

# RJK03L3DNS

## Silicon N Channel Power MOS FET with Schottky Barrier Diode Power Switching

R07DS0780EJ0110

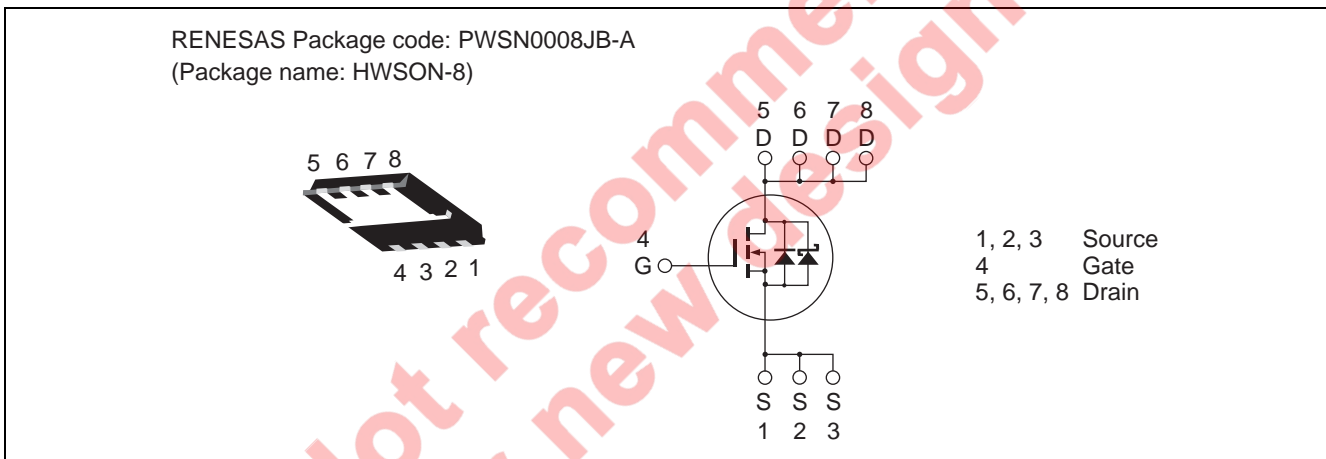
Rev.1.10

May 30, 2012

### Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)} = 5.3 \text{ m}\Omega$  typ. (at  $V_{GS} = 10 \text{ V}$ )
- Pb-free
- Halogen-free

### Outline



### Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	30	V
Gate to source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	25	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	100	A
Body-drain diode reverse drain current	$I_{DR}$	25	A
Avalanche current	$I_{AP}$ <sup>Note 2</sup>	10.5	A
Avalanche energy	$E_{As}$ <sup>Note 2</sup>	11	mJ
Channel dissipation	$P_{ch}$ <sup>Note 3</sup>	15	W
Channel to case thermal impedance	$\theta_{ch-c}$ <sup>Note 3</sup>	8.33	$^\circ\text{C}/\text{W}$
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

- Notes: 1.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$   
 2. Value at  $T_{ch} = 25^\circ\text{C}$ ,  $R_g \geq 50 \Omega$   
 3.  $T_c = 25^\circ\text{C}$

