



STD8NS25

N-CHANNEL 250V - 0.38Ω - 8A DPAK MESH OVERLAY™ MOSFET

PRELIMINARY DATA

Table 1: General Features

TYPE	V _{DSS}	R _{DS(on)}	I _D
STD8NS25	250 V	< 0.45 Ω	8 A

- TYPICAL R_{DS(on)} = 0.38 Ω
- EXTREMELY HIGH dv/dt CAPABILITY
- 100% AVALANCHE TESTED

DESCRIPTION

Using the latest high voltage MESH OVERLAY™ process, STMicroelectronics has designed an advanced family of power MOSFETs with outstanding performance. The new patented STrip layout coupled with the Company's proprietary edge termination structure, makes it suitable in converters for lighting applications.

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLIES (SMPS)
- DC-DC CONVERTERS FOR TELECOM, INDUSTRIAL, AND LIGHTING EQUIPMENT

Table 2: Order Codes

SALES TYPE	MARKING	PACKAGE	PACKAGING
STD8NS25T4	D8NS25	DPAK	TAPE & REEL

Figure 1: Package

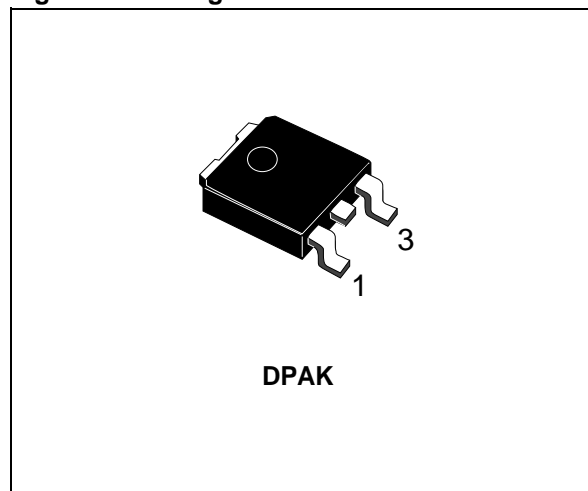


Figure 2: Internal Schematic Diagram

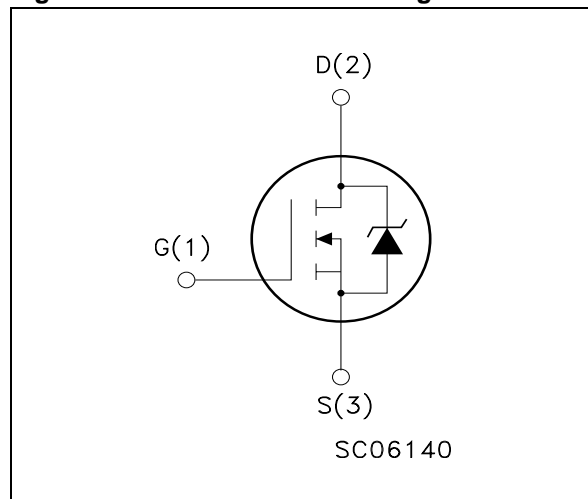


Table 3: Absolute Maximum ratings

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	250	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	250	V
V _{GS}	Gate- source Voltage	± 20	V
I _D	Drain Current (continuous) at T _C = 25°C	8	A
I _D	Drain Current (continuous) at T _C = 100°C	5	A
I _{DM} (•)	Drain Current (pulsed)	32	A
P _{TOT}	Total Dissipation at T _C = 25°C	80	W
	Derating Factor	0.64	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	5	V/ns
E _{AS} (2)	Single Pulse Avalanche Energy	209	mJ
T _{stg}	Storage Temperature	-65 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

(•) Pulse width limited by safe operating area

(1) I_{SD} ≤ 8A, di/dt ≤ 300 A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{jMAX}

(2) Starting T_j = 25°C, I_{AR} = 50A, V_{DD} = 20 V

Table 4: Thermal Data

R _{thj-case}	Thermal Resistance Junction-case Max	1.56	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient Max	62.5	°C/W
T _l	Maximum Lead Temperature For Soldering Purpose	300	°C

Table 5: Avalanche Characteristics

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max)	8	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	300	mJ

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25°C UNLESS OTHERWISE SPECIFIED)
Table 6: Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA, V _{GS} = 0	250			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating, T _C = 125 °C			1 10	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ±20V			±100	nA

ELECTRICAL CHARACTERISTICS (CONTINUED)

Table 7: On

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10V$, $I_D = 4 A$		0.38	0.45	Ω

Table 8: Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (1)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$, $I_D = 4A$	7	8		S
C_{iss}	Input Capacitance	$V_{DS} = 25V$, $f = 1 MHz$, $V_{GS} = 0$		770		pF
C_{oss}	Output Capacitance			118		pF
C_{rss}	Reverse Transfer Capacitance			48		pF

