DRJ100/C2

RELIABILITY DATA

信頼性データ

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※他項目の信頼性データは標準品を参照ください。
Other reliability data refer to RELIABILITY DATA of standard model DRJ100.

* 試験結果は、代表データでありますが、全ての製品はほぼ同等な特性を示します。
従いまして、以下の結果は参考値とお考え願います。
Test results are typical data. Nevertheless the following results are considered to be reference data because all units have nearly the same characteristics.

評価負荷条件　Load conditions

*入力電圧が100VAC未満の場合、下記のとおり出力ディレーティングが必要です。
Output derating is needed when input voltage is less than 100VAC.

Output voltage : 24V

Vin	Iout : Full load	24V
100 - 265VAC	100%	3.75A
85VAC	80%	3.0A

1. 部品ディレーティング Components Derating

MODEL : DRJ100/C2

(1) 算出方法 Calculating Method

(a) 測定方法 Measuring method

・取付方法 Mounting method : 標準取付 : A Standard mounting : A	・周囲温度 Ambient temperature : 55℃
・入力電圧 Input voltage : 100 , 230VAC	・出力電圧、電流 Output voltage & current : Typ. , 100%

(b) 半導体 Semiconductors

ケース温度、消費電力、熱抵抗より使用状態の接合点温度を求め最大定格、接合点温度との比較を求めました。

Compared with maximum junction temperature and actual one which is calculated based on case temperature, power dissipation and thermal impedance.

(c) IC、抵抗、コンデンサ等 IC, Resistors, Capacitors, etc.

周囲温度、使用状態、消費電力など、個々の値は設計基準内に入っています。

Ambient temperature, operating condition, power dissipation and so on are within derating criteria.

(d) 熱抵抗算出方法 Calculating method of thermal impedance

$$\theta j-c = \frac{Tj(max) - Tc}{Pj(max)} \qquad \theta j-l = \frac{Tj(max) - Tl}{Pj(max)}$$

Tc : ディレーティングの始まるケース温度 一般に25°C
Case Temperature at Start Point of Derating ; 25°C in General

Tl : ディレーティングの始まるリード温度 一般に25°C
Lead Temperature at Start Point of Derating ; 25°C in General

Pj(max) : 最大接合点(チャネル)損失
(Pch(max)) Maximum Junction (channel) Dissipation

Tj(max) : 最大接合点(チャネル)温度
(Tch(max)) Maximum Junction (channel) Temperature

θj-c : 接合点(チャネル)からケースまでの熱抵抗
(θch-c) Thermal Impedance between Junction (channel) and Case

θj-l : 接合点(チャネル)からリードまでの熱抵抗
(θch-l) Thermal Impedance between Junction (channel) and Lead

θj-a : 接合点から周囲までの熱抵抗
Thermal Impedance between Junction and Ambient

(2) 部品ディレーティング表 Component Derating List

MODEL : DRJ100-24-1/C2

部品番号 Location No.	Vin = 100VAC Ta = 55℃ Vo = 24V Io = 3.75A		
Q1 IPA60R199CP INFINEON	Tch (max) = 150 ℃ Pch = 1.12 W Tch = Tc + ((θch-c) × Pch) = 90.5 ℃ D.F. = 60.3 %	θch-c = 3.7 ℃/W ΔTc = 31.4 ℃	Tc = 86.4 ℃
Q2 R6009ENX ROHM	Tch (max) = 150 ℃ Pch = 1.68 W Tch = Tc + ((θch-c) × Pch) = 127.3 ℃ D.F. = 84.9 %	θch-c = 3.13 ℃/W ΔTc = 67.0 ℃	Tc = 122.0 ℃
D1 D3SB60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 2.15 W Tj = Tc + ((θj-c) × Pj) = 112.9 ℃ D.F. = 75.3 %	θj-c = 5.5 ℃/W ΔTc = 46.1 ℃	Tc = 101.1 ℃
D51 STPS30150CW ST MICRO.	Tj (max) = 175 ℃ Pj = 2.82 W Tj = Tc + ((θj-c) × Pj) = 131.7 ℃ D.F. = 75.3 %	θj-c = 1.5 ℃/W ΔTc = 72.5 ℃	Tc = 127.5 ℃
D103 DE5L60U SHINDENGEN	Tj (max) = 150 ℃ Pj = 0.879 W Tj = Tc + ((θj-c) × Pj) = 102.4 ℃ D.F. = 68.3 %	θj-c = 4.0 ℃/W ΔTc = 43.9 ℃	Tc = 98.9 ℃
D105 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 26.39 mW Tj = Tl + ((θj-l) × Pj) = 115.2 ℃ D.F. = 76.8 %	θj-l = 23.0 ℃/W ΔTl = 59.6 ℃	Tl = 114.6 ℃
D201 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 19mW Tj = Ta + ((θj-a) × Pj) = 125.3 ℃ D.F. = 83.5 %	θj-a = 130 ℃/W ΔTa = 67.8 ℃	Ta = 122.8 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 1.25 mW Tj = Tc + ((θj-c) × Pj) = 97.4 ℃ D.F. = 77.9 %	θj-c = 250 ℃/W ΔTc = 42.1 ℃	Tc = 97.1 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 2.4 mW Tj = Tc + ((θj-c) × Pj) = 97.7 ℃ D.F. = 78.2 %	θj-c = 250 ℃/W ΔTc = 42.1 ℃	Tc = 97.1 ℃

