



## TM30P06NF

## P-Channel Enhancement Mosfet

### General Description

- Low  $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

### Applications

- Load switch
- PWM

### General Features

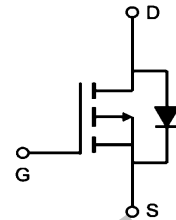
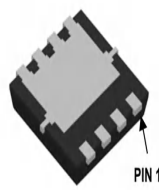
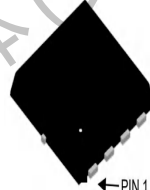
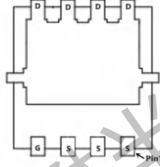
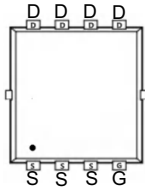
$V_{DS} = -60V$   $I_D = -30A$

$R_{DS(ON)} = 24m\Omega (typ.) @ V_{GS} = -10V$

100% UIS Tested  
100%  $R_g$  Tested



NF:DFN5x6-8L



Marking:30P06

### Absolute Maximum Ratings ( $T_C = 25^\circ C$ unless otherwise noted)

| Symbol                    | Parameter                                  | Rating     | Units      |
|---------------------------|--------------------------------------------|------------|------------|
| $V_{DS}$                  | Drain-Source Voltage                       | -60        | V          |
| $V_{GS}$                  | Gate-Source Voltage                        | $\pm 20$   | V          |
| $I_D @ T_C = 25^\circ C$  | Continuous Drain Current, $-V_{GS} @ -10V$ | -30        | A          |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $-V_{GS} @ -10V$ | -19        | A          |
| $I_{DM}$                  | Pulsed Drain Current                       | -94        | A          |
| EAS                       | Single Pulse Avalanche Energy              | 196        | mJ         |
| $P_D @ T_C = 25^\circ C$  | Total Power Dissipation                    | 79         | W          |
| $T_{STG}$                 | Storage Temperature Range                  | -55 to 175 | $^\circ C$ |
| $T_J$                     | Operating Junction Temperature Range       | -55 to 175 | $^\circ C$ |

### Thermal Data

| Symbol          | Parameter                           | Typ. | Max. | Unit         |
|-----------------|-------------------------------------|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | ---  | 62   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case    | ---  | 3.6  | $^\circ C/W$ |

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Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)

