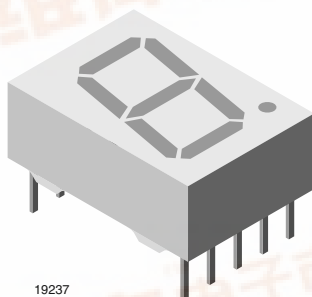


Standard 7-Segment Display 13 mm



DESCRIPTION

The TDS.51... series are 13 mm character seven segment LED displays in a very compact package.

The displays are designed for a viewing distance up to 7 m and available in four bright colors. The grey package surface and the evenly lighted untinted segments provide an optimum on-off contrast.

All displays are categorized in luminous intensity groups. That allows users to assemble displays with uniform appearance. Typical applications include instruments, panel meters, point-of-sale terminals and household equipment.

FEATURES

- Evenly lighted segments
- Grey package surface
- Untinted segments
- Luminous intensity categorized
- Yellow and green categorized for color
- Wide viewing angle
- Suitable for DC and high peak current
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS
COMPLIANT

APPLICATIONS

- Panel meters
- Test- and measure- equipment
- Point-of-sale terminals
- Control units
- TV sets

PRODUCT GROUP AND PACKAGE DATA

- Product group: display
- Package: 13 mm
- Product series: standard
- Angle of half intensity: $\pm 50^\circ$

PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY AT 10 mA	CIRCUITRY
TDSO5150	Orange red	$I_V > 700 \mu\text{cd}$	Common anode
		$I_V = 5000 \mu\text{cd (typ.)}$	Common anode
TDSO5150-LM	Orange red	$I_V = (2800 \text{ to } 9000) \mu\text{cd}$	Common anode
TDSO5150-M	Orange red	$I_V = (4500 \text{ to } 9000) \mu\text{cd}$	Common anode
TDSO5160	Orange red	$I_V > 700 \mu\text{cd}$	Common cathode
		$I_V = 5000 \mu\text{cd (typ.)}$	Common cathode
TDSO5160-LM	Orange red	$I_V = (2800 \text{ to } 9000) \mu\text{cd}$	Common cathode
TDSY5150	Yellow	$I_V > 700 \mu\text{cd}$	Common anode
		$I_V = 4200 \mu\text{cd (typ.)}$	Common anode
TDSY5160	Yellow	$I_V > 700 \mu\text{cd}$	Common cathode
		$I_V = 4200 \mu\text{cd (typ.)}$	Common cathode
TDSG5150	Green	$I_V > 700 \mu\text{cd}$	Common anode
		$I_V = 9500 \mu\text{cd (typ.)}$	Common anode
TDSG5150-MN	Green	$I_V = (4500 \text{ to } 14\ 000) \mu\text{cd}$	Common anode
TDSG5150-N	Green	$I_V = (7000 \text{ to } 14\ 000) \mu\text{cd}$	Common anode
TDSG5160	Green	$I_V > 700 \mu\text{cd}$	Common cathode
		$I_V = 9500 \mu\text{cd (typ.)}$	Common cathode
TDSG5160-MN	Green	$I_V = (4500 \text{ to } 14\ 000) \mu\text{cd}$	Common cathode
TDSG5160-N	Green	$I_V = (7000 \text{ to } 14\ 000) \mu\text{cd}$	Common cathode

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TDSO5150, TDSO5160, TDSY5150, TDSY5160, TDSG5150, TDSG5160

PARAMETER		TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage per segment or DP			V_R	6	V
DC forward current per segment or DP		TDSO5150	I_F	25	mA
		TDSO5160		25	
		TDSY5150		25	
		TDSY5160		25	
		TDSG5150		25	
		TDSG5160		25	
Surge forward current per segment or DP	$t_p \leq 10\text{ }\mu\text{s}$ (non repetitive)	TDSO5150	I_{FSM}	0.15	A
		TDSO5160		0.15	
		TDSY5150		0.15	
		TDSY5160		0.15	
		TDSG5150		0.15	
		TDSG5160		0.15	
Power dissipation	$T_{amb} \leq 45\text{ }^{\circ}\text{C}$	TDSO5150, TDSO5160, TDSY5150, TDSY5160, TDSG5150, TDSG5160	P_V	550	mW
Junction temperature			T_j	100	$^{\circ}\text{C}$
Operating temperature range			T_{amb}	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range			T_{stg}	- 40 to + 85	$^{\circ}\text{C}$
Soldering temperature	$t \leq 3\text{ s}$, 2 mm below seating plane		T_{sd}	260	$^{\circ}\text{C}$
Thermal resistance LED junction/ambient			R_{thJA}	100	K/W

