

# MPI2520

## High Current, Low Profile, Miniature Power Inductors



### Applications:

- Mobile/smart phones
- Handheld/mobile equipment
- Digital cameras
- Media players
- GPS
- MP3 Players
- Tablets/e-readers

### Environmental data:

- Storage temperature range (Component): -40°C to +125°C
- Operating temperature range: -40°C to +125°C (ambient + self temperature rise)
- Solder reflow temperature: J-STD-020D compliant

### Packaging:

- Supplied in tape and reel packaging, 3000 parts per 7" diameter reel

### Product description:

- Halogen free, lead free, RoHS compliant
- 125°C maximum total temperature operation
- 2.7 x 2.2 x 1.0 / 1.2mm maximum surface mount package
- Magnetically shielded, low EMI
- Inductance range from 0.47µH to 10.0µH
- Current range from 1.1 to 4.8 amps

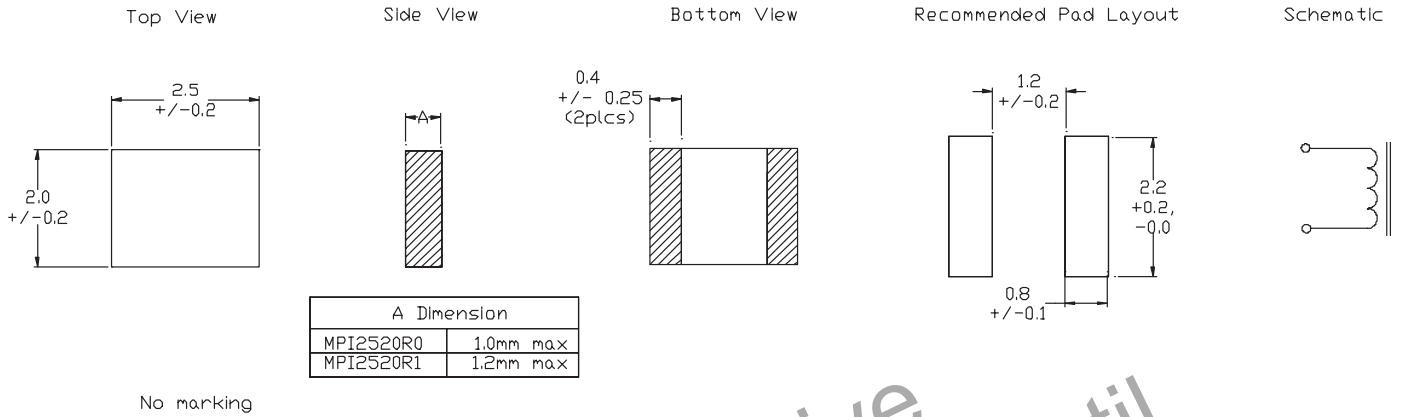
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**Product specifications**

