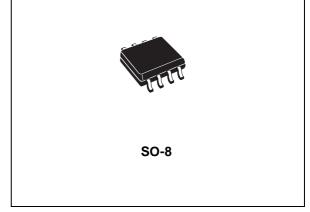


STS1DNC45

DUAL N-CHANNEL 450V - 4.1Ω - 0.4A SO-8 SuperMESH™ POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STS1DNC45	450 V	< 4.5 Ω	0.4 A

- TYPICAL $R_{DS}(on) = 4.1\Omega$
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- GATE CHARGE MINIMIZED

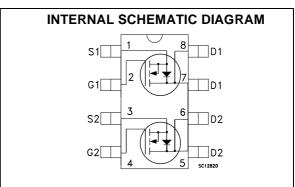


DESCRIPTION

The SuperMESH™ series is obtained through an extreme optimization of ST's well established strip-based PowerMESH™ layout. In addition to pushing on-resistance significantly down, special care is taken to ensure a very good dv/dt capability for the most demanding applications. Such series complements ST full range of high voltage MOSFETs including revolutionary MDmesh™ products.

APPLICATIONS

- SWITCH MODE LOW POWER SUPPLIES (SMPS)
- DC-DC CONVERTERS
- LOW POWER, LOW COST CFL (COMPACT FLUORESCENT LAMPS)
- LOW POWER BATTERY CHARGERS



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	450	V
V_{DGR}	Drain-gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)	450	V
V _{GS}	Gate- source Voltage	± 30	V
I _D	Drain Current (continuous) at T _C = 25°C Drain Current (continuous) at T _C = 100°C	0.40 0.25	A A
I _{DM} (•)	Drain Current (pulsed)	1.6	Α
Ртот	Total Dissipation at $T_C = 25^{\circ}C$ Dual Operation Total Dissipation at $T_C = 25^{\circ}C$ Single Operation	1.6 2	W W
dv/dt(1)	Peak Diode Recovery voltage slope	3	V/ns

^(●) Pulse width limited by safe operating area

(1) $I_{SD} \le 0.4$ A, di/dt ≤ 100 A/ μ s, $V_{DD} \le V_{(BR)DSS}$, $T_j \le T_{JMAX}$.

June 2003 1/8

STS1DNC45

THERMAL DATA

Rthj-amb(#)	Thermal Resistance Junction-ambient Max Single Operation Thermal Resistance Junction-ambient Max Dual Operation	62.5 78	°C/W
Tj	Max. Operating Junction Temperature	150	°C
T _{stg}	Storage Temperature	-65 to 150	°C

^(#) When Mounted on FR4 board (Steady State)

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max)	0.4	А
E _{AS}	Single Pulse Avalanche Energy (starting $T_j = 25$ °C, $I_D = I_{AR}$, $V_{DD} = 50$ V)	30	mJ

ELECTRICAL CHARACTERISTICS ($T_{CASE} = 25~^{\circ}C$ UNLESS OTHERWISE SPECIFIED) OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0$	450			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating, T_{C} = 125 °C			1 50	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 30V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	2.3	3	3.7	٧
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V, I _D = 0.5 A		4.1	4.5	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 25 V, I _D = 0.5 A		1.1		S
C _{iss}	Input Capacitance	$V_{DS} = 25 \text{ V, f} = 1 \text{ MHz, } V_{GS} = 0$		160		pF
Coss	Output Capacitance			27.5		pF
C _{rss}	Reverse Transfer Capacitance			4.7		pF

2/8

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	$V_{DD} = 225 \text{ V}, I_D = 0.5 \text{ A}$		6.7		ns
t _r	Rise Time	$R_G = 4.7\Omega V_{GS} = 10 V$ (see test circuit, Figure 3)		4		ns
Q _g Q _{gs} Q _{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 360 \text{ V}, I_D = 1.5 \text{ A}, V_{GS} = 10 \text{ V}$		7 1.3 3.2	10	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t _{r(off)} t _f t _c	Off-voltage Rise Time Fall Time Cross-over Time	$V_{DD} = 360 \text{ V}, I_D = 1.5 \text{ A}$ $R_G = 4.7\Omega, V_{GS} = 10 \text{ V}$ (see test circuit, Figure 5)		8.5 12 18		ns ns ns