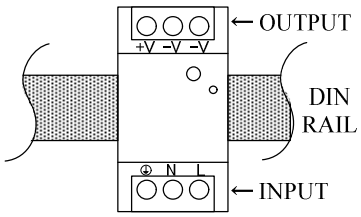
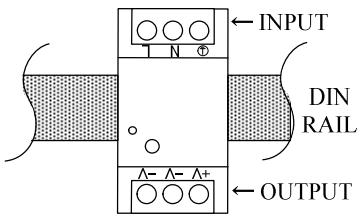
MODEL : DRJ100-24-1/C2

部品番号 Location No.	Vin = 230VAC Ta = 55℃ Vo = 24V Io = 3.75A		
Q1 IPA60R199CP INFINEON	Tch (max) = 150 ℃ Pch = 1.68 W Tch = Tc + ((θch-c) × Pch) = 92.8 ℃ D.F. = 61.9 %	θch-c = 3.7 ℃/W ΔTc = 31.6 ℃	Tc = 86.6 ℃
Q2 R6009ENX ROHM	Tch (max) = 150 ℃ Pch = 1.68 W Tch = Tc + ((θch-c) × Pch) = 124.5 ℃ D.F. = 83.0 %	θch-c = 3.13 ℃/W ΔTc = 64.2 ℃	Tc = 119.2 ℃
D1 D3SB60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 0.94 W Tj = Tc + ((θj-c) × Pj) = 85.0 ℃ D.F. = 56.7 %	θj-c = 5.5 ℃/W ΔTc = 24.8 ℃	Tc = 79.8 ℃
D51 STPS30150CW ST MICRO.	Tj (max) = 175 ℃ Pj = 2.82 W Tj = Tc + ((θj-c) × Pj) = 127.3 ℃ D.F. = 72.7 %	θj-c = 1.5 ℃/W ΔTc = 68.1 ℃	Tc = 123.1 ℃
D103 DE5L60U SHINDENGEN	Tj (max) = 150 ℃ Pj = 0.879 W Tj = Tc + ((θj-c) × Pj) = 94.4 ℃ D.F. = 62.9 %	θj-c = 4.0 ℃/W ΔTc = 35.9 ℃	Tc = 90.9 ℃
D105 D1F60 SHINDENGEN	Tj (max) = 150 ℃ Pj = 26.39 mW Tj = Tl + ((θj-l) × Pj) = 112.0 ℃ D.F. = 74.7 %	θj-l = 23.0 ℃/W ΔTl = 56.4 ℃	Tl = 111.4 ℃
D201 CRH01 TOSHIBA	Tj (max) = 150 ℃ Pj = 22mW Tj = Ta + ((θj-a) × Pj) = 121.2 ℃ D.F. = 80.8 %	θj-a = 130 ℃/W ΔTa = 63.3 ℃	Ta = 118.3 ℃
PC102 TLP291(SE (LED) TOSHIBA	Tj (max) = 125 ℃ Pj = 1.25 mW Tj = Tc + ((θj-c) × Pj) = 92.1 ℃ D.F. = 73.7 %	θj-c = 250 ℃/W ΔTc = 36.8 ℃	Tc = 91.8 ℃
PC102 TLP291(SE (TRANSISTOR) TOSHIBA	Tj (max) = 125 ℃ Pj = 2.4 mW Tj = Tc + ((θj-c) × Pj) = 92.4 ℃ D.F. = 73.9 %	θj-c = 250 ℃/W ΔTc = 36.8 ℃	Tc = 91.8 ℃