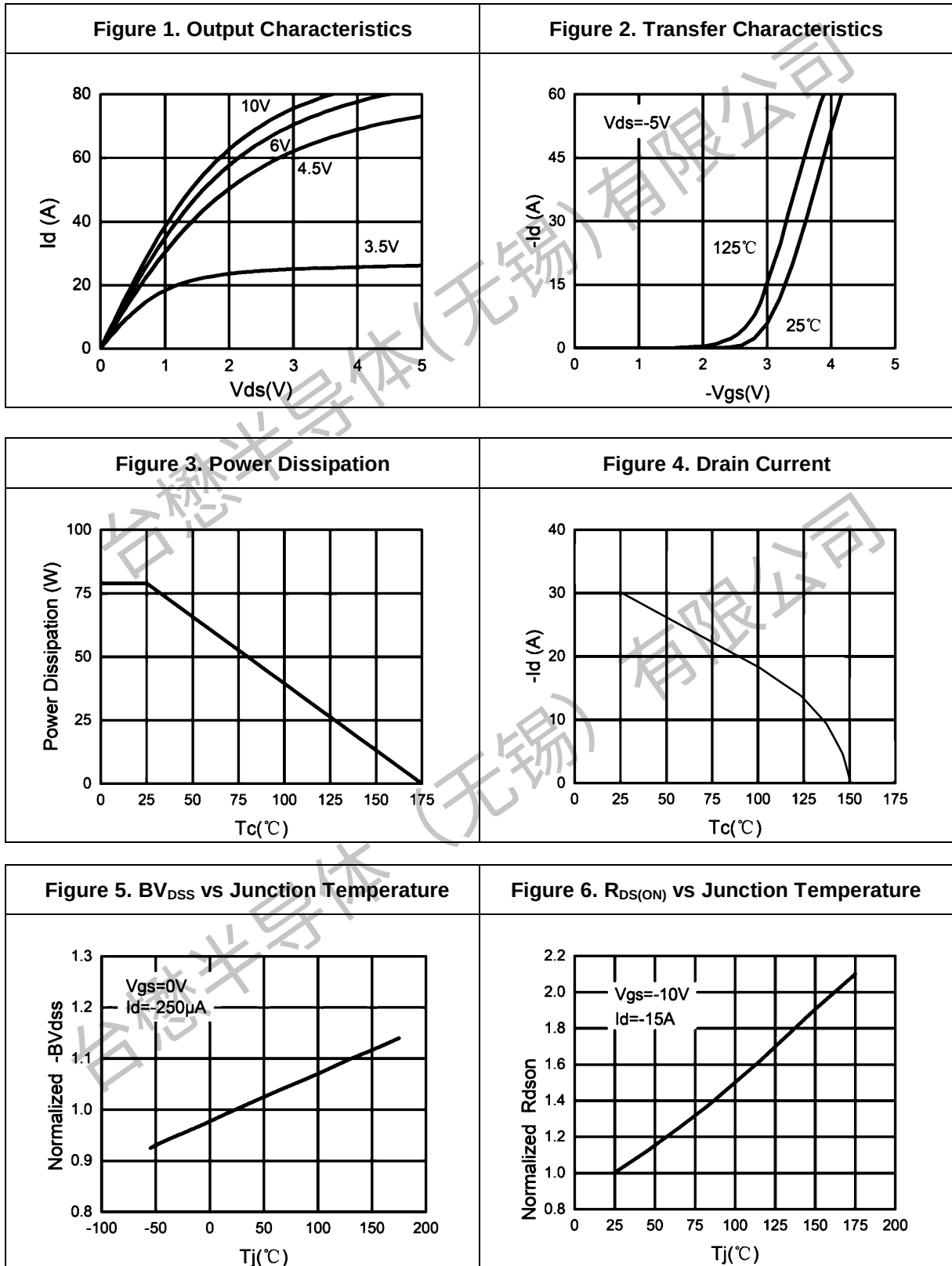
| Symbol                             | Parameter                              | Conditions                                                                               | Min | Typ  | Max  | Unit |
|------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------|-----|------|------|------|
| On/Off States                      |                                        |                                                                                          |     |      |      |      |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage         | V <sub>GS</sub> =0V I <sub>D</sub> =-250μA                                               | -60 |      |      | V    |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current        | V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V                                               |     |      | -1   | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current              | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                               |     |      | ±100 | nA   |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage                 | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                | -1  | -2   | -3   | V    |
| g <sub>FS</sub>                    | Forward Transconductance               | V <sub>DS</sub> =-5V, I <sub>D</sub> =-15A                                               |     | 35   |      | S    |
| R <sub>DS(ON)</sub>                | Drain-Source On-State Resistance       | V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A                                              |     | 24   | 29   | mΩ   |
|                                    |                                        | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A                                             |     | 30   | 40   | mΩ   |
| Dynamic Characteristics            |                                        |                                                                                          |     |      |      |      |
| C <sub>iss</sub>                   | Input Capacitance                      | V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1.0MHz                                     |     | 2026 |      | pF   |
| C <sub>oss</sub>                   | Output Capacitance                     |                                                                                          |     | 134  |      | pF   |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance           |                                                                                          |     | 98   |      | pF   |
| Switching Parameters               |                                        |                                                                                          |     |      |      |      |
| t <sub>d(on)</sub>                 | Turn-on Delay Time                     | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-30V, R <sub>L</sub> =1.5Ω, R <sub>GEN</sub> =3Ω |     | 12.2 |      | nS   |
| t <sub>r</sub>                     | Turn-on Rise Time                      |                                                                                          |     | 10   |      | nS   |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                    |                                                                                          |     | 64   |      | nS   |
| t <sub>f</sub>                     | Turn-Off Fall Time                     |                                                                                          |     | 14   |      | nS   |
| Q <sub>g</sub>                     | Total Gate Charge                      | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-30V, I <sub>D</sub> =-20A                       |     | 68   |      | nC   |
| Q <sub>gs</sub>                    | Gate-Source Charge                     |                                                                                          |     | 10.5 |      | nC   |
| Q <sub>gd</sub>                    | Gate-Drain Charge                      |                                                                                          |     | 13   |      | nC   |
| Source-Drain Diode Characteristics |                                        |                                                                                          |     |      |      |      |
| I <sub>SD</sub>                    | Source-Drain Current (Body Diode)      |                                                                                          |     |      | -30  | A    |
| V <sub>SD</sub>                    | Forward on Voltage <sup>(Note 3)</sup> | V <sub>GS</sub> =0V, I <sub>S</sub> =-15A                                                |     |      | -1.2 | V    |
| t <sub>rr</sub>                    | Reverse Recovery Time                  | I <sub>F</sub> =-20A, di/dt=100A/μs                                                      |     | 26   |      | ns   |
| Q <sub>rr</sub>                    | Reverse Recovery Charge                | I <sub>F</sub> =-20A, di/dt=100A/μs                                                      |     | 29   |      | nC   |