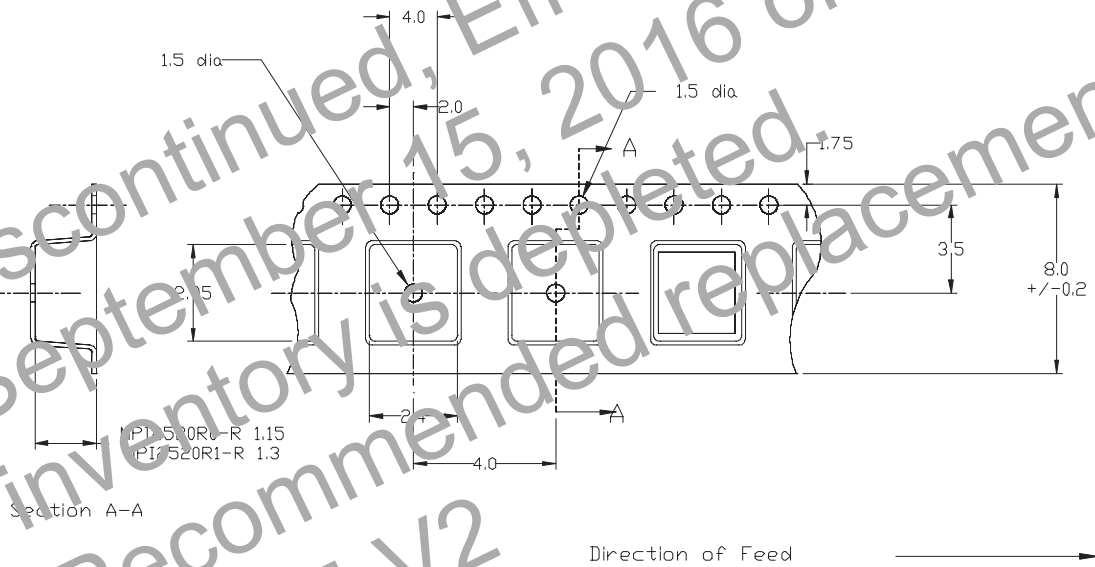
Part Number <sup>5</sup>	OCL1 ( $\mu\text{H}$ ) $\pm 20\%$	$I_{\text{rms}}^2$ (Amps)	$I_{\text{sat}}^3$ (Amps)	DCR (m $\Omega$ ) @ 25°C typical	DCR (m $\Omega$ ) @ 25°C max	K-Factor <sup>4</sup>
R0 — 1.0mm Height						
MPI2520R0-R47-R	0.47	4.1	4.4	28	34	2887
MPI2520R0-1R0-R	0.9	3.2	3.2	50	60	1925
MPI2520R0-1R5-R	1.5	2.4	2.6	80	96	1444
MPI2520R0-2R2-R	2.2	2.2	2.4	103	124	1283
MPI2520R0-3R3-R	3.3	1.6	1.6	190	228	1050
MPI2520R0-4R7-R	4.7	1.4	1.4	240	288	825
R1 - 1.2mm Height						
MPI2520R1-R47-R	0.47	4.5	4.8	20	24	2310
MPI2520R1-1R0-R	1.0	3.7	4.0	35	42	1925
MPI2520R1-1R5-R	1.5	2.9	3.2	55	66	1444
MPI2520R1-2R2-R	2.2	2.3	2.7	75	90	1255
MPI2520R1-3R3-R	3.3	1.8	2.4	105	126	962
MPI2520R1-4R7-R	4.7	1.6	1.9	150	180	825
MPI2520R1-5R6-R	5.6	1.5	1.9	200	240	679
MPI2520R1-6R8-R	6.8	1.3	1.3	300	360	679
MPI2520R1-100-R	10.0	1.1	1.2	390	468	525

- Open Circuit Inductance (OCL) Test Parameters: 1MHz, 0.1Vrms, 0.0Aac, 25°C
- $I_{\text{rms}}$ : DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed +25°C under worst case operating conditions verified in the end application.
- $I_{\text{sat}}$ : Peak current for approximately 10% rolloff at +25°C
- K-factor: Used to determine  $B_{\text{pp}}$  for core loss (see graph).  
 $B_{\text{pp}} = K \sqrt{L \Delta I}$ ; (Gauss), K: (K-factor from table),  
L: (Inductance in  $\mu\text{H}$ ),  $\Delta I$  (Peak to peak ripple current in Amps).
- Part Number Definition: MPI2520R $x$ -yyy-R  
- MPI2520R $x$  = Product code and size  
- yyy = Inductance value in  $\mu\text{H}$ , R = decimal point,  
if no R is present then third character = number of zeros.  
- "-R" suffix = RoHS compliant