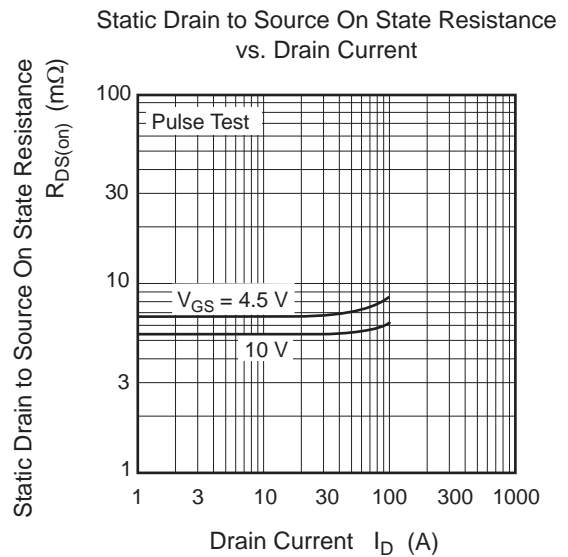
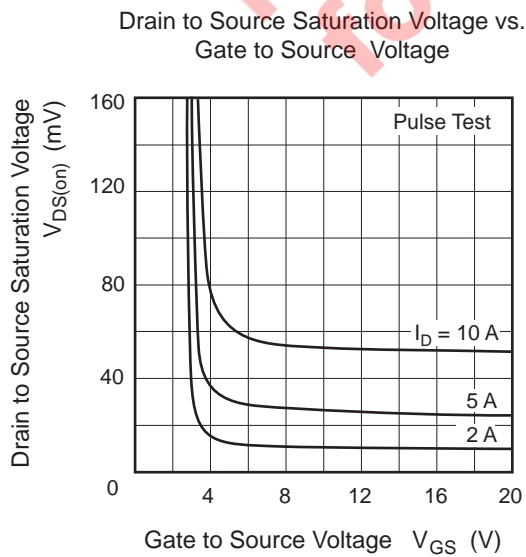
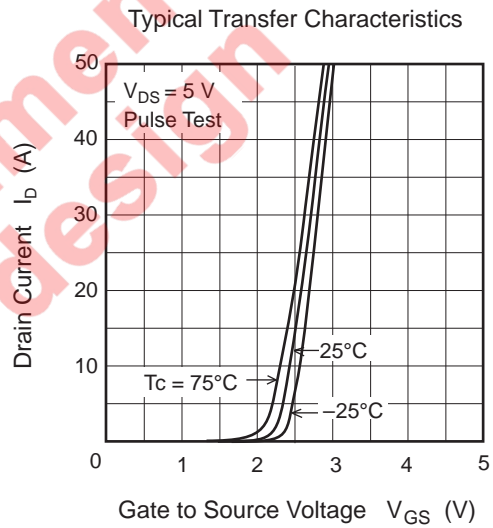
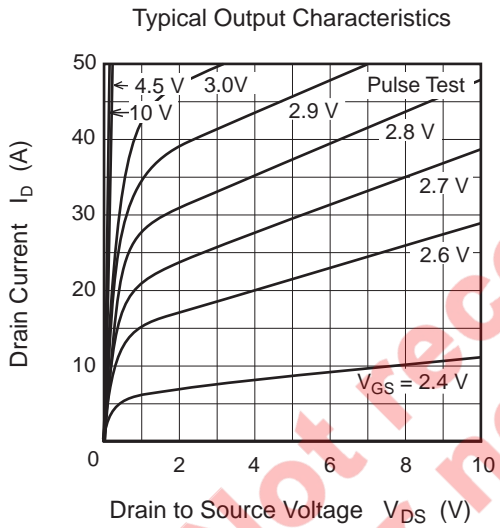
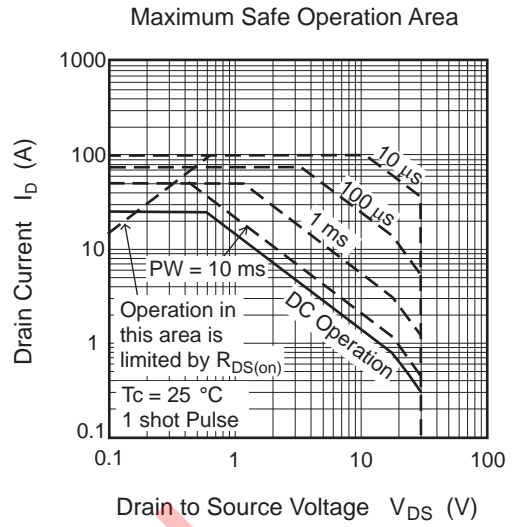
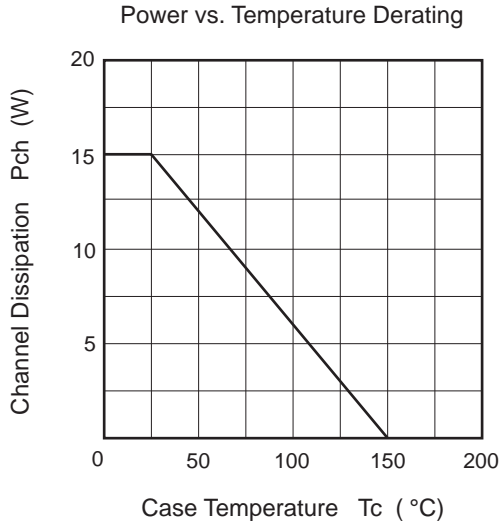
## Electrical Characteristics