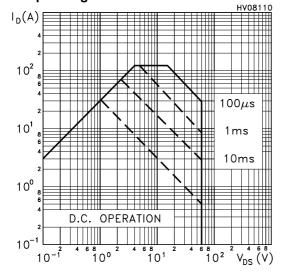
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I _{SD}	Source-drain Current				0.4	Α
I _{SDM} (2)	Source-drain Current (pulsed)				1.6	Α
V _{SD} (1)	Forward On Voltage	I _{SD} = 0.4 A, V _{GS} = 0			1.6	V
t _{rr} Q _{rr} I _{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 0.4 A, di/dt = 100A/ μ s, V_{DD} = 100 V, T_j = 150°C (see test circuit, Figure 5)		225 530 4.7		ns nC A

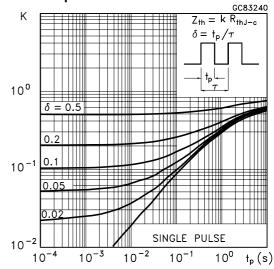
Note: 1. Pulsed: Pulse duration = 300 μ s, duty cycle 1.5 %.

2. Pulse width limited by safe operating area.

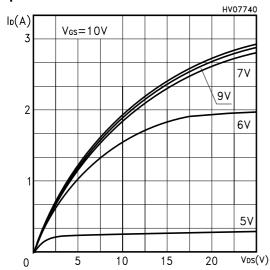
Safe Operating Area



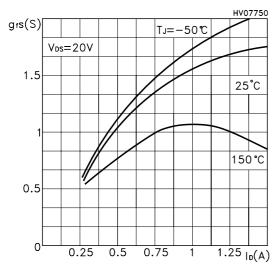
Thermal Impedance



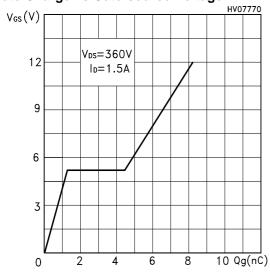
Output Characteristics



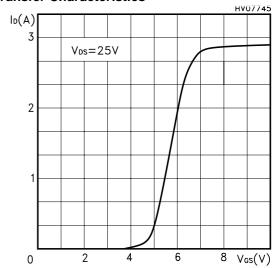
Transconductance



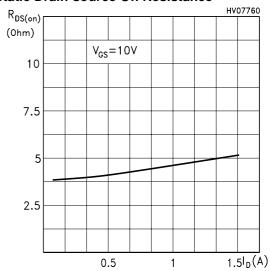
Gate Charge vs Gate-source Voltage



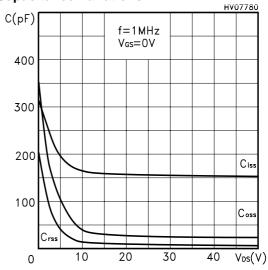
Transfer Characteristics



Static Drain-source On Resistance

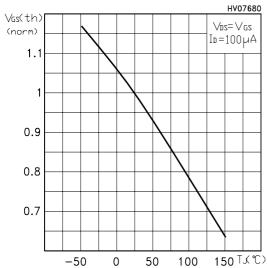


Capacitance Variations

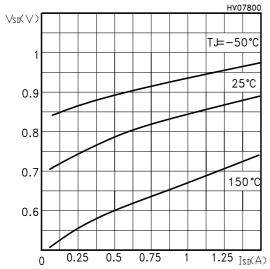


4/8

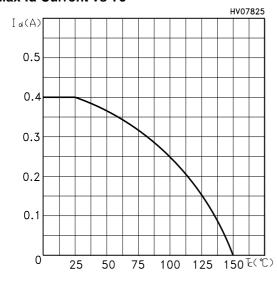
Normalized Gate Threshold Voltage vs Temp.