**Dimensions - mm**

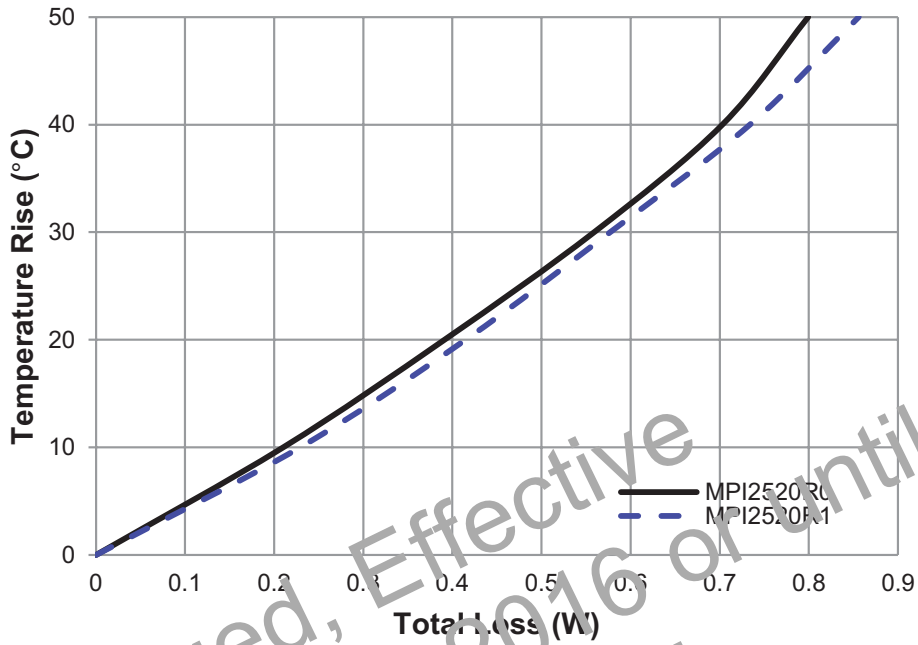


**Packaging information - mm**

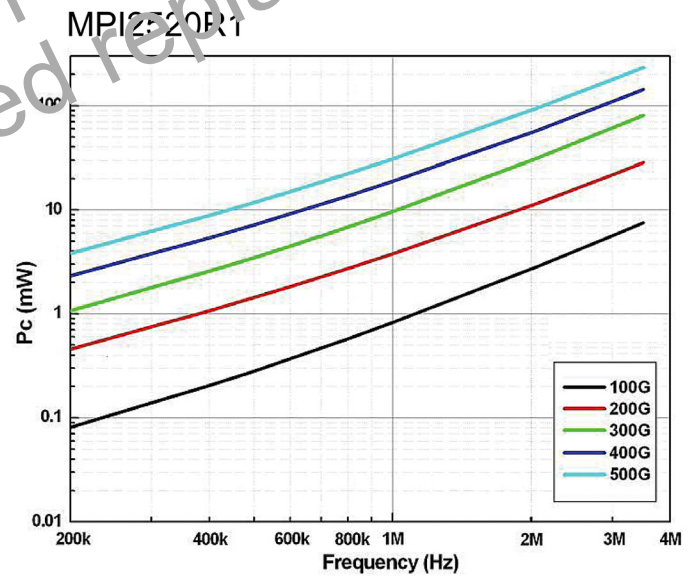
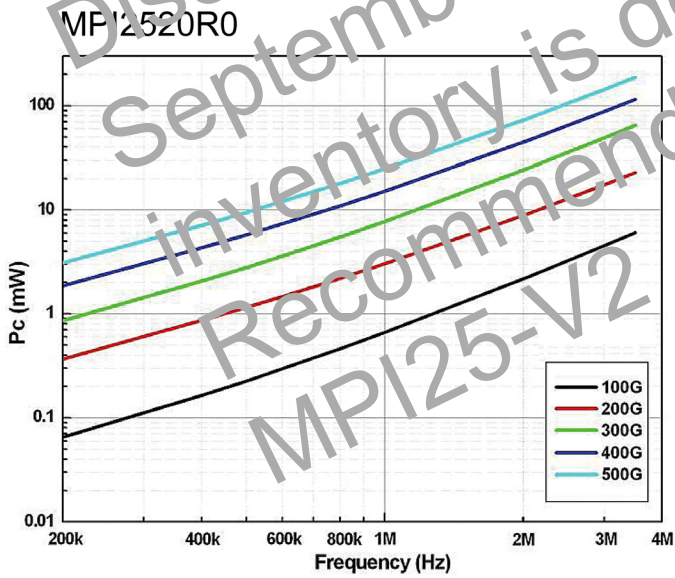


