60V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = 25°C
60V	66mΩ @ V_{GS} = 10V	4.4A
	97mΩ @ V_{GS} = 4.5V	3.6A

Features and Benefits

- Low on-resistance
- Fast switching speed
- 100% Unclamped Inductive Switch (UIS) test in production
- **"Green" component and RoHS compliant (Note 1)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

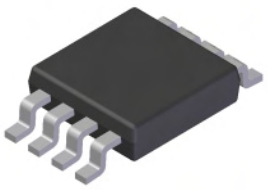
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

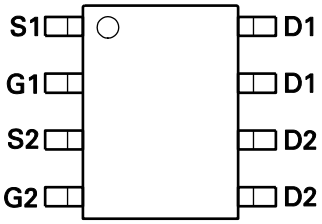
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)

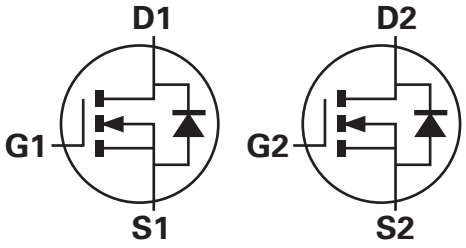
SO-8



Top View



Top View



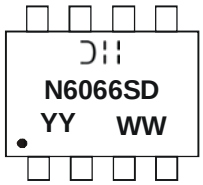
Equivalent Circuit

Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN6066SSD-13	N6066SD	13	12	2,500

Note: 1. Diodes, Inc. defines "Green" products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.'s "Green" Policy can be found on our website. For packaging details, go to our website.

Marking Information



= Manufacturer's Marking
N6066SD = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 09 = 2009)
WW = Week (01 - 53)

Maximum Ratings @T_A = 25°C unless otherwise specified

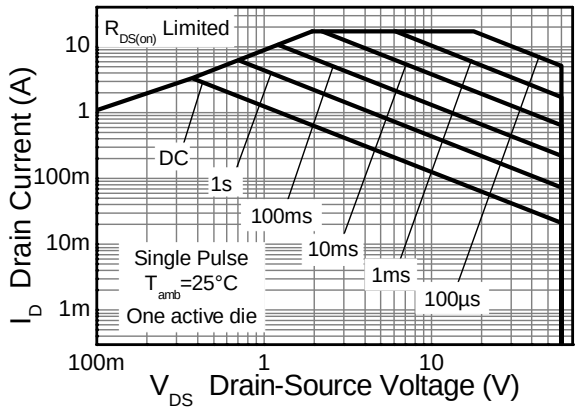
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V_{DSS}	60	V
Gate-Source voltage		(Note 2)	V_{GS}	±20	V
Single Pulsed Avalanche Energy		(Note 9)	E_{AS}	37.5	mJ
Single Pulsed Avalanche Current		(Note 9)	I_{AS}	5.0	A
Continuous Drain current	V_{GS} = 10V	(Note 4)	I_D	4.4	A
		T_A = 70°C (Note 4)		3.5	
		(Note 3)		3.3	
Pulsed Drain current	V_{GS} = 10V	(Note 5)	I_{DM}	17.0	A
Continuous Source current (Body diode)		(Note 4)	I_S	3.2	A
Pulsed Source current (Body diode)		(Note 5)	I_{SM}	17.0	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

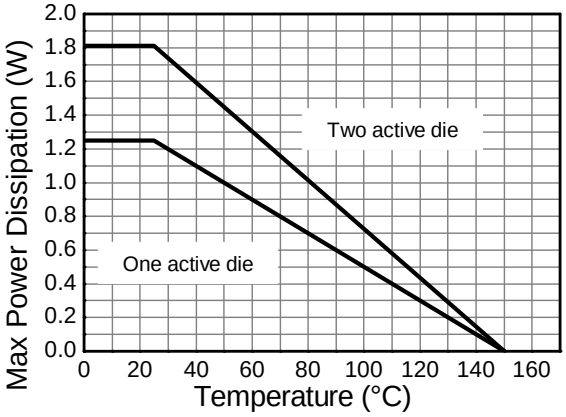
Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Notes 3 & 6)	P_D	1.25 10	W mW/°C
	(Notes 3 & 7)		1.8 14.3	
	(Notes 4 & 6)		2.14 17.2	
Thermal Resistance, Junction to Ambient	(Notes 3 & 6)	$R_{\theta JA}$	100	°C/W
	(Notes 3 & 7)		70	
	(Notes 4 & 6)		58	
Thermal Resistance, Junction to Lead	(Notes 6 & 8)	$R_{\theta JL}$	55	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	°C

Notes:
2. AEC-Q101 V_{GS} maximum is ±16V.
3. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
4. Same as note (3), except the device is measured at t ≤ 10 sec.
5. Same as note (3), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
6. For a dual device with one active die.
7. For a device with two active die running at equal power.
8. Thermal resistance from junction to solder-point (at the end of the drain lead).
9. UIS in production with L = 3.0mH, I_{AS} = 5.0A, R_G = 25Ω, V_{DD} = 50V, starting T_J = 25°C.