## TM30P06NF

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### Typical Electrical And Thermal Characteristics (Curves)



# TM30P06NF

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Figure 7. Gate Charge Waveforms

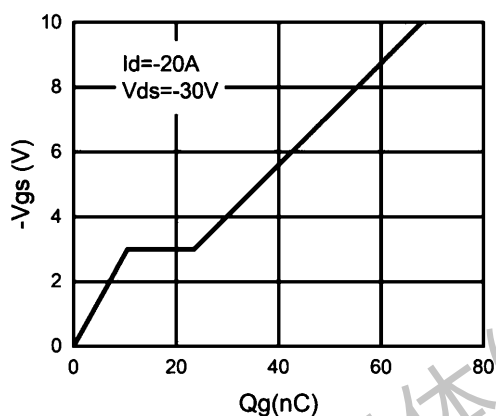


Figure 8. Capacitance

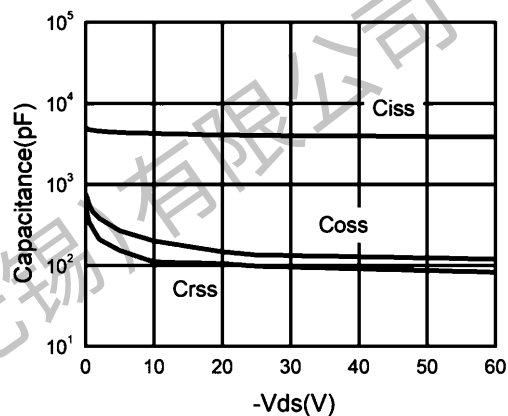


Figure 9. Body-Diode Characteristics

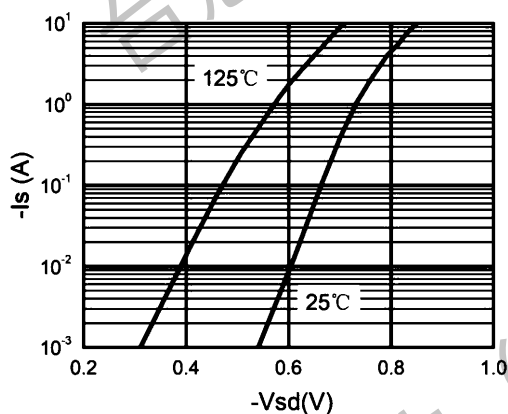
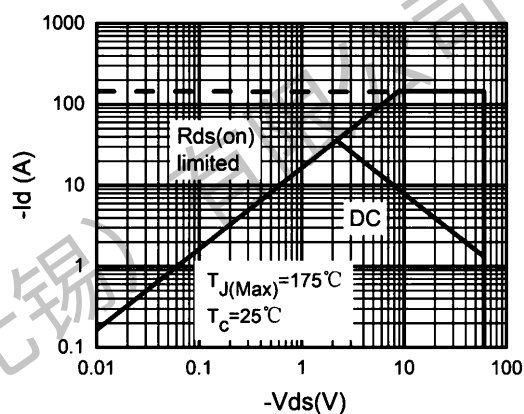