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TDSO5150, TDSO5160, ORANGE RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity per segment (digit average) ⁽¹⁾	$I_F = 10\text{ mA}$	TDSO5150	I_V	700	5000	-	μcd
		TDSO5150-LM		2800	-	9000	
		TDSO5150-M		4500	-	9000	
		TDSO5160		700	5000	-	
		TDSO5160-LM		2800	-	9000	
Dominant wavelength	$I_F = 10\text{ mA}$	TDSO5150, TDSO5160	λ_d	612	-	625	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p	-	630	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		φ	-	± 50	-	deg
Forward voltage per segment or DP	$I_F = 20\text{ mA}$		V_F	-	2	3	V
Reverse voltage per segment or DP	$I_R = 10\text{ }\mu\text{A}$		V_R	6	15	-	V

Note

⁽¹⁾ $I_{Vmin.}$ and I_V groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is ≥ 0.5 , excluding decimal points and colon.

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TDSY5150, TDSY5160, YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity per segment (digit average) ⁽¹⁾	$I_F = 10\text{ mA}$	TDSY5150	I_V	700	4200	-	μcd
		TDSY5160		700	4200	-	
Dominant wavelength	$I_F = 10\text{ mA}$	TDSY5150, TDSY5160	λ_d	581	-	594	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p	-	585	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		φ	-	± 50	-	deg
Forward voltage per segment or DP	$I_F = 20\text{ mA}$		V_F	-	2.4	3	V
Reverse voltage per segment or DP	$I_R = 10\text{ }\mu\text{A}$		V_R	6	15	-	V

Note

⁽¹⁾ $I_{Vmin.}$ and I_V groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is ≤ 0.5 , excluding decimal points and colon.

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TDSG5150, TDSG5160, GREEN

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity per segment (digit average) ⁽¹⁾	$I_F = 10\text{ mA}$	TDSG5150	I_V	700	9500	-	μcd
		TDSG5150-MN		4500	-	14 000	
		TDSG5150-N		7000	-	14 000	
		TDSG5160		700	9500	-	
		TDSG5160-MN		4500	-	14 000	
		TDSG5160-N		7000	-	14 000	
Dominant wavelength	$I_F = 10\text{ mA}$	TDSG5150, TDSG5160	λ_d	562	-	575	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p	-	565	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		φ	-	± 50	-	deg
Forward voltage per segment or DP	$I_F = 20\text{ mA}$		V_F	-	2.4	3	V
Reverse voltage per segment or DP	$I_R = 10\text{ }\mu\text{A}$		V_R	6	15	-	V

Note

⁽¹⁾ $I_{Vmin.}$ and I_V groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is ≥ 0.5 , excluding decimal points and colon.

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LIGHT INTENSITY (μcd)	
	MIN.	MAX.
E	180	360
F	280	560
G	450	900
H	700	1400
I	1100	2200
K	1800	3600
L	2800	5600
M	4500	9000
N	7000	14 000

Note

The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped in one tube (there will be no mixing of two groups in one tube). In order to ensure availability, single brightness groups will not be orderable.

COLOR CLASSIFICATION

GROUP	ORANGE RED		YELLOW		GREEN	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1	598	601	581	584		
2	600	603	583	586	562	565
3	602	605	585	588	564	567
4	604	607	587	590	566	569
5	606	609	589	592	568	571
6	608	611	591	594	570	573
7					570	575

Note

Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of $\pm 1\text{ nm}$.