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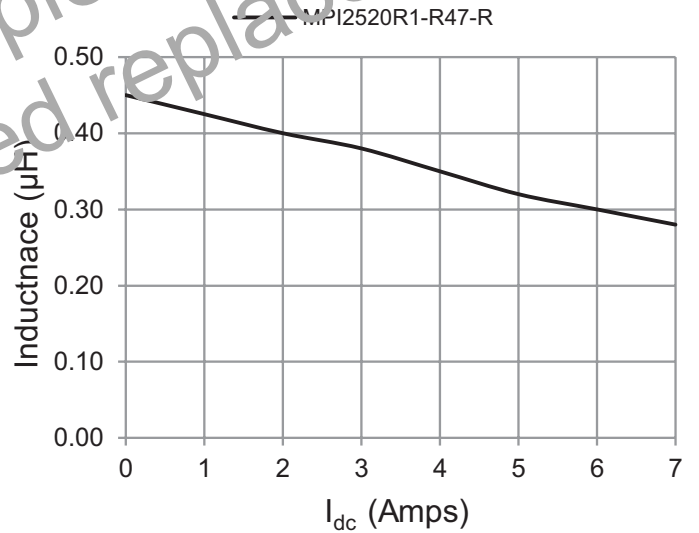
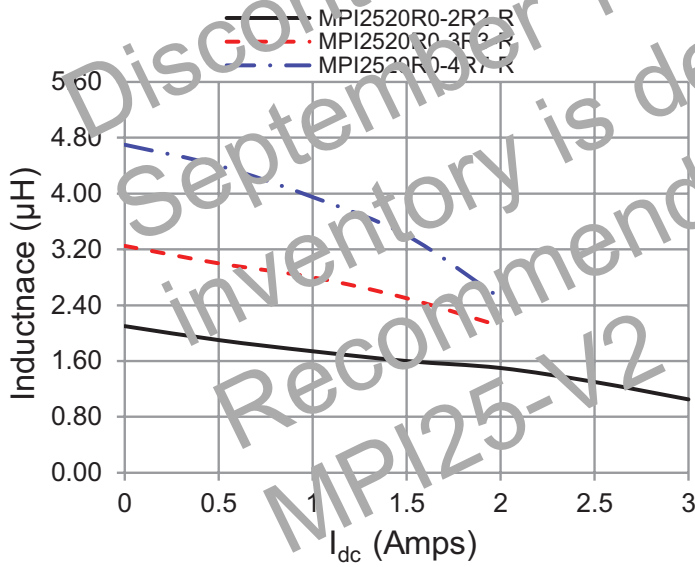
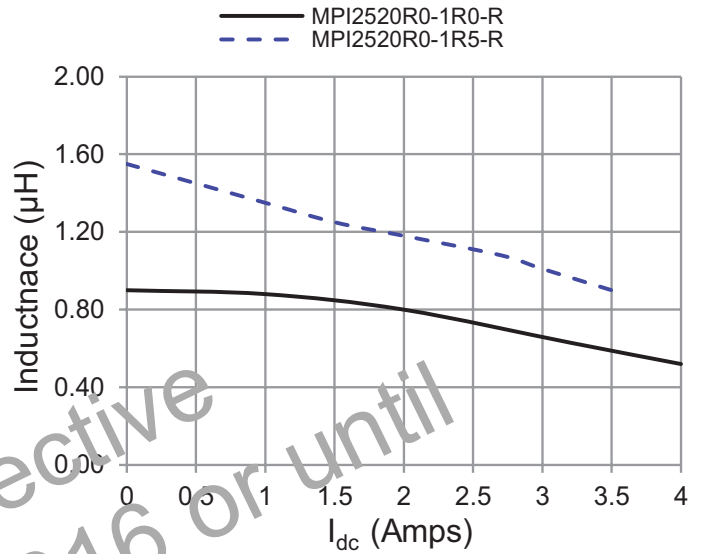
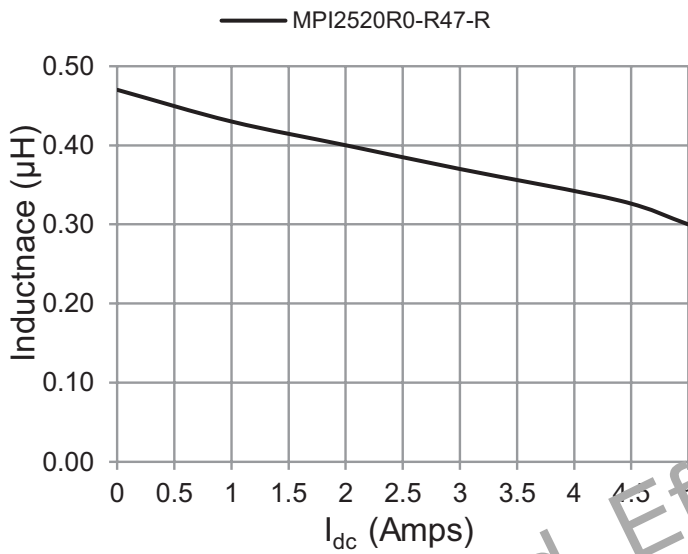
Temperature rise vs. total loss