2. 主要部品温度上昇値 Main Components Temperature Rise △T List

MODEL : DRJ100-24-1/C2

(1) 測定条件 Measuring Conditions

取付方法 Mounting Method (標準取付 : A) (Standard Mounting : A)	Mounting A		Mounting B	
				
入力電圧 Vin Input Voltage	100VAC	230VAC	100VAC	230VAC
出力電圧 Vo Output Voltage	24VDC			
出力電流 Io Output Current	3.75A(100%)			

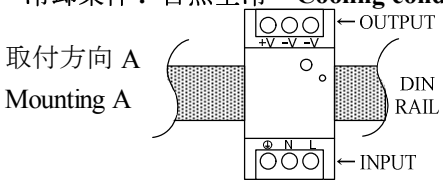
(2) 測定結果 Measuring Results

		ΔT Temperature Rise (℃)			
出力ディレーティング Output Derating		Io=100 %			
		Ta=55℃		Ta=40℃	
部品番号	部品名	取付方向 : Mounting A		取付方向 : Mounting B	
Location No.	Part name	Vin : 100VAC	Vin : 230VAC	Vin : 100VAC	Vin : 230VAC
Q1	MOS FET	31.4	31.6	46.1	45.4
Q2	BRIDGE DIODE	67.0	64.2	55.7	54.8
D1	DIODE	46.1	24.8	66.2	44.5
D51	S.B.D.	72.5	68.1	58.8	58.2
D103	DIODE	43.9	35.9	61.6	52.8
D105	DIODE	59.6	56.4	40.3	39.5
D201	DIODE	67.8	63.3	55.1	54.3
PC102	PHOTO COUPLER	42.1	36.8	43.3	41.0
T1	TRANS	67.2	63.4	52.6	51.8
L31	CHOKE COIL	16.1	11.1	20.7	16.7
L1	BALUN	34.0	14.6	53.8	31.7
L4	CHOKE COIL	37.7	26.5	56.6	45.7
L71	BALUN	28.8	25.1	23.9	22.7
C5	E.CAP.	34.9	31.1	40.5	37.8
C6	E.CAP.	44.4	40.7	45.0	43.0
C51	E.CAP.	40.2	36.2	24.9	24.0
C52	E.CAP.	35.8	30.4	31.4	29.5
C73	E.CAP.	19.8	17.6	13.9	13.1

3. 電解コンデンサ推定寿命計算値　Electrolytic Capacitor Lifetime

MODEL ： DRJ100-24-1/C2

冷却条件：自然空冷　Cooling condition：Convection cooling

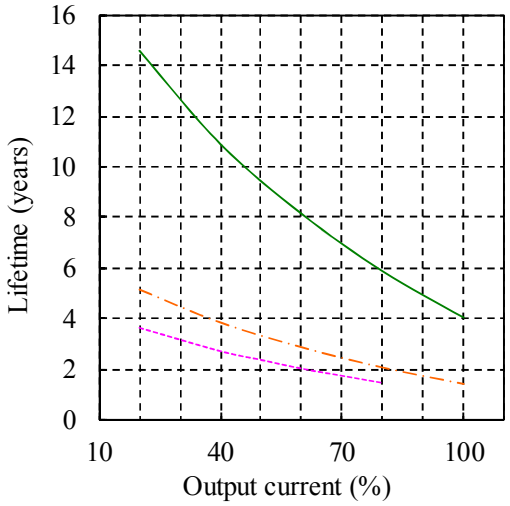


Conditions　Ta　40℃ :
55℃ :
60℃ :