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

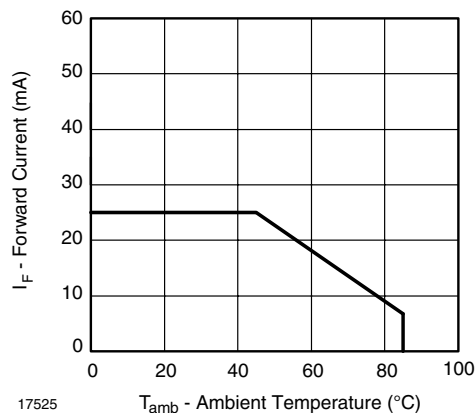


Fig. 1 - Forward Current vs. Ambient Temperature

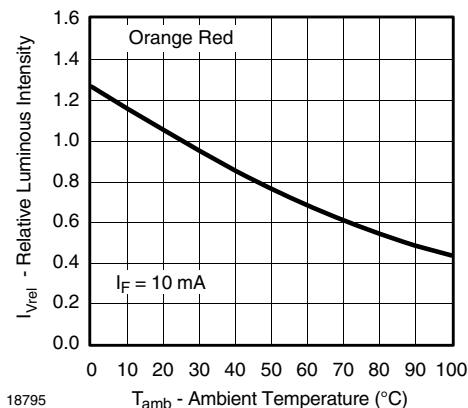


Fig. 4 - Rel. Luminous Intensity vs. Ambient Temperature

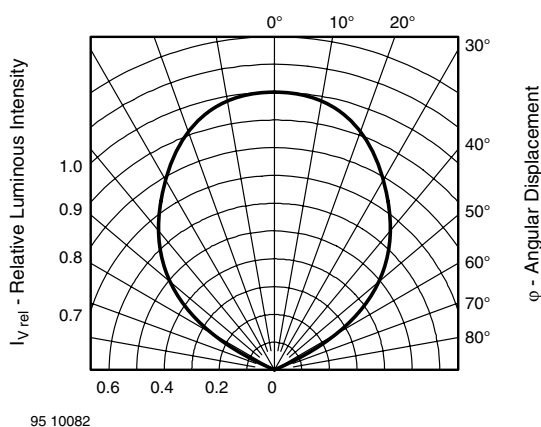


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

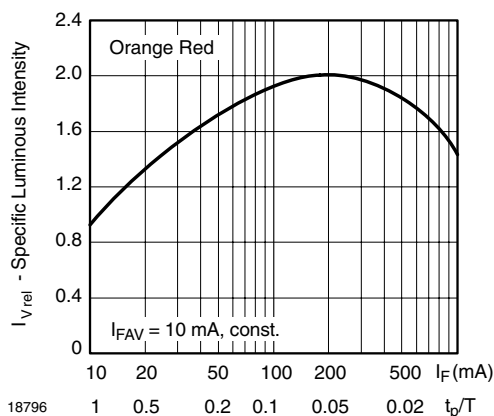


Fig. 5 - Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

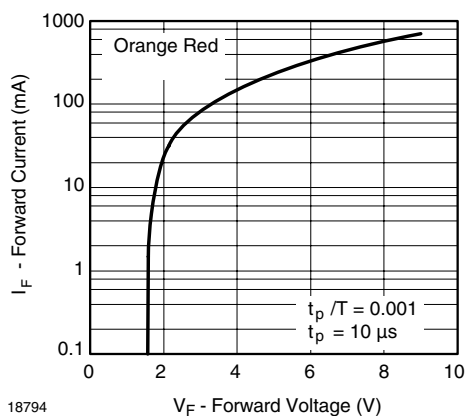


Fig. 3 - Forward Current vs. Forward Voltage

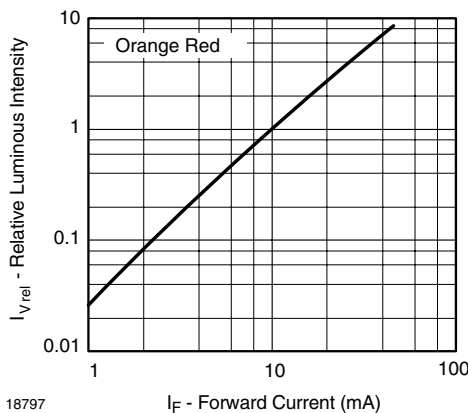


Fig. 6 - Relative Luminous Intensity vs. Forward Current

