NFR25/25H/1W/2W

FEATURES

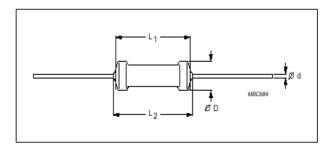
- Overload protection without risk of fire
- wide range of overload currents.

APPLICATIONS

• TV, Monitor, Audio, Video

DESCRIPTION

A homogeneous film of metal alloy is Deposited on a high grade ceramic body. After a laser groove has been cut in the resistive layer, tined connecting leads of electrolytic copper are welded to the end-caps. The resistors are coated with a grey and green non flammable lacquer witch provides electrical, mechanical and climatic protection.



	Dimensions (mm)					
TYPE	D ±0.8	L 1 ±0.8	L 2 Max.	d (±0.05)		
NFR25	2.5	6.5	7.5	0.55		
NFR25H	2.5	6.5	7.5	0.55		
NFR 1W	3.9	9.0	12	0.65/0.8		
NFR 2W	3.9	9.0	12	0.65/0.8		

QUICK REFERENCE DATA

DESCRIPTION		VALUE				
DESCRIPTION	NFR25	NFR25H	NFR 1W	NFR 2W		
resistance range	0.22 Ω1	to 15 kΩ	0.1 Ω1	to 1 kΩ		
resistance tolerance		±10%, ±5%,	±2% (E24)			
temperature coefficient R ≤ 4.7 Ω R > 4.7 Ω	±250 ppm / ℃ ±200 ppm / ℃					
rated dissipation at T _{amb} = 70 ℃	0.25 W	0.5 W	1 W	2 W		
max. working voltage	250 V	350 V	350 V	500 V		
max. overload voltage	400 V	500 V	500 V	700 V		
noise		max. 1	.5 µ\/V			
basic specifications		IEC 60 115-1	and 60 115-2			
climatic category (IEC60)		55 / 1	55 / 56			
stability, ∆R/R _{max} after load : 1000 hours	± 1% +0.05Ω	± 1% +0.05Ω	± 5% +0.1Ω	± 5% +0.1 Ω		
climatic tests	± 1% +0.05Ω	± 1% +0.05Ω	± 3% +0.1 Ω	± 3% +0.1 Ω		
soldering	± 0.25%	+0.05Ω	± 1% +0.05 Ω			
short time overload	± 0.25%	+0.05 Ω	± 1% +	-0.05 Ω		

NFR25/25H/1W/2W

ORDERING INFORMATION

Ordering code indicating resistor types and packing

Table 1

Туре	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code	
	NFR25 52mm ree (0.25W) R - shape		ammo 1000 5	1000		5	PNFR 205 13xxx
NEDOS		ammo	5000	0.22 Ω to 15 kΩ	3	PNFR 205 33xxx	
_		reel	5000		5	PNFR 205 23xxx	
		паре	2000			5	PNFR 205 83xxx

Table 2

Туре	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
	NFR25H 52mm (0.5W)	ammo	1000		5	PNFR 207 13xxx
NEDOSII		aiiiiio	5000		,	PNFR 207 33xxx
_		reel 5000 0.22 Ω to 15 kΩ	0.22 Ω to 15 kΩ	5	PNFR 207 23xxx	
	R - shape			2000	5	PNFR 207 83xxx

Table 3

Туре	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code	
	64mm	ammo	1000			5	PNFR 208 13xxx
NFR 1W	R - sh	паре	1500	0.1 Ω to 1 kΩ	5	PNFR 208 26xxx	
,	T - shape 1000		1000]	5	PNFR 308 26xxx	

Table 4

Туре	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
	64mm	ammo	1000		5	PNFR 209 13xxx
NFR 2W	R - sł	паре	1500	0.1 Ω to 1 kΩ	5	PNFR 209 26xxx
	T - sh	nape	1000		5	PNFR 309 26xxx

Table 5. Last digit of 12NC

Resistance decade	Last digit
1 to 9.76Ω	8
10 to 97.6Ω	9
100 to 976Ω	1
1 to 9.76 kΩ	2
10 to 97.6 kΩ	3

Ordering Example

The ordering code of a NFR 1W resistor, value 1 Ω ±5%, taped on a bandolier of 1000 units in ammopack is: PNFR 208 13108.