Core loss

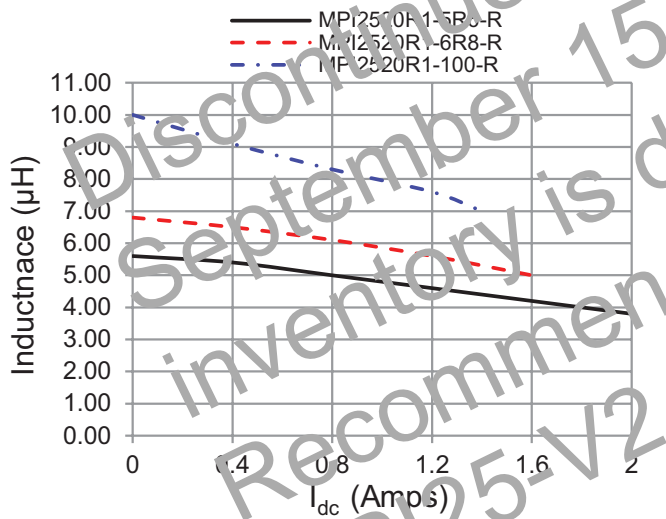
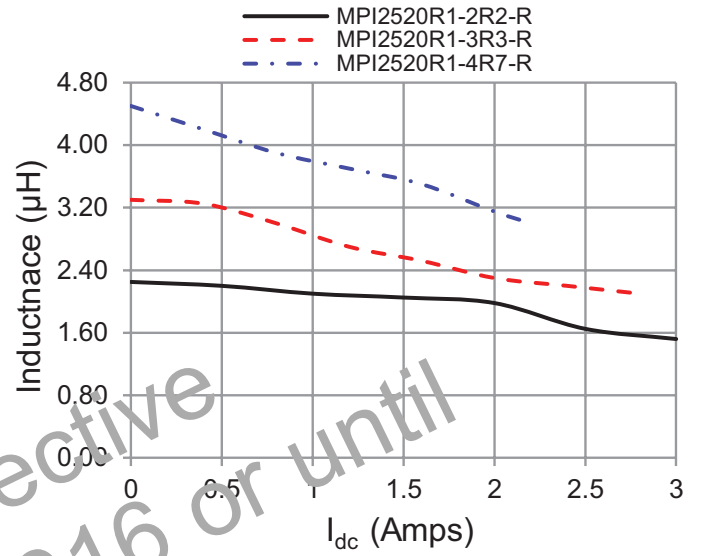
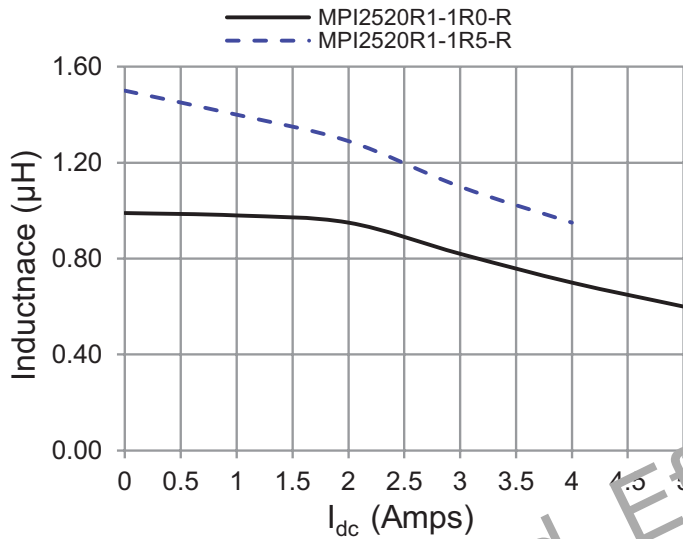