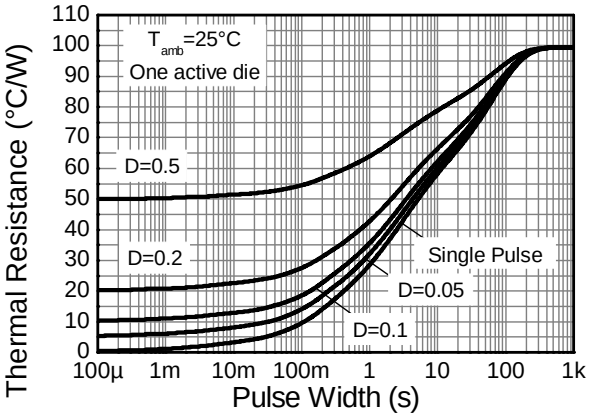
Thermal Characteristics



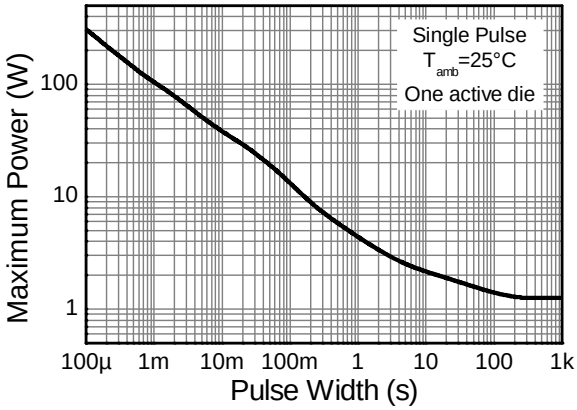
Safe Operating Area



Derating Curve



Transient Thermal Impedance



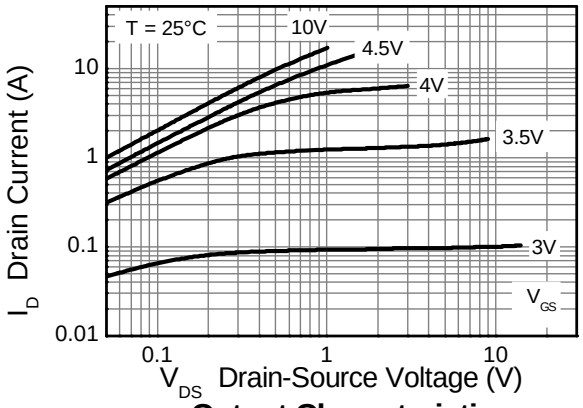
Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