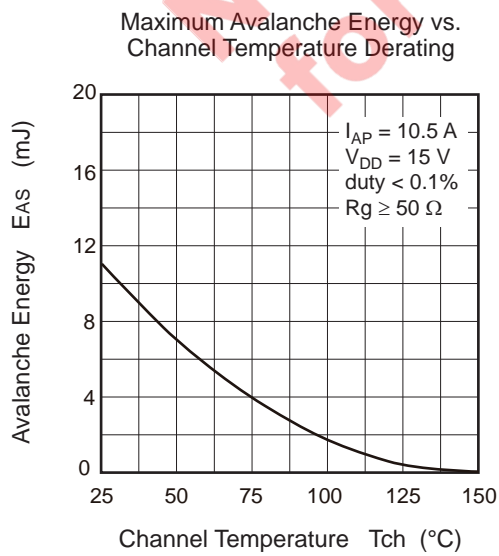
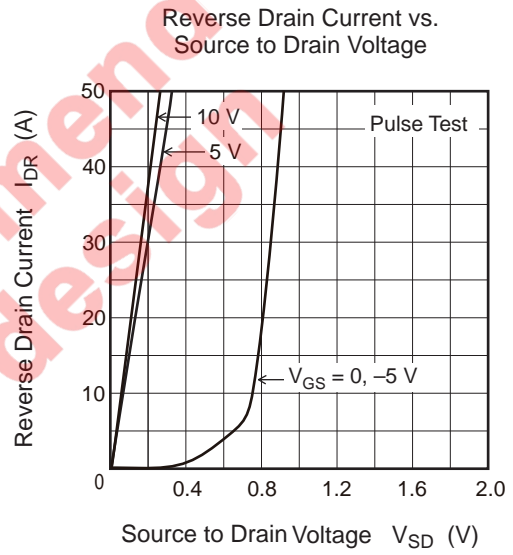
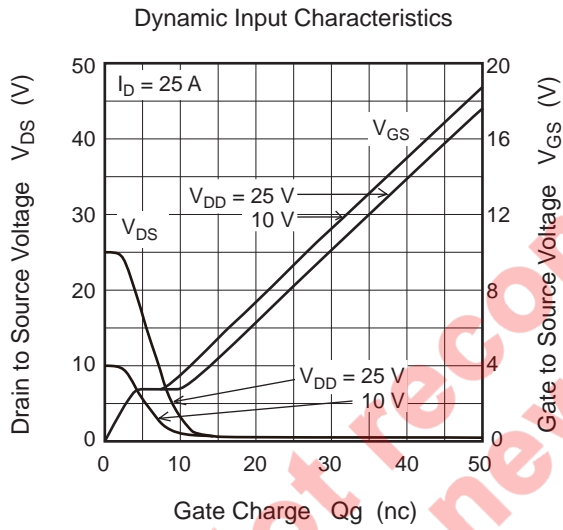
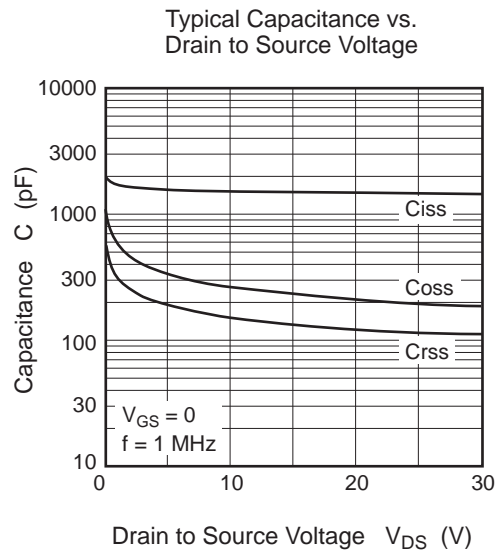
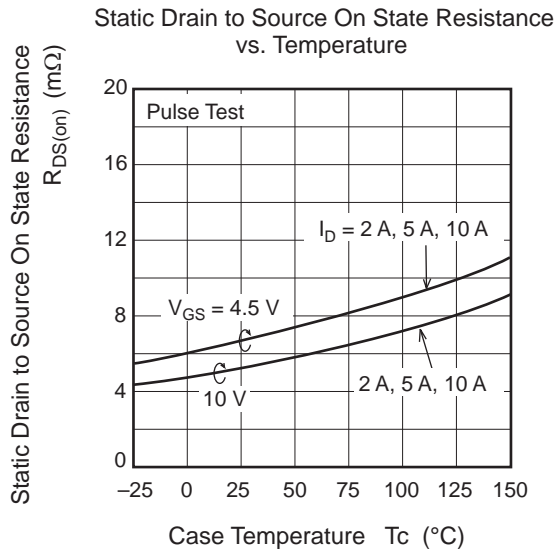
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.5	μA	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	mA	$V_{DS} = 24 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.2	—	2.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	5.3	6.4	mΩ	$I_D = 12.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	6.7	8.7	mΩ	$I_D = 12.5 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	—	50	—	S	$I_D = 12.5 \text{ A}$ , $V_{DS} = 5 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	1550	2170	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	265	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	155	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	$R_g$	—	1.7	3.4	Ω	
Total gate charge	$Q_g$	—	12.3	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	$Q_{gs}$	—	4.0	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	3.7	—	nC	$I_D = 25 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	3.9	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 12.5 \text{ A}$
Rise time	$t_r$	—	3.7	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	29	—	ns	$R_L = 0.8 \text{ Ω}$
Fall time	$t_f$	—	9.4	—	ns	$R_g = 4.7 \text{ Ω}$
Body-drain diode forward voltage	$V_{DF}$	—	0.47	—	V	$I_F = 2 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	6.4	—	ns	$I_F = 25 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 500 \text{ A}/\mu\text{s}$