NFR25/25H/1W/2W

Table 6. Limiting values

TYPE	LIMITING VOLTAGE ⁽¹⁾ (V)	LIMITING POWER (W)
NFR25	250	0.25
NFR25H	350	0.5
NFR 1W	350	1
NFR 2W	500	2

Note

1. the maximum voltage that may be continuously applied to the resistor element, see "IEC publication 60 115-1"

The maximum permissible hot – spot temperature is 155 $\,^{\circ}$ C.

DERATING

The power that the resistor can dissipate depends on the operating temperature : Fig. 1

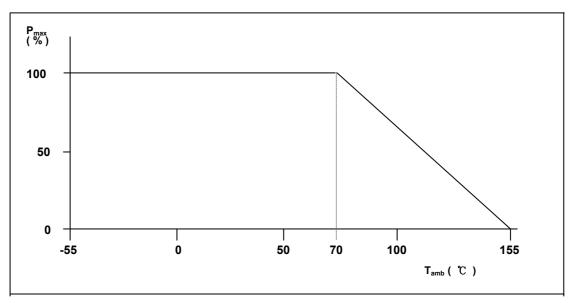


Fig. 1 Maximum dissipation (P_{max}) in percentage of rated power as a function of the ambient Temperature (T_{amb})

NFR25/25H/1W/2W

FUSING CHARACTERISTICS

The resistors will fuse without the risk of fire and within an indicated range of overload Fusing means that the resistive value of the resistor increases at least 100 times.

Table 7

Туре	Power	Fusing time (Rated power x)			
	rating	x 25 x 16			
NFR25	0.25W	0.2Ω ~ 0.98Ω	1Ω ~ 15KΩ		
NFR25H	0.5W	0.2 Ω ~ 0.98 Ω	1Ω ~ 15KΩ	Max.	
NFR 1W	1W	0.2Ω ~ 0.98Ω	1Ω ~ 1KΩ	1 ~ 30 sec	
NFR 2W	2W	0.2Ω ~ 0.98Ω	1Ω ~ 1KΩ		

The fusing characteristic is measured under constant voltage

Fusing graph

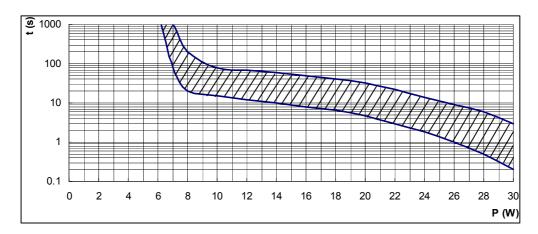


Fig. 2 NFR 25, 25H, 1W, 2W

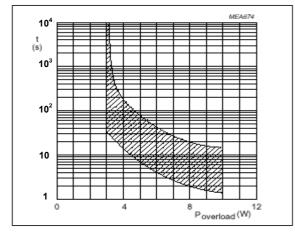


Fig. 3 NFR25 (2322 205 series)

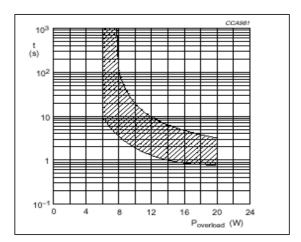


Fig. 4 NFR25H (2322 207 series)

NFR25/25H/1W/2W

PULSE LOADING CAPABILITIES

NFR 25

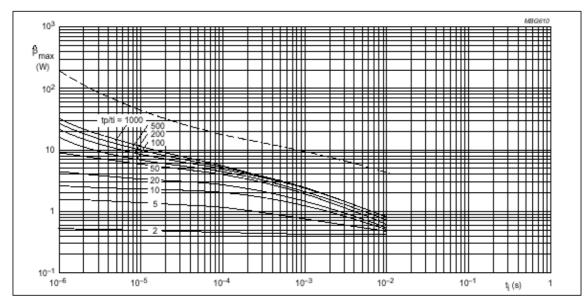


Fig. 5 Pulse on a regular basis: maximum permissible peak pulse power (P_{max}) as a function of pulse duration (t_i).

NFR25H

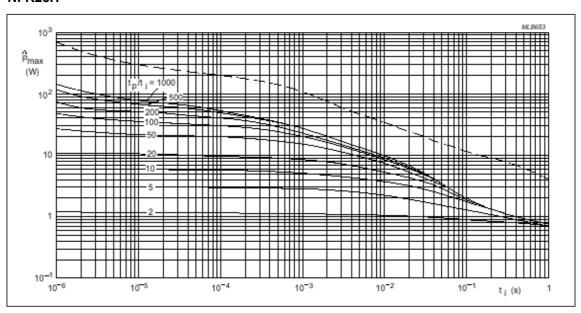


Fig. 6 Pulse on a regular basis: maximum permissible peak pulse power (P_{max}) as a function of pulse duration (t_i).