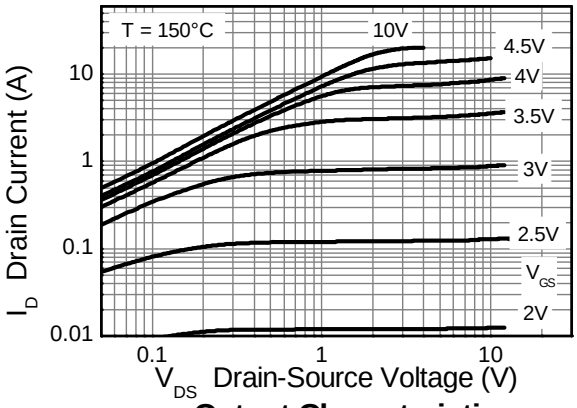
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	I_D = 250μA, V_{GS}= 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	V_{DS}= 60V, V_{GS}= 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS}= ±20V, V_{DS}= 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	I_D= 250μA, V_{DS}= V_{GS}
Static Drain-Source On-Resistance (Note 10)	$R_{DS\ (ON)}$	—	0.048	0.066	Ω	V_{GS}= 10V, I_D= 4.5A
			0.068	0.097		V_{GS}= 4.5V, I_D= 3.5A
Forward Transconductance (Notes 10 & 11)	g_{fs}	—	19.2	—	S	V_{DS}= 15V, I_D= 6A
Diode Forward Voltage (Note 10)	V_{SD}	—	0.89	1.15	V	I_S= 4.5A, V_{GS}= 0V
Reverse recovery time (Note 11)	t_{rr}		22.2	—	ns	I_S= 1.9A, di/dt= 100A/μs
Reverse recovery charge (Note 11)	Q_{rr}	—	16.9	—	nC	
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	502	—	pF	V_{DS}= 30V, V_{GS}= 0V f= 1MHz
Output Capacitance	C_{oss}	—	45.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	27.1	—	pF	
Total Gate Charge (Note 12)	Q_g	—	5.4	—	nC	V_{GS}= 4.5V; V_{DS}= 30V, I_D= 4.5A
Total Gate Charge (Note 12)	Q_g	—	10.3	—	nC	V_{GS}= 10V; V_{DS}= 30V, I_D= 4.5A
Gate-Source Charge (Note 12)	Q_{gs}	—	1.7	—	nC	V_{GS}= 10V; V_{DS}= 30V, I_D= 4.5A
Gate-Drain Charge (Note 12)	Q_{gd}	—	3.2	—	nC	V_{GS}= 10V; V_{DS}= 30V, I_D= 4.5A
Turn-On Delay Time (Note 12)	$t_{D(on)}$	—	2.7	—	ns	V_{DD}= 30V, V_{GS}= 10V, I_D= 1A, $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 12)	t_r	—	2.4	—	ns	
Turn-Off Delay Time (Note 12)	$t_{D(off)}$	—	14.7	—	ns	
Turn-Off Fall Time (Note 12)	t_f	—	5.4	—	ns	

Notes:
10. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
11. For design aid only, not subject to production testing.
12. Switching characteristics are independent of operating junction temperatures.

