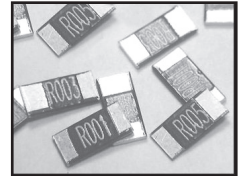


FEATURES

- SURFACE MOUNTABLE 0805, 1206, 2010 AND 2512 CASE SIZE
- LOW RESISTANCE METAL STRIP CONSTRUCTION
- PRECISION TOLERANCE ($\pm 1\%$)
- TAPED & REEL PACKAGING FOR EASY PICK AND PLACE
- REFLOW COMPATIBLE

**RoHS
Compliant**
includes all homogeneous materials



See Part Number System for Details

SPECIFICATIONS

Type	EIA Size	Material (See Note on EMF Characteristics Below)	Power Rating at 70°C	Resistance Tolerance (Code)	Temperature Coefficient (ppm/°C, +25°C ~ +125°C)	Resistance Range*	Operating Temperature Range (°C)
NCSS10	0805	Mn-Cu	1/8W (B)	±1% (F) ±2% (G) ±5% (J)	±100ppm	5mΩ ~ 25mΩ	-55°C ~ +170°C
			1/4W (A)				
			1/2W (S)				
NCSS12	1206	Mn-Cu	1/4W (A)		1mΩ = ±200ppm 2mΩ ~ 10mΩ = ±100ppm >10mΩ = ±75ppm	1mΩ ~ 30mΩ	
			1/2W (S)				
			1W (C)				
NCSS20	2010	Ni-Cu	1/2W (S)		5mΩ ~ 10mΩ = ±100ppm >10mΩ = ±75ppm	5mΩ ~ 50mΩ	
			3/4W (I)				
			1W (C)				
			1.5W (D)				
NCSS25	2512	Ni-Cu	1W (C)		1mΩ = ±275ppm 2mΩ ~ 10mΩ = ±100ppm >10mΩ = ±75ppm	1mΩ ~ 50mΩ	
			1.5W (D)			1mΩ ~ 15mΩ	
			2W (E)			1mΩ ~ 10mΩ	
NCSS25	2512	Mn-Cu	1W (C)		1.5mΩ ~ 10mΩ = ±100ppm >10mΩ = ±75ppm	1.5mΩ ~ 50mΩ	
			1.5W (D)			1.5mΩ ~ 10mΩ	
			2W (E)			1.5mΩ ~ 10mΩ	

*Contact NIC regarding availability of values not shown.

PART NUMBER SYSTEM

NCSS 25 * * R005 TR N F

Series

Case Size Code: 10 = 0805, 12 = 1206, 20 = 2010, 25 = 2512

Power Rating Code: 1/8W = B, 1/4W = A, 1/2W = S, 1W = C, 1.5W = D, 2W = E

Tolerance Code: J = 5%, G = 2%, F = 1%

Resistance Code: See Values Tables

Packaging: TR = Tape & Reel

Material: N = Ni-Cu, Blank = Mn-Cu

RoHS compliant

*Insert appropriate power rating and tolerance codes,

THERMAL EMF CHARACTERISTICS:

Standard Mn-Cu Construction: Thermal EMF = -1 $\mu\text{V}/^\circ\text{C}$

Low Cost Ni-Cu Construction: Thermal EMF = -40 $\mu\text{V}/^\circ\text{C}$

RATED CURRENT: $I = \sqrt{P/R}$

EXAMPLE: Part Number NCSS25E_R001TRNF

P = 2W

R = 0.001W (1milli-ohm)

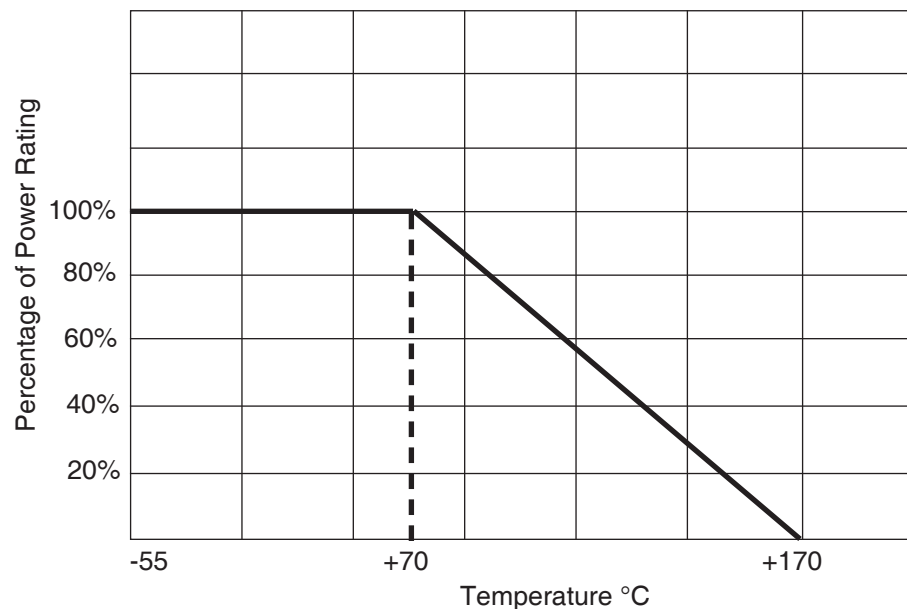
$I = \sqrt{P/R} = \sqrt{2/0.001} = 44.7\text{A}$