**Inductance characteristics**



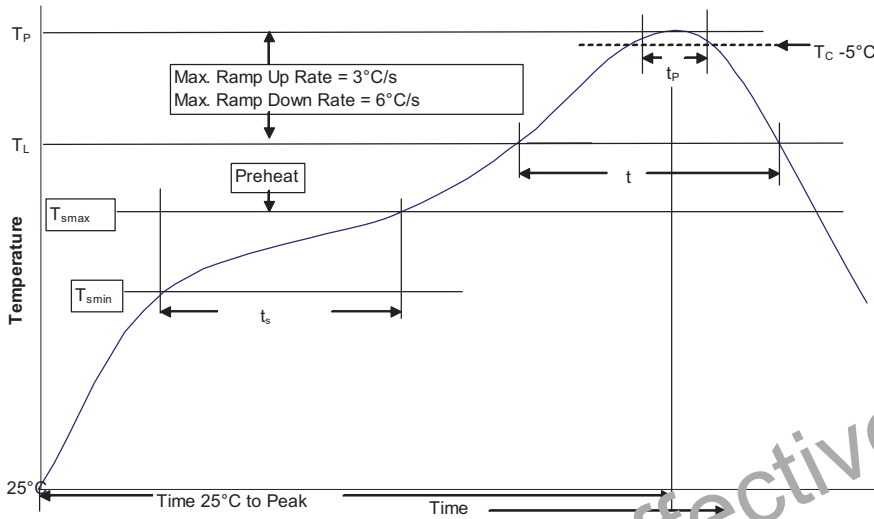
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**Inductance characteristics**



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**Solder reflow profile**



**Table 1 - Standard SnPb Solder ( $T_c$ )**

Package Thickness	Volume $<350$ mm <sup>3</sup>	Volume $\geq 350$ mm <sup>3</sup>
$<2.5$ mm	235°C	220°C
$\geq 2.5$ mm	220°C	220°C

**Table 2 - Lead (Pb) Free Solder ( $T_c$ )**

Package Thickness	Volume $<350$ mm <sup>3</sup>	Volume 350 - 2000 mm <sup>3</sup>	Volume $>2000$ mm <sup>3</sup>
$<1.6$ mm	260°C	260°C	260°C
1.6 - 2.5mm	260°C	250°C	245°C
$>2.5$ mm	250°C	245°C	245°C

**Reference JDEC J-STD-020D**

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak	<ul style="list-style-type: none"> <li>Temperature min. (<math>T_{smin}</math>)</li> <li>Temperature max. (<math>T_{smax}</math>)</li> <li>Time (<math>T_{smin}</math> to <math>T_{smax}</math>) (<math>t_s</math>)</li> </ul>	<ul style="list-style-type: none"> <li>100°C</li> <li>50°C</li> <li>60-120 Seconds</li> </ul>
Average ramp up rate $T_{smax}$ to $T_p$	3°C/ Second Max.	3°C/ Second Max.
Liquidus temperature ( $T_L$ )	183°C	217°C
Time at Liquidus ( $t_L$ )	60-150 Seconds	60-150 Seconds
Peak package body temperature ( $T_p$ )*	Table 1	Table 2
Time ( $t_p$ )** within 5°C of the specified classification temperature ( $T_c$ )	20 Seconds**	30 Seconds**
Average ramp down rate ( $T_p$ to $T_{smax}$ )	6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature	6 Minutes Max.	8 Minutes Max.

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

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