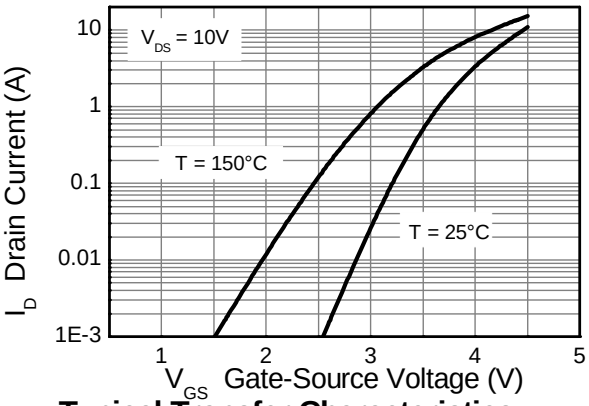
Typical Characteristics



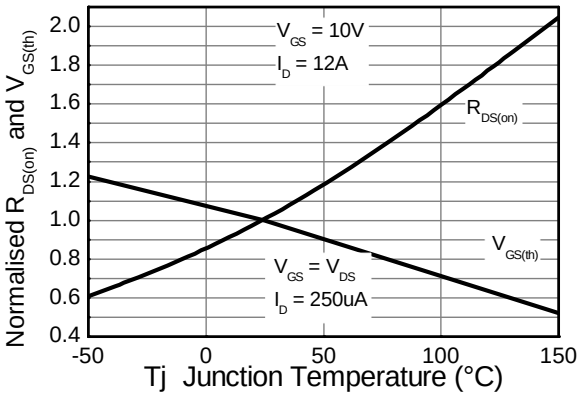
Output Characteristics



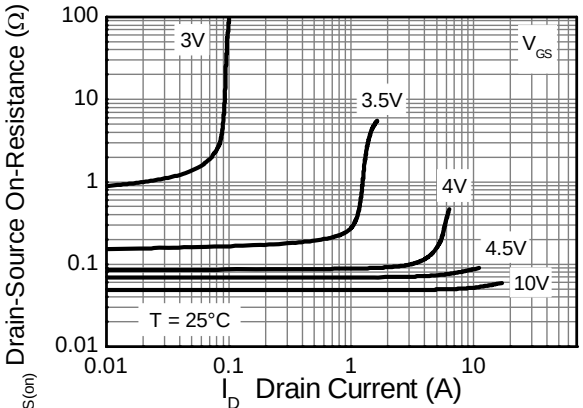
Output Characteristics



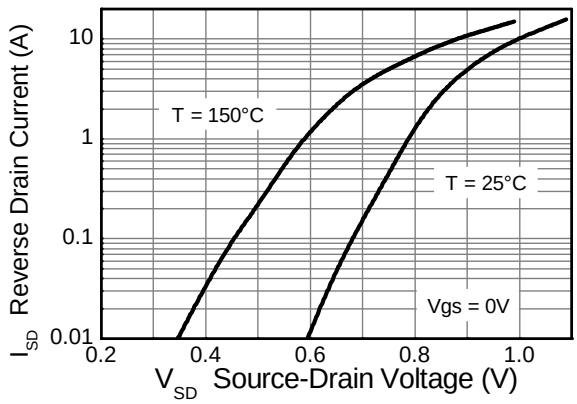
Typical Transfer Characteristics



Normalised Curves v Temperature

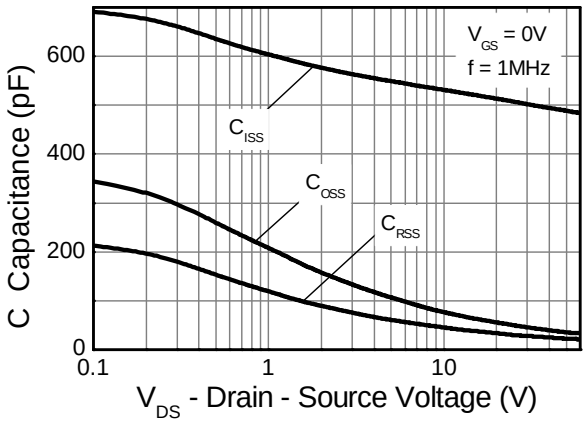


On-Resistance v Drain Current

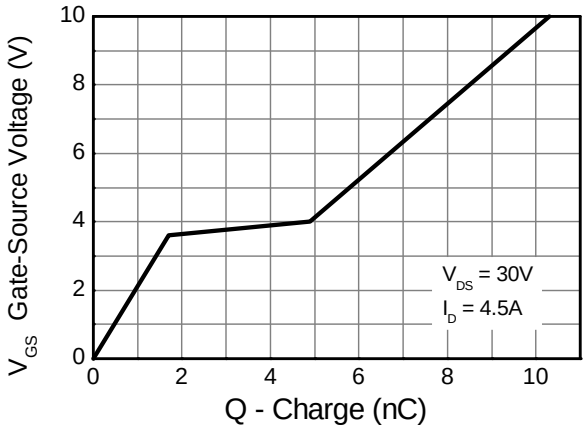


Source-Drain Diode Forward Voltage

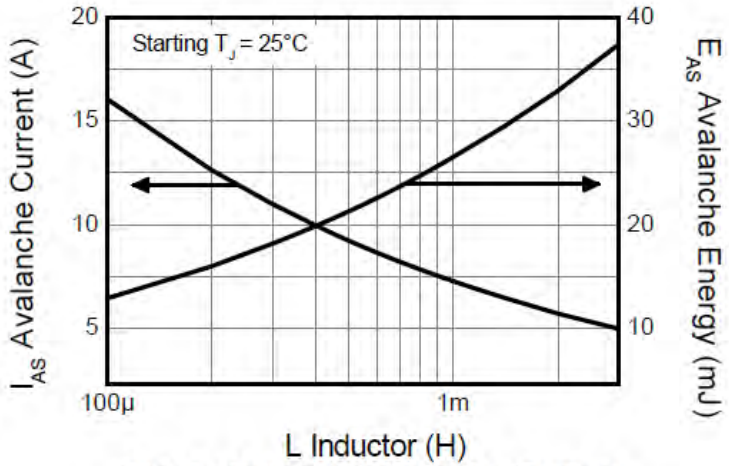
Typical Characteristics - continued



Capacitance v Drain-Source Voltage

