 MAX
M	438 ± 015	11 13 ± 0 38
N	078 MAX	1 98 MAX

DO-203AB
(DO-5)



Notes:
1. Standard polarity is cathode-to-stud.
   For reverse polarity (anode-to-stud) add suffix "R", ie. 1N6304R.
2. All metal surfaces tin plated.
3. Maximum unlubricated stud torque: 20 inch pounds (20 kg. cm).
4. Angular orientation of terminal is undefined.

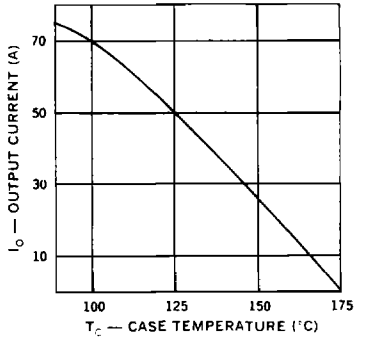
ELECTRICAL SPECIFICATIONS

Type	V_R	Maximum Forward Voltage V_F		Maximum Reverse Current I_R		Maximum Reverse Recovery Time t_{rr}
		T_C = 25°C	T_C = 150°C	T_C = 25°C	T_C = 150°C	
1N6304 1N6305 1N6306	50V 100V 150V	.975V @ 70A t_P = 300μS	.840V @ 70A t_P = 300μS	25μA	30mA	50ns 1A-1A-0.1A
J, JTX, JTXV 1N6304 J, JTX, JTXV 1N6305 J, JTX, JTXV 1N6306	50V 100V 150V	.975V @ 70A t_P = 300μs	.840V @ 70A t_P = 300μs	25μA	30mA	50ns[1]
		1.18V @ 150A t_P = 300μs				60ns[2]

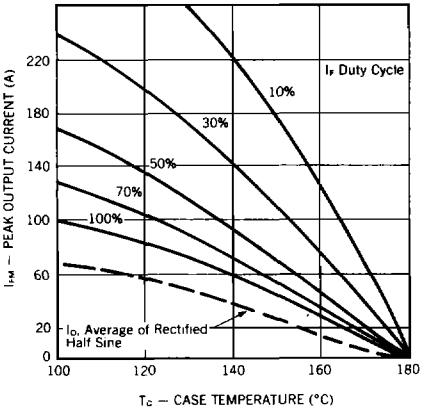
[1] I_F = 0.5A, I_R = 1A, I_{REC} = 0.25A, $di/_{dt}$ = 85A/μs (min.).
[2] I_{FM} = 70A, $di/_{dt}$ = 130A/μs.

Type	V_R	Maximum Forward Recovery Time	Maximum Forward Voltage	Maximum Junction Capacitance
J, JTX, JTXV 1N6304 J, JTX, JTXV 1N6305 J, JTX, JTXV 1N6306	50V 100V 150V	15ns I_{FM} = 1A, t_r = 8ns	2.2V I_{FM} = 1A, t_r = 8ns	@ -10V 600pF

Output Current vs. Case Temperature

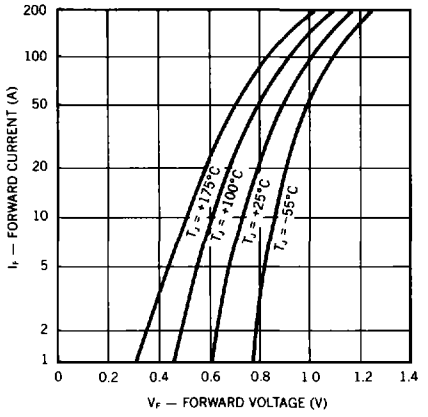


Peak Output Current vs. Case Temperature

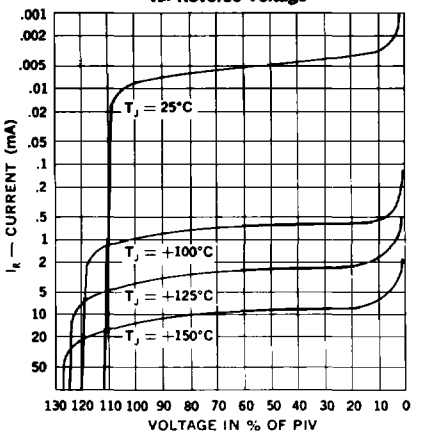


4

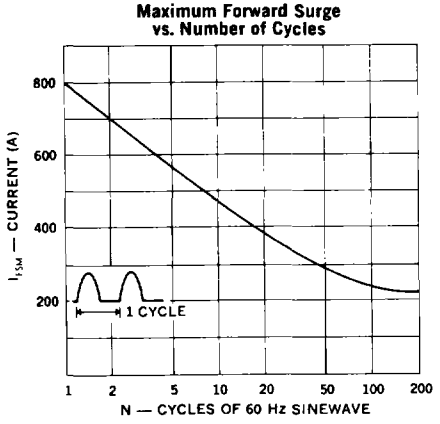
Forward Current vs. Forward Voltage



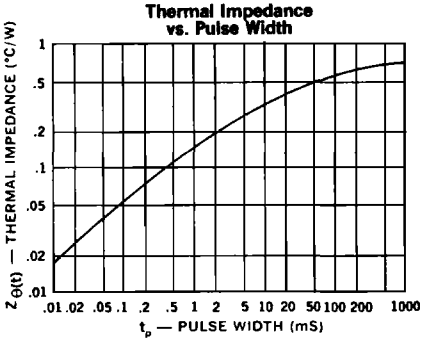
Typical Reverse Current vs. Reverse Voltage



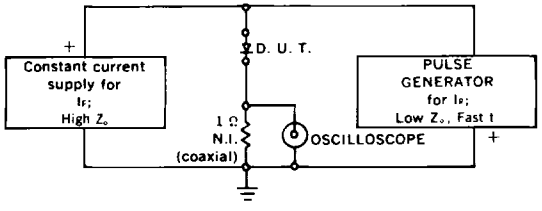
Maximum Forward Surge vs. Number of Cycles



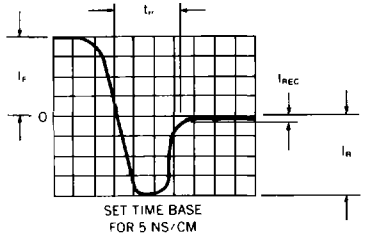
Thermal Impedance vs. Pulse Width



Reverse-Recovery Circuit



Characteristic Waveform



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

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