ENVIRONMENTAL CHARACTERISTICS

Item	Specification				Test Method	Reference Standard
	0805	1206	2010	2512		
Temperature Coefficient of Resistance	Within specified value				+25°C ~ +125°C	IEC60115-1 4.8 JIS-C5201 4.8
Load Life	<±1%	<±1%	<±1%	<±1%	1,000 hours at rated power, +70°C, 1.5 hours ON, 0.5 hours OFF	IEC60115-1 4.25.1 JIS-C5201 4.25.1
Short Time Overload	<±0.5%	<±0.5%	<±0.5%	<±0.5%	5 x rated power for 5 seconds	IEC60115-1 4.13 JIS-C5201 4.13
Moisture Resistance (no load)	<±1%	<±1.0%	<±1%	<±1%	+85°C, 85% RH, 1000 hours	IEC60115-1 4.24.2 1a JIS-C5201 4.24.2 1a
Temperature Cycling	<±0.5%	<±0.5%	<±0.5%	<±0.5%	-55°C & +155°C, 300 cycles, 15 minutes at each temperature	IEC60115-1 4.19 JIS-C5201 4.19
Resistance to Soldering Heat	<±0.5%	<±0.5%	<±0.5%	<±0.5%	+260°C ± 5°C for 10 sec. ±1 sec., Two cycles (20 sec. ±1 sec. for 2512 size)	IEC60115-1 4.18 JIS-C5201 4.18
Solderability	At least 95% coverage of electrode surface				+245°C ± 5°C, 2 sec. ± 0.5sec.	IEC60115-1 4.17 JIS-C5201 4.17
High Temperature Exposure	<±1%	<±1%	<±1%	<±1%	+170°C for 1,000 hours	IEC60115-1 4.23.2 JIS-C5201 4.23.2
Low Temperature Storage	<±0.5%	<±0.5%	<±0.5%	<±0.5%	-55°C for 1,000 hours	IEC60115-1 4.23.4 JIS-C5201 4.23.4
Substrate Bending	<±1%	<±0.5%	<±0.5%	<±0.5%	Bending within 2mm	IEC60115-1 4.33 JIS-C5201 4.33
Insulation Resistance	>100MΩ				100VDC for 1 minute	IEC60115-1 4.6 JIS-C5201 4.6

Power Derating Curve: For operation above 70°C, power rating must be derated according to the following chart:



NCSS10 (0805 CASE SIZE 1/8W, 1/4W and 1/2W) AVAILABLE VALUES (Mn-Cu)

Part Number	Resistance Value (mΩ)	Available Power Ratings	Available Tolerance	Available TCR
NCSS10_ R005TRF	5.0	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS10_ R006TRF	6.0	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS10_ R008TRF	8.0	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS10_ R009TRF	9.0	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS10_ R010TRF	10	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS10_ R020TRF	20	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS10_ R025TRF	25	1/8W (B), 1/4W (A), 1/2W (S)	±1% (F), ±2% (G), ±5% (J)	±100ppm

NCSS12 (1206 CASE SIZE 1/4W, 1/2W AND 1W) AVAILABLE VALUES (Mn-Cu)

Part Number	Resistance Value (mΩ)	Available Power Ratings	Available Tolerance	Available TCR
NCSS12_ R001TRF	1.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±200ppm
NCSS12_ R002TRF	2.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R003TRF	3.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R004TRF	4.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R005TRF	5.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R006TRF	6.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R007TRF	7.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R008TRF	8.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R009TRF	9.0	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R010TRF	10	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS12_ R012TRF	12	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS12_ R014TRF	14	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS12_ R015TRF	15	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS12_ R020TRF	20	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS12_ R022TRF	22	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS12_ R025TRF	25	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS12_ R030TRF	30	1/4W (A), 1/2W (S), 1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm

NCSS20 (2010 CASE SIZE 1/2W, 3/4W, 1W and 1.5W) AVAILABLE VALUES (Ni-Cu)