NFR25/25H/1W/2W

NFR 1W

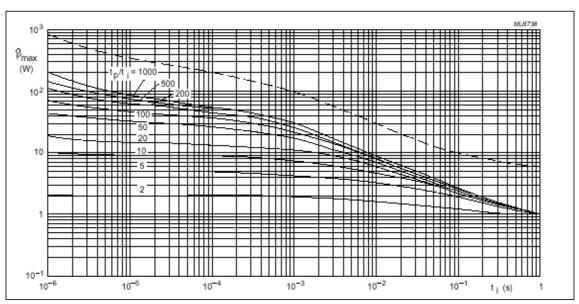


Fig. 7 Pulse on a regular basis: maximum permissible peak pulse power (P_{max}) as a function of pulse duration (t_i).

NFR 2W

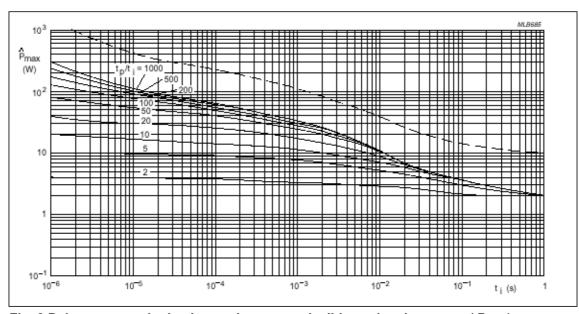
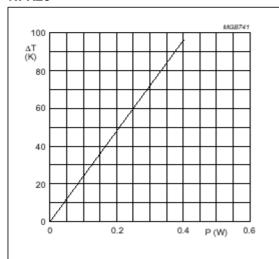


Fig. 8 Pulse on a regular basis: maximum permissible peak pulse power (P_{max}) as a function of pulse duration (t_i).

NFR25/25H/1W/2W

Application information

NFR25



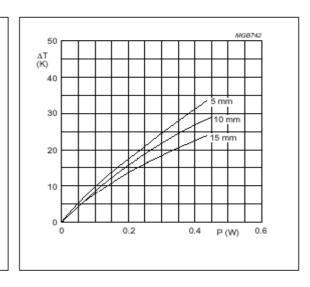
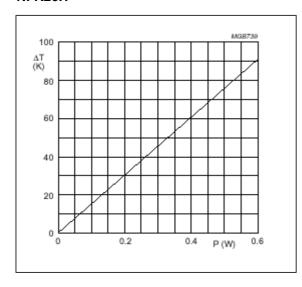


Fig. 9 Hot-spot temperature rise (ΔT) as a function of dissipated power.

Fig.10 Temperature rise (Δ T) at the lead end of the lead (soldering point) as a function of dissipated power at various lead lengths after mounting

NFR25H



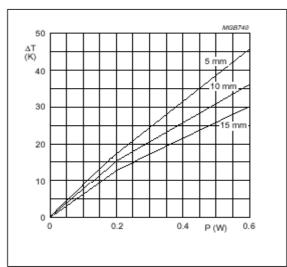
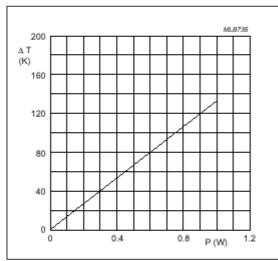


Fig.11 Hot – spot temperature rise (Δ T) as a function of dissipated power

Fig.12 Temperature rise (Δ T) at the lead end of the lead (soldering point) as a function of dissipated power at various lead lengths after mounting

NFR25/25H/1W/2W

NFR 1W



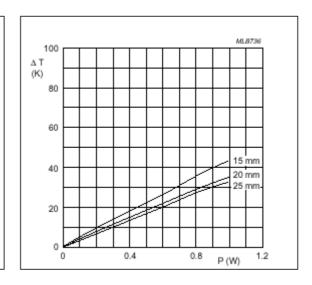


Fig.13 Hot – spot temperature rise (Δ T) as a function of dissipated power

Fig.14 Temperature rise (Δ T) at the lead end of the lead (soldering point) as a function of dissipated power at various lead lengths after mounting

NFR 2W

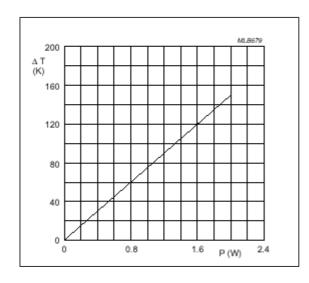


Fig.15 hot-spot temperature rise (Δ T) as a function of dissipated power.