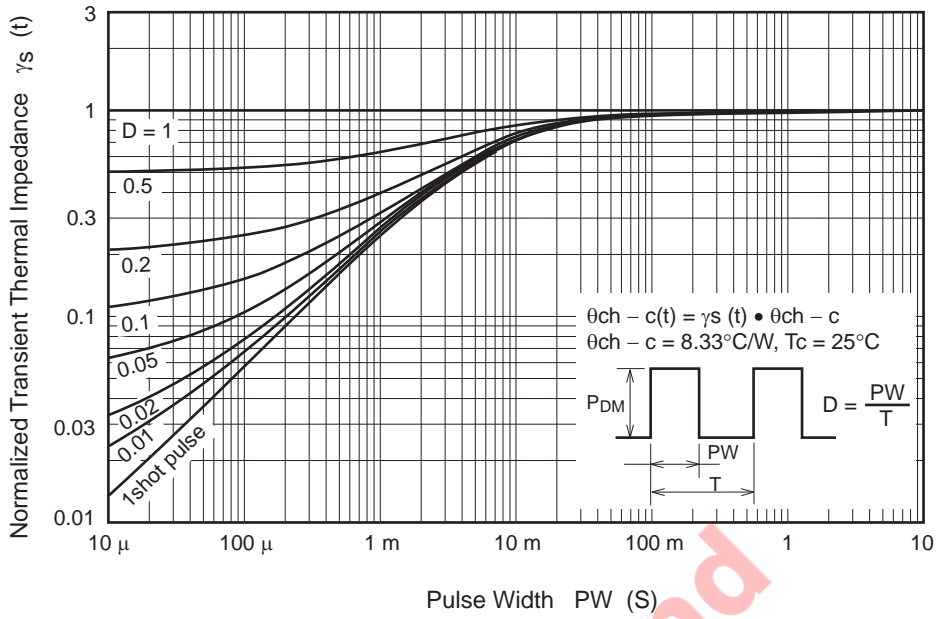
Notes: 4. Pulse test

Main Characteristics

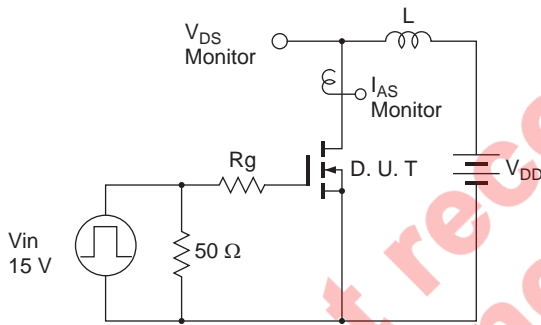




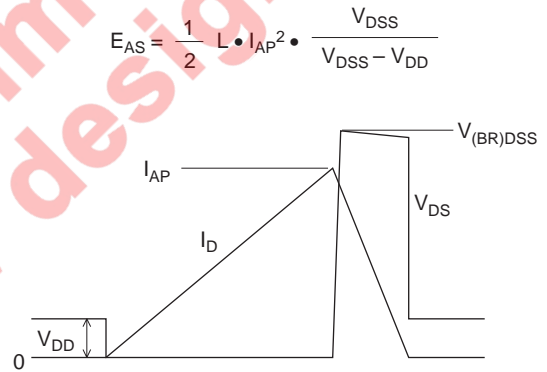
Normalized Transient Thermal Impedance vs. Pulse Width