Part Number	Resistance Value (mΩ)	Available Power Ratings	Available Tolerance	Available TCR
NCSS20_ R005TRNF	5.0	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS20_ R006TRNF	6.0	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS20_ R010TRNF	10	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS20_ R015TRNF	15	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS20_ R020TRNF	20	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS20_ R022TRNF	22	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS20_ R024TRNF	24	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS20_ R030TRNF	30	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS20_ R050TRNF	50	1/2W (S), 3/4W (I), 1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm

NCSS25 (2512 CASE SIZE 1W, 1.5W and 2W) AVAILABLE VALUES (Ni-Cu)

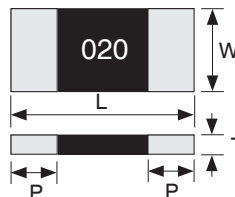
Part Number	Resistance Value (mΩ)	Available Power Ratings	Available Tolerance	Available TCR
NCSS25_ _ R001TRNF	1.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±275ppm
NCSS25_ _ R002TRNF	2.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R003TRNF	3.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R004TRNF	4.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R005TRNF	5.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R006TRNF	6.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R007TRNF	7.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R008TRNF	8.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R010TRNF	10	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100ppm
NCSS25_ _ R011TRNF	11	1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25_ _ R012TRNF	12	1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25_ _ R015TRNF	15	1W (C), 1.5W (D)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R018TRNF	18	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R020TRNF	20	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R025TRNF	25	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R030TRNF	30	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R033TRNF	33	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R035TRNF	35	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R040TRNF	40	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R050TRNF	50	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm

NCSS25 (1W, 1.5W and 2W 2512 CASE SIZE) AVAILABLE VALUES (Mn-Cu)

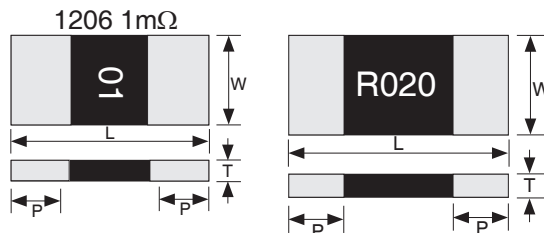
Part Number	Resistance Value (mΩ)	Available Power Ratings	Available Tolerance	Available TCR
NCSS25_ _ R0015TRF	1.5	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100
NCSS25_ _ R005TRF	5.0	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100
NCSS25_ _ R010TRF	10	1W (C), 1.5W (D), 2W (E)	±1% (F), ±2% (G), ±5% (J)	±100
NCSS25C _ R020TRF	20	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R025TRF	25	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R030TRF	30	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R040TRF	40	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm
NCSS25C _ R050TRF	50	1W (C)	±1% (F), ±2% (G), ±5% (J)	±75ppm

COMPONENT DIMENSIONS AND PART MARKING

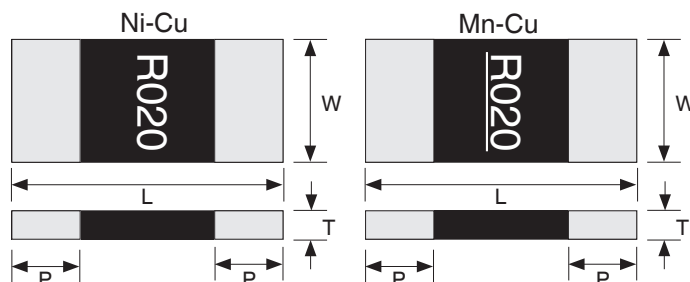
Case Size	L	W	T	P
0805	2.0 ± 0.1	1.25 ± 0.1	0.6 ± 0.2	0.4 ± 0.2



Case Size	L	W	T	P
1206	3.2 ± 0.2	1.6 ± 0.2	$1\text{m}\Omega = 0.75 \pm 0.2$ $2\text{m}\Omega \sim 30\text{m}\Omega \ 0.6 \pm 0.2$	$1\text{m}\Omega \ 1.1 \pm 0.3$ $2\text{m}\Omega \sim 30\text{m}\Omega \ 0.5 \pm 0.3$
2010	5.0 ± 0.2	2.5 ± 0.2	0.6 ± 0.2	0.6 ± 0.3

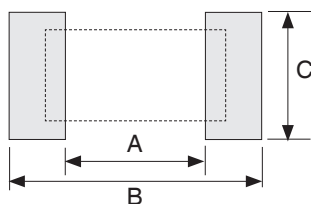


Case Size	L	W	T	P
2512	$R \leq 3\text{m}\Omega$	6.4 ± 0.2	3.2 ± 0.2	0.6 ± 0.2
	$R > 3\text{m}\Omega$			
				2.0 ± 0.2 0.9 ± 0.2