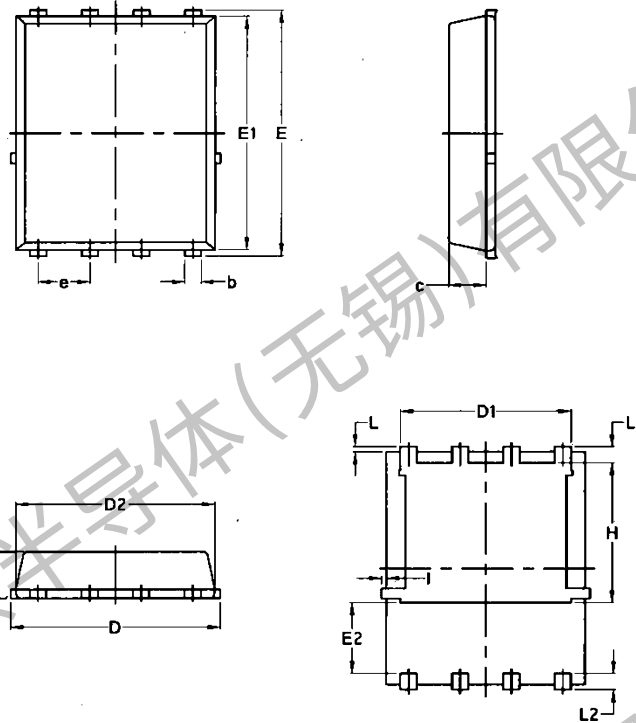
Figure 10. Maximum Safe Operating Area



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### Package Mechanical Data:DFN5x6-8L

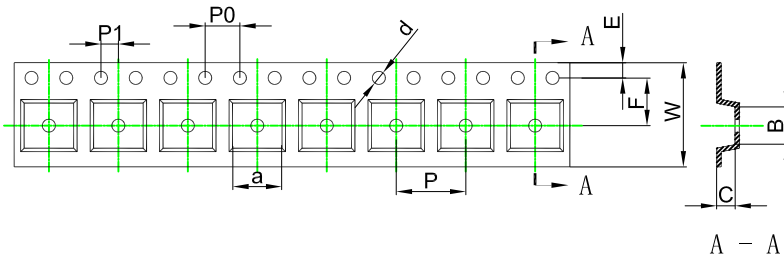


| Symbol | Common   |        |          |        |
|--------|----------|--------|----------|--------|
|        | mm       |        | Inch     |        |
|        | Min      | Max    | Min      | Max    |
| A      | 1.03     | 1.17   | 0.0406   | 0.0461 |
| b      | 0.34     | 0.48   | 0.0134   | 0.0189 |
| c      | 0.824    | 0.0970 | 0.0324   | 0.082  |
| D      | 4.80     | 5.40   | 0.1890   | 0.2126 |
| D1     | 4.11     | 4.31   | 0.1618   | 0.1697 |
| D2     | 4.80     | 5.00   | 0.1890   | 0.1969 |
| E      | 5.95     | 6.15   | 0.2343   | 0.2421 |
| E1     | 5.65     | 5.85   | 0.2224   | 0.2303 |
| E2     | 1.60     | /      | 0.0630   | /      |
| e      | 1.27 BSC |        | 0.05 BSC |        |
| L      | 0.05     | 0.25   | 0.0020   | 0.0098 |
| L1     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| L2     | 0.38     | 0.50   | 0.0150   | 0.0197 |
| H      | 3.30     | 3.50   | 0.1299   | 0.1378 |
| I      | /        | 0.18   | /        | 0.0070 |

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### PDFN5×6-8L Embossed Carrier Tape