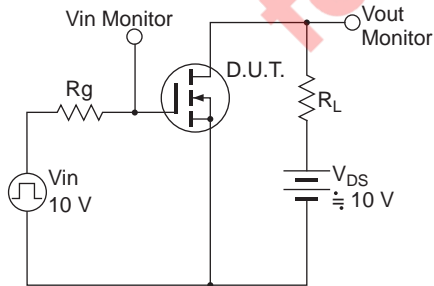
Avalanche Test Circuit



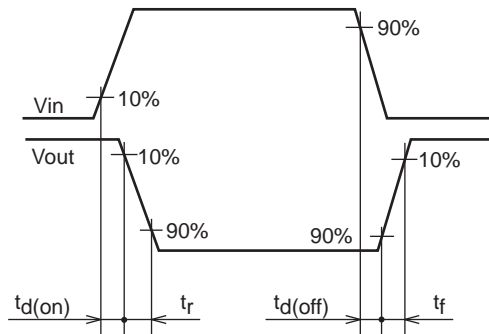
Avalanche Waveform



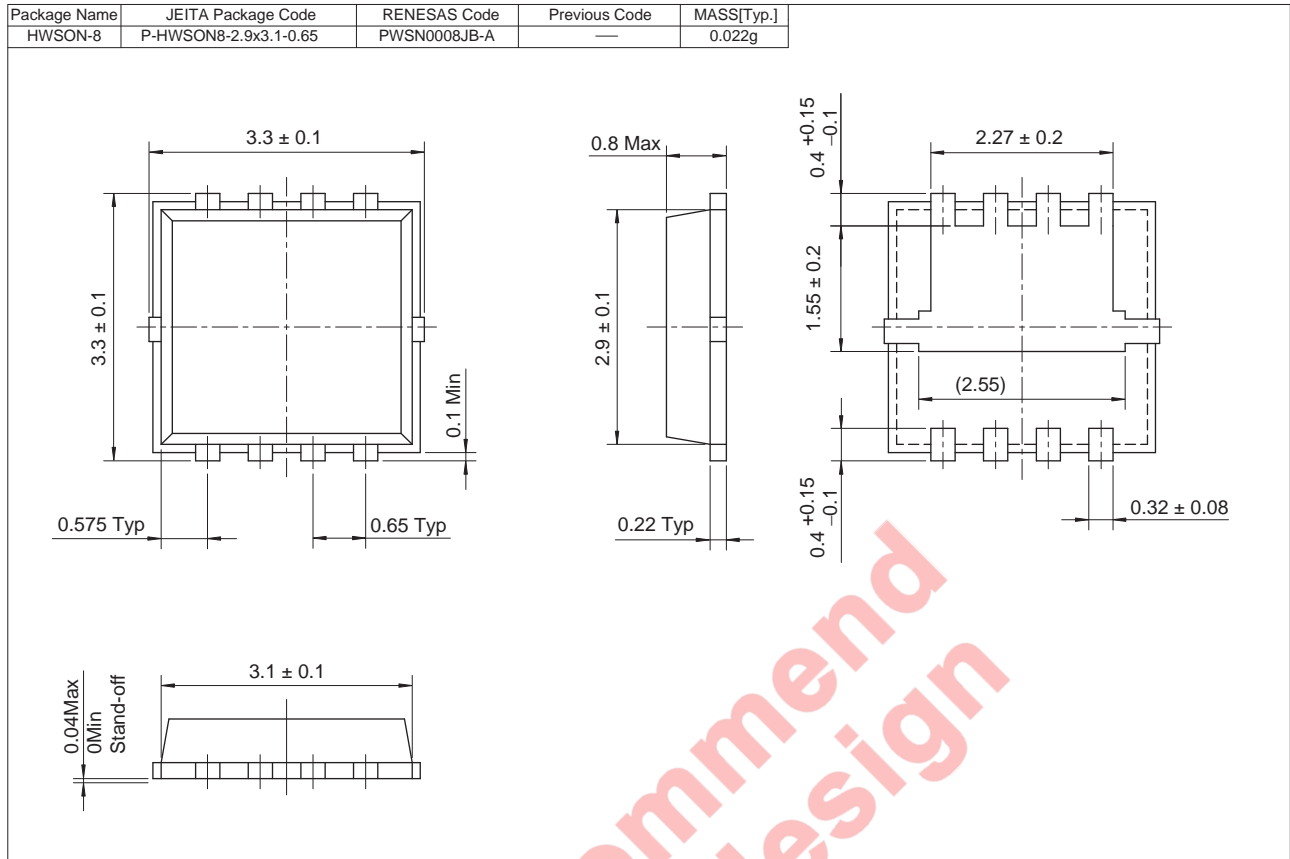
Switching Time Test Circuit



Switching Time Waveform



### Package Dimensions



### Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK03L3DNS-00-J5	5000 pcs	Taping

Note: The symbol of 2nd "-" is occasionally presented as "#".

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