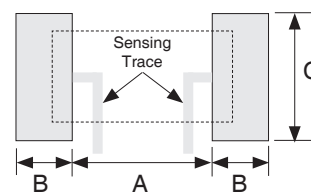
RECOMMENDED LAND PATTERN DIM. (mm)

Case Size	A	B	C
0805	1.2	3.5	1.4

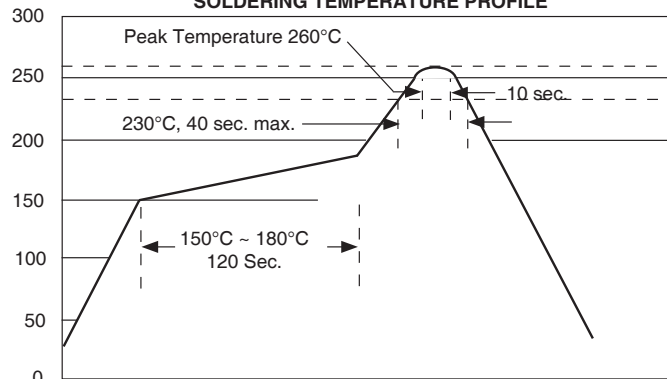


RECOMMENDED LAND PATTERN DIM. (mm)

Case Size	A	B	C
1206	$1\text{m}\Omega$	1.0	2.3
	$2\text{m}\Omega \sim 30\text{m}\Omega$	1.6	1.7
2010		3.5	1.5
2512	$1\text{m}\Omega \sim 3\text{m}\Omega$	1.3	3.1
	$4\text{m}\Omega \sim 50\text{m}\Omega$	4.1	2.1

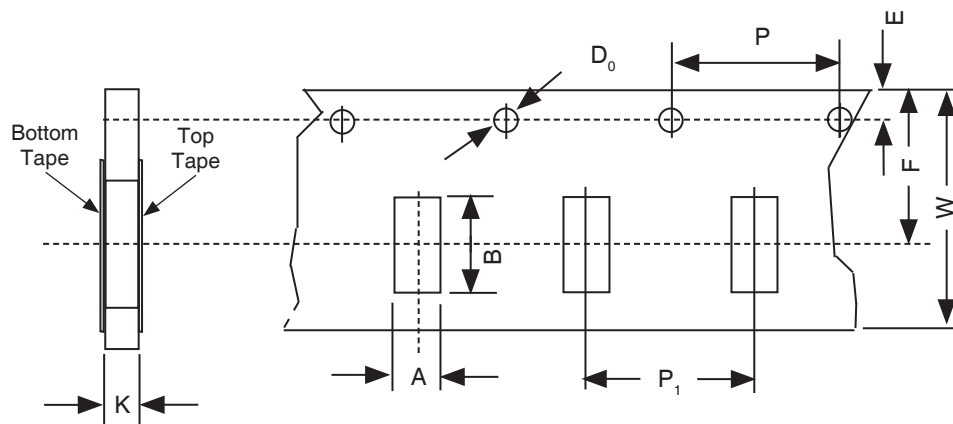


RECOMMENDED REFLOW SOLDERING TEMPERATURE PROFILE



PAPER TAPE DIMENSIONS (mm)

Case Size	A	B	K	P	P ₁	E	F	D ₀	W	Quantity per Reel
0805	1.6 ± 0.15	2.4 ± 0.2	0.84 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	1.75 ± 0.1	3.5 ± 0.05	1.5 ^{+0.1/-0}	8.0 ± 0.2	5,000
1206	2.0 ± 0.15	3.6 ± 0.2	0.84 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	1.75 ± 0.1	3.5 ± 0.05	1.5 ^{+0.1/-0}	8.0 ± 0.2	5,000



EMBOSSED PLASTIC TAPE DIMENSIONS (mm)

Case Size	A	B	K	P	P ₁	E	F	D ₀	D ₁	W	Quantity per Reel
2010	2.8 ± 0.2	5.3 ± 0.2	0.85 ± 0.15	4.0 ± 0.05	4.0 ± 0.1	1.75 ± 0.1	5.5 ± 0.05	1.5 ± 0.1	1.5 min.	12.0 ± 0.2	4,000
2512	3.6 ^{+0.2/-0.18}	6.9 ± 0.2	0.85 ± 0.15	4.0 ± 0.05	4.0 ± 0.1	1.75 ± 0.1	5.5 ± 0.05	1.5 ^{+0.1/-0}	1.5 min.	12.0 ± 0.2	4,000