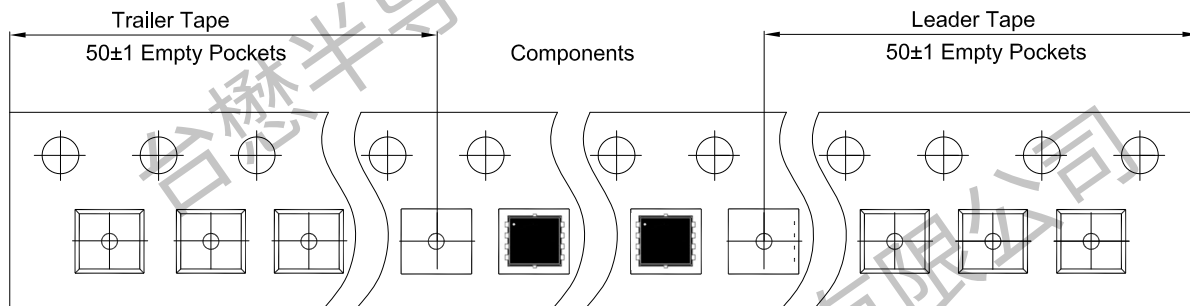
#### Packaging Description:

SOP-8L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

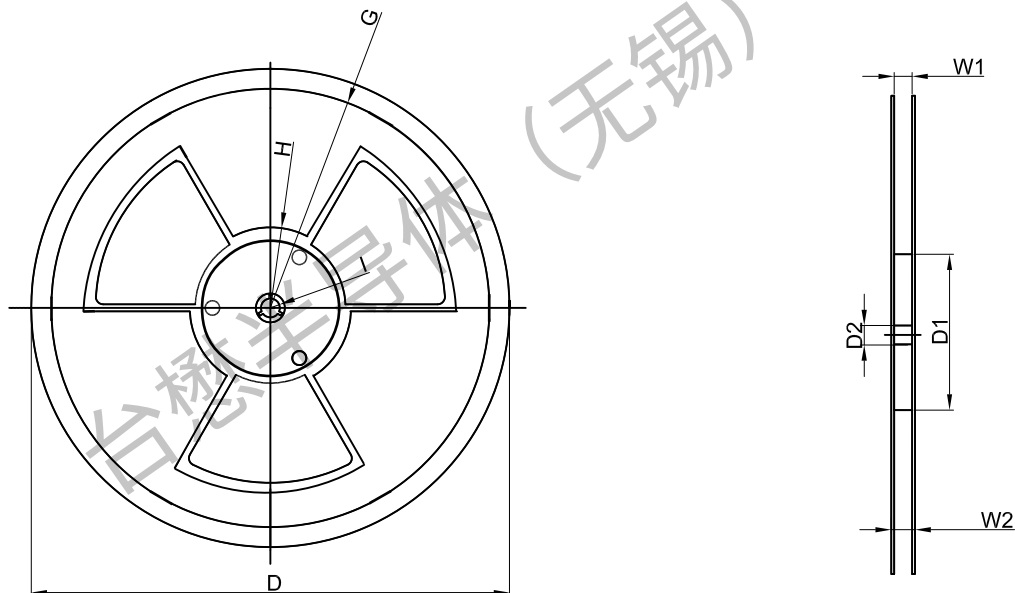
ALL DIM IN mm

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |       |
|------------------------------|------|------|------|-------|------|------|------|------|------|-------|
| Pkg type                     | a    | B    | C    | d     | E    | F    | P0   | P    | P1   | W     |
| PDFN5×6-8L                   | 6.40 | 5.40 | 2.10 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

### PDFN5×6-8L Tape Leader and Trailer



### PDFN5×6-8L Reel



| Dimensions are in millimeter |         |        |       |         |        |       |       |       |
|------------------------------|---------|--------|-------|---------|--------|-------|-------|-------|
| Reel Option                  | D       | D1     | D2    | G       | H      | I     | W1    | W2    |
| 13"Dia                       | Ø330.00 | 100.00 | 13.00 | R135.00 | R55.00 | R6.50 | 12.00 | 14.00 |

| REEL      | Reel Size | Box        | Box Size(mm) | Carton     | Carton Size(mm) | G.W.(kg) |
|-----------|-----------|------------|--------------|------------|-----------------|----------|
| 5,000 pcs | 13 inch   | 10,000 pcs | 370×355×52   | 50,000 pcs | 400×360×368     |          |

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Revision history:

| Date       | Rev   | Description | Page |
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