24V

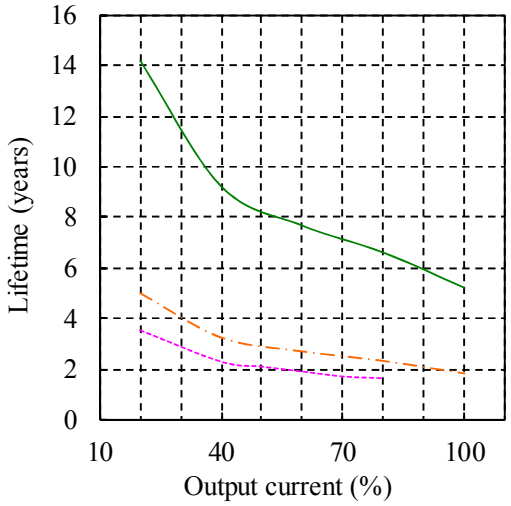
Vin = 100VAC

Load \ Ta	Lifetime (years)		
	40℃	55℃	60℃
20%	14.6	5.2	3.6
40%	10.9	3.9	2.7
60%	8.1	2.9	2.0
80%	5.9	2.1	1.5
100%	4.0	1.4	-



Vin = 230VAC

Load \ Ta	Lifetime (years)		
	40℃	55℃	60℃
20%	14.2	5.0	3.5
40%	9.2	3.3	2.3
60%	7.7	2.7	1.9
80%	6.6	2.3	1.7
100%	5.2	1.8	-



上記推定寿命は、弊社計算方法により算出した値であり、封口ｺﾞﾑの劣化等の影響を含めておりません。

The lifetime is calculated based on our method and doesn't include the seal rubber degradation effect etc.

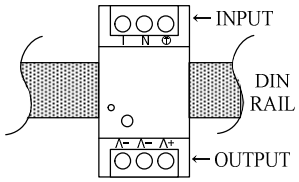
電解コンデンサの寿命は15年が上限となります。

The upper limit of the Electolytic Capacitors lifetime are 15 years.

MODEL ： DRJ100-24-1/C2

冷却条件：自然空冷　Cooling condition：Convection cooling

取付方向 B
Mounting B

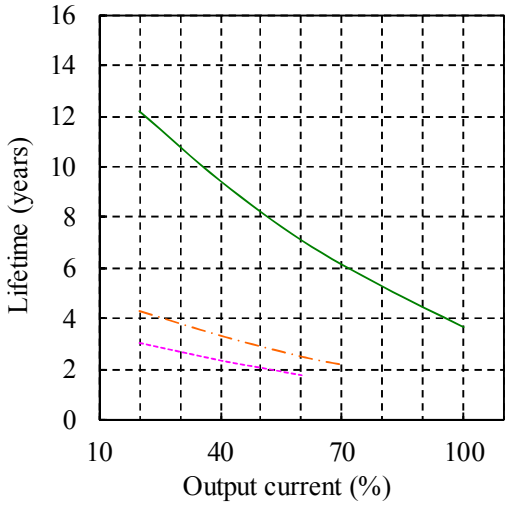


Conditions　Ta　40℃ :
55℃ :
60℃ :

24V

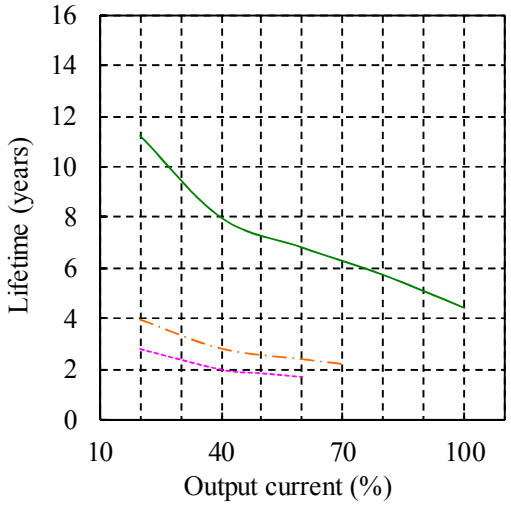
Vin = 100VAC

Load \ Ta	Lifetime (years)		
	40℃	55℃	60℃
20%	12.2	4.3	3.0
40%	9.4	3.3	2.4
60%	7.1	2.5	1.8
80%	5.3	-	-
100%	3.7	-	-



Vin = 230VAC

Load \ Ta	Lifetime (years)		
	40℃	55℃	60℃
20%	11.2	4.0	2.8
40%	8.0	2.8	2.0
60%	6.8	2.4	1.7
80%	5.7	-	-
100%	4.4	-	-



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