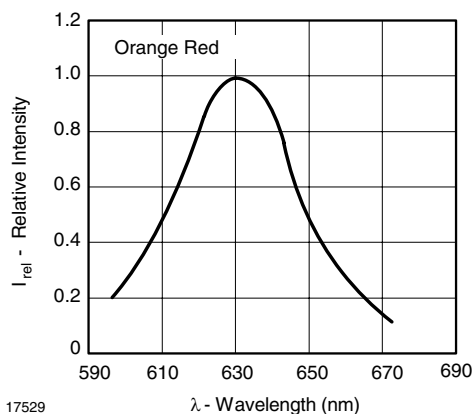


Fig. 7 - Relative Intensity vs. Wavelength

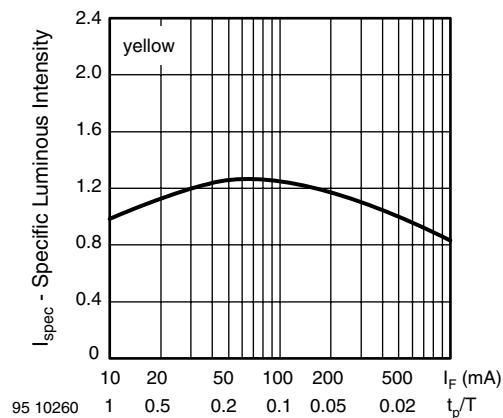


Fig. 10 - Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

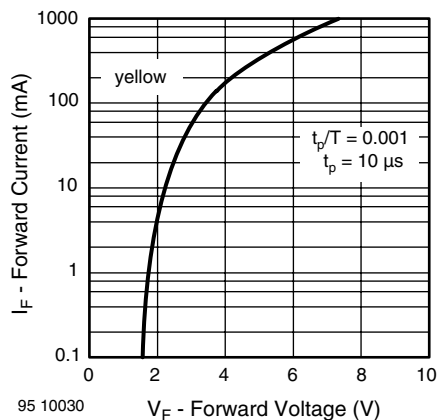


Fig. 8 - Forward Current vs. Forward Voltage

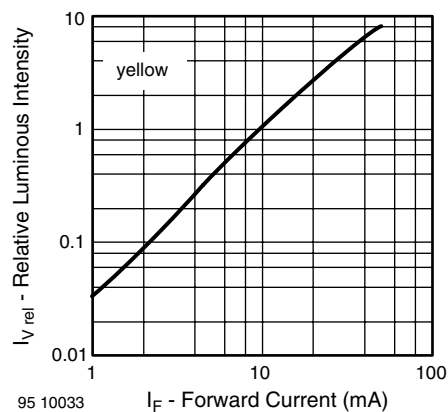


Fig. 11 - Relative Luminous Intensity vs. Forward Current

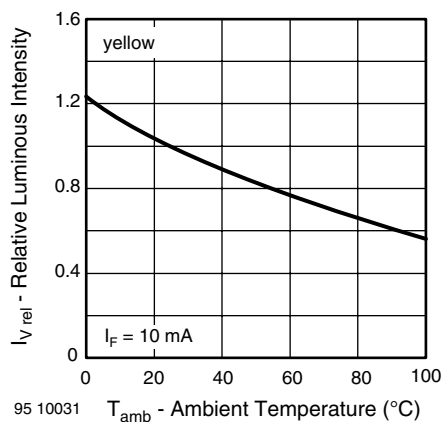


Fig. 9 - Rel. Luminous Intensity vs. Ambient Temperature

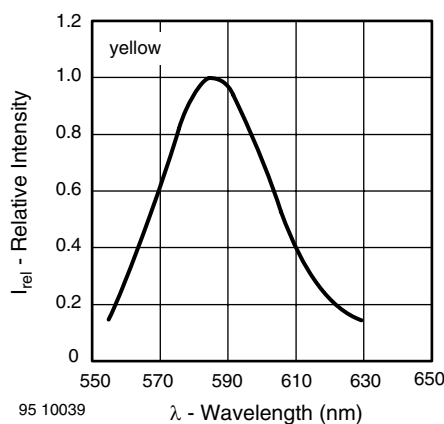


Fig. 12 - Relative Intensity vs. Wavelength

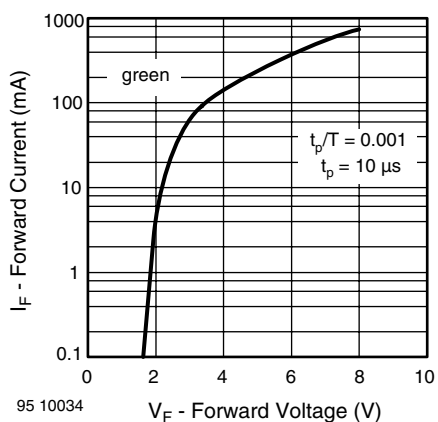


Fig. 13 - Forward Current vs. Forward Voltage