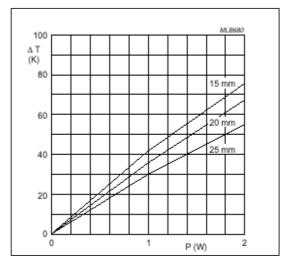


Fig.16 temperature rise (∆ t) at the lead end (soldering point) as a function of dissipated power at various lead lengths after mounting

NFR25/25H/1W/2W

MECHANICAL DATA

Table 8. Mass per 100 units

TYPE	MASS (g)
NFR25	25
NFR25H	25
NFR 1W	40
NFR 2W	40

MARKING

The nominal resistance and tolerance are marked on the resistor using four or five colored Bands in accordance with IEC publication 60 062 "color codes for fixed resistors"

NFR25 : 5th band is added, which is violet NFR25H : 5th band is added, which is white

NFR 1W: 4 band

NFR 2W: 5th band is added, which is white

Table 9. BODY COLORS

TYPE	COLORS
NFR25	Grey (non flammable lacquer)
NFR25H	Grey (non flammable lacquer)
NFR 1W	Grey (non flammable lacquer)
NFR 2W	Dark-green (non flammable lacquer)

NFR25/25H/1W/2W

TEST AND REQUIREMENTS

Table 10. Test procedures and requirements

	-		REQUIR	EMENTS	
TEST	PROCEDURE	NFR25	NFR25H	NFR1W	NFR2W
robustness of terminations: tensile all samples	φ 0.55 mm: load 10N:10s φ 0.80 mm: load 10N:10s	number of failures < 10 x 10 ⁻⁶			
bending half number of samples	φ 0.55 mm: load 5N: 4x90° φ 0.80 mm: load 5N: 4x90°	number of failures < 10 x 10 ⁻⁶			
torsion other half number samples	3x360°in opposite directions	no dama ±0.25% +	_		
solderability	2 s ; 235℃ flux 600	good tin	ning; no d	amage	
soldering heat	Thermal shock: 3 s; 360 ℃ 6mm from body	± 0.25%	\pm 0.25% +0.05 Ω		.05Ω
rapid change of temperature	30 minutes at −55 ℃ and 30 minutes at +155 ℃;5cycles	± 0.25% +0.05Ω		± 1% +0	.05Ω
	frequency 10 to 500 Hz; displacement 1.5mm or	no damage			
vibration	acceleration 10g; 3 directions total 6 hours(3x2 hours)	± 0.25%	+0.05Ω	± 0.5%	+0.05Ω
Climatic sequence dry heat damp heat (accelerated) 1st cycle	16 hours;155℃ 24hours;55℃; 90 to 100% RH	R _{ins min} ; 1	000 №2		
cold	2 hours; - 55℃				
low air pressure damp heat	2 hours;8.5 Kpa; 15 to 35℃ 5 days;55℃;95 to 100% RH				
(accelerated) remaining cycles	3 days,33 ©,33 to 100 /6 KH	± 1% +0.	05Ω	± 3% +0).1Ω
damp heat	56 days; 40 ℃; 90 to 95% RH dissipation 0.01 P _n	± 1% +0.	05Ω	± 3% +0).1Ω
endurance	1000 hours at 70 ℃; P _n or V _{max}	± 1% +0.	05Ω	± 5% +0).1Ω
temperature coefficient	between −55 °C and +155 °C		: ± 250 pp : ± 200 pp		
dielectric withstanding voltage	400V _{RMS} : NFR25 500V _{RMS} : NFR25H 500V _{RMS} : NFR1W 500V _{RMS} : NFR2W during 1min. V- block method	no break	down		
noise	IEC publication 195	max. : 1.	5 μ \/\V		

NFR25/25H/1W/2W

TEST AND REQUIREMENTS

TEST	PROCEDURE	REQUIREMENTS			
		NFR25	NFR25H	NFR1W	NFR2W
insulation resistance	500V _{DC} during 1 minute ; V – block method	min. : 1000 №			
short time overload	rated voltage x 2.5 5 s on 45 s off (V≤2 x V _{max}) 10 cycles	±0.25% +0.05Ω		±1% +0.05Ω	
pulse load		see Fig.5.6.7.8.9.10.11. and 12			