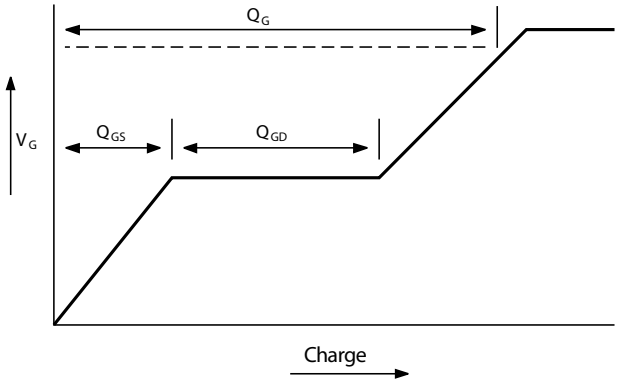


Gate-Source Voltage v Gate Charge

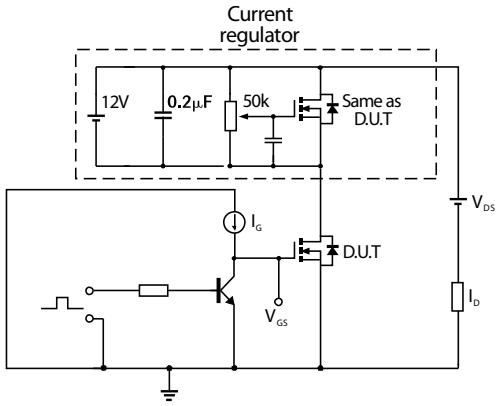


Single-Pulsed Avalanche Rating

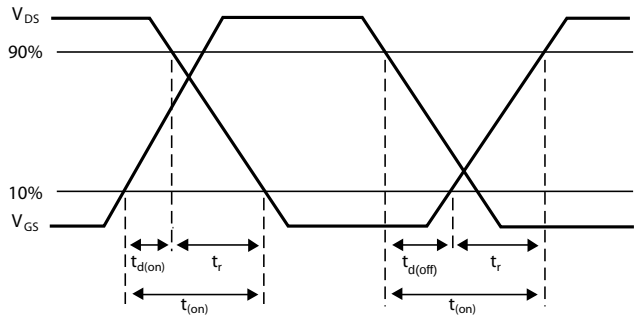
Test Circuits



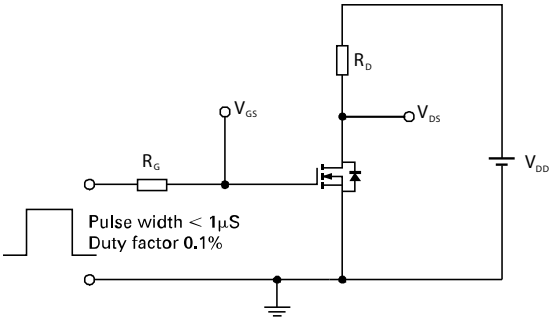
Basic gate charge waveform



Gate charge test circuit

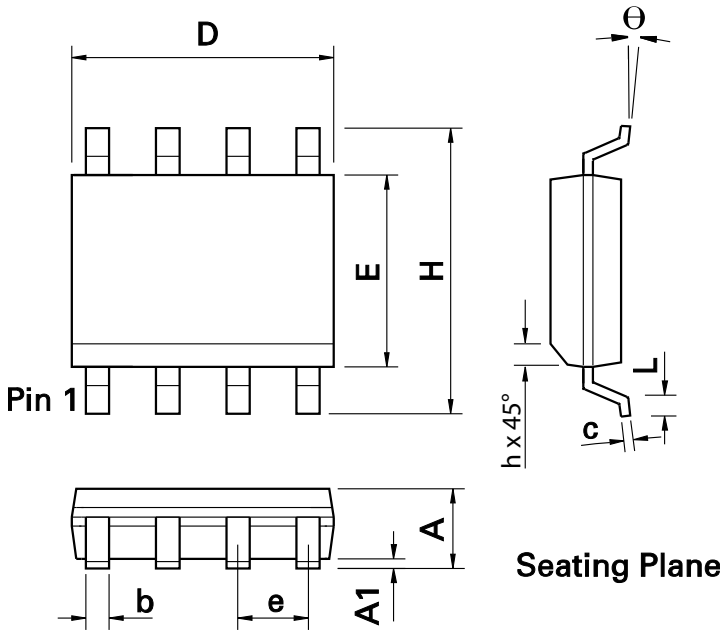


Switching time waveforms



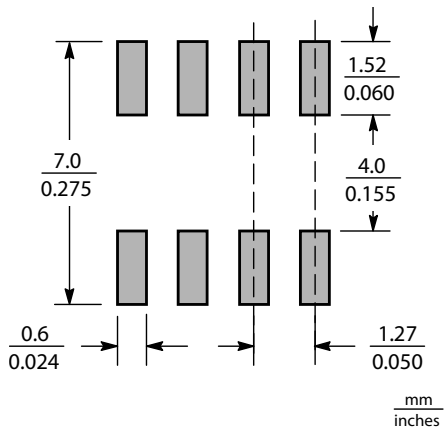
Switching time test circuit

Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

Suggested Pad Layout



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