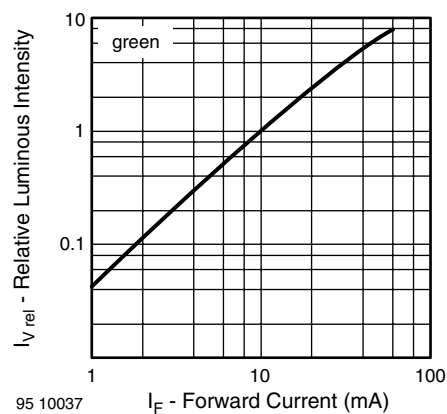


Fig. 16 - Relative Luminous Intensity vs. Forward Current

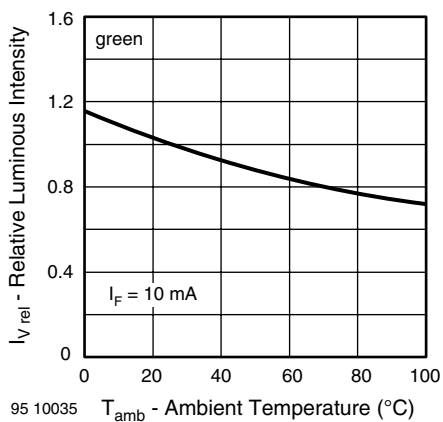


Fig. 14 - Rel. Luminous Intensity vs. Ambient Temperature

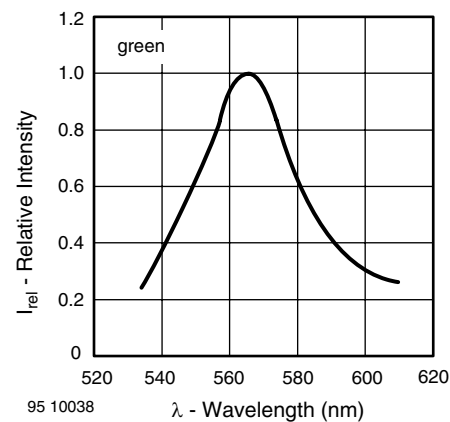


Fig. 17 - Relative Intensity vs. Wavelength

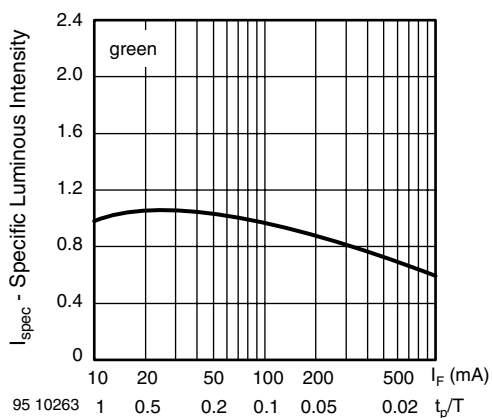


Fig. 15 - Specific Luminous Intensity vs. Forward Current

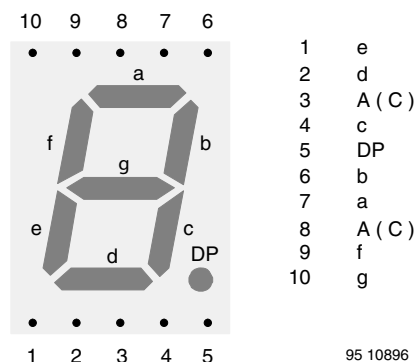
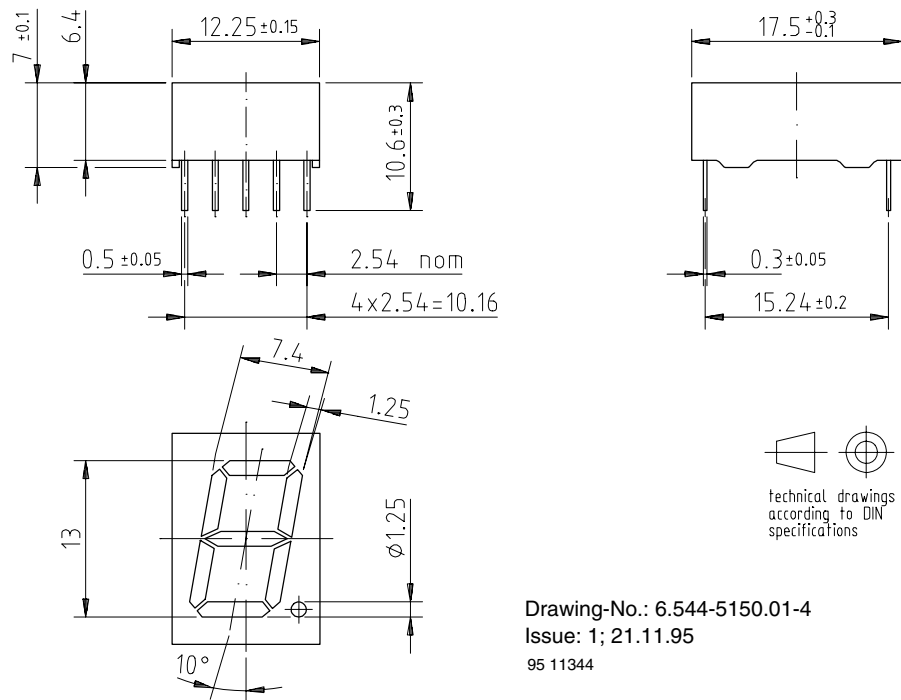


Fig. 18 - TDS.51..



PACKAGE DIMENSIONS FOR TDS.51.. in millimeters



Drawing-No.: 6.544-5150.01-4
Issue: 1; 21.11.95
95 11344

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