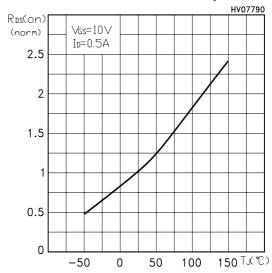
Source-drain Diode Forward Characteristics



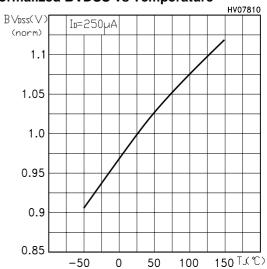
Max Id Current vs Tc



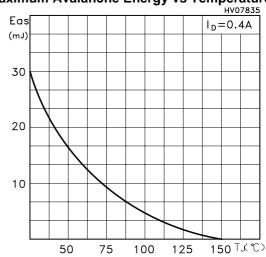
Normalized On Resistance vs Temperature



Normalized BVDSS vs Temperature



Maximum Avalanche Energy vs Temperature



47/₈

Fig. 1: Unclamped Inductive Load Test Circuit

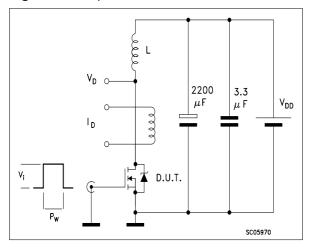


Fig. 3: Switching Times Test Circuit For Resistive Load

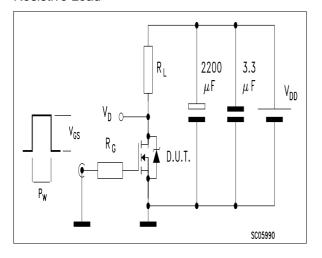


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times

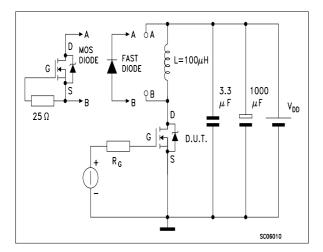


Fig. 2: Unclamped Inductive Waveform

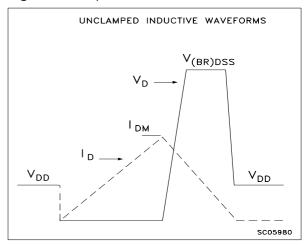
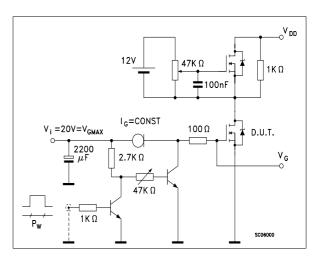


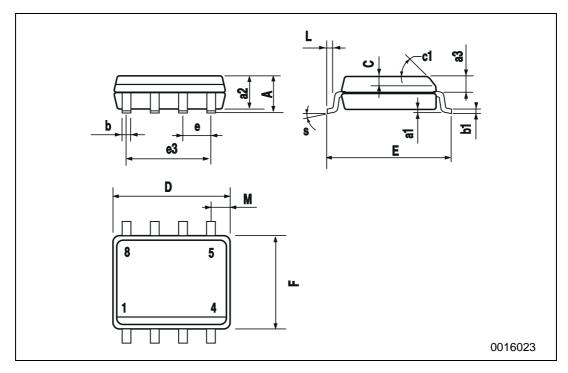
Fig. 4: Gate Charge test Circuit



6/8

SO-8 MECHANICAL DATA

DIM.		mm			inch			
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
А			1.75			0.068		
a1	0.1		0.25	0.003		0.009		
a2			1.65			0.064		
a3	0.65		0.85	0.025		0.033		
b	0.35		0.48	0.013		0.018		
b1	0.19		0.25	0.007		0.010		
С	0.25		0.5	0.010		0.019		
c1			45	(typ.)				
D	4.8		5.0	0.188		0.196		
E	5.8		6.2	0.228		0.244		
е		1.27			0.050			
e3		3.81			0.150			
F	3.8		4.0	0.14		0.157		
L	0.4		1.27	0.015		0.050		
М			0.6			0.023		
S			8 (r	nax.)				



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477. 8/8