Table 9: Switching On

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 125 V$, $I_D = 4 A$ $R_G = 4.7\Omega$, $V_{GS} = 10 V$ (see test circuit, Figure 3)		13		ns
t_r	Rise Time			18		ns
Q_g	Total Gate Charge	$V_{DD} = 200V$, $I_D = 8 A$, $V_{GS} = 10V$ (see Figure 7)		37	50	nC
Q_{gs}	Gate-Source Charge			5.2		nC
Q_{gd}	Gate-Drain Charge			14.8		nC

Table 10: Switching Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(Voff)}$	Turn-off- Delay Time Fall Time	$V_{DD} = 125V$, $I_D = 4 A$, $R_G = 4.7\Omega$, $V_{GS} = 10V$ (see Figure 4)		51		ns
t_f				16		ns
$t_{r(Voff)}$	Off-voltage Rise Time Fall Time Cross-over Time	$V_{clamp} = 200V$, $I_D = 8 A$, $R_G = 4.7\Omega$, $V_{GS} = 10V$ (see Figure 4)		12.5		ns
t_f				12.5		ns
t_c				28		ns

Table 11: Source Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				8	A
$I_{SDM} (2)$	Source-drain Current (pulsed)				32	A
$V_{SD} (1)$	Forward On Voltage	$I_{SD} = 8 A$, $V_{GS} = 0$			1.7	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 8 A$, $di/dt = 100A/\mu s$ $V_{DD} = 30V$, $T_j = 150^\circ C$ (see Figure 5)		198		ns
Q_{rr}	Reverse Recovery Charge			1.1		μC
I_{RRM}	Reverse Recovery Current			11.3		A

(1) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

(2) Pulse width limited by safe operating area.

Figure 3: Unclamped Inductive Load Test Circuit

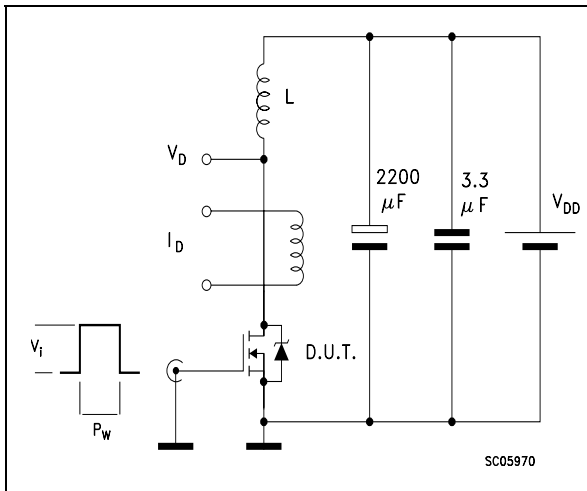


Figure 4: Switching Times Test Circuit For Resistive Load

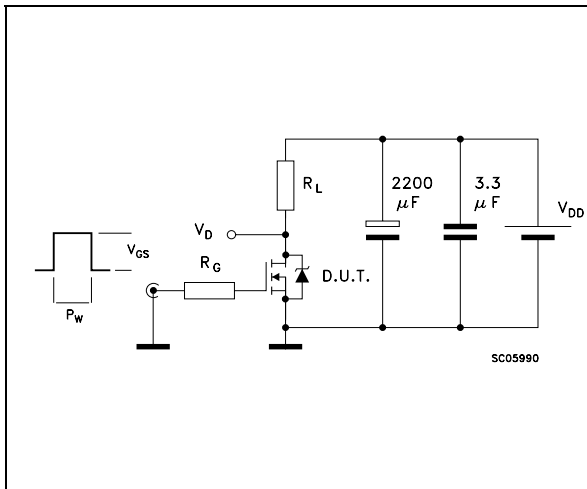


Figure 5: Test Circuit For Inductive Load Switching and Diode Recovery Times

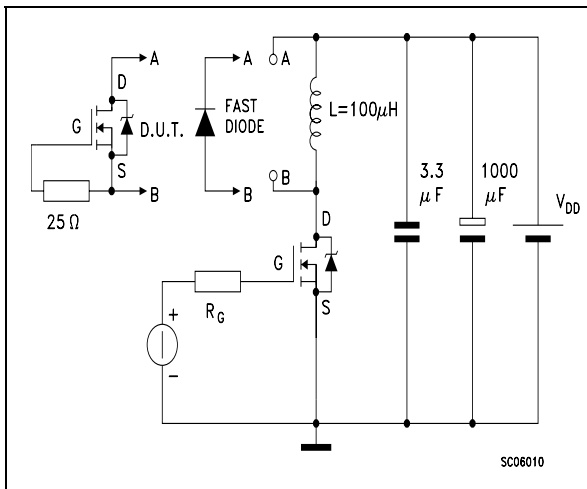


Figure 6: Unclamped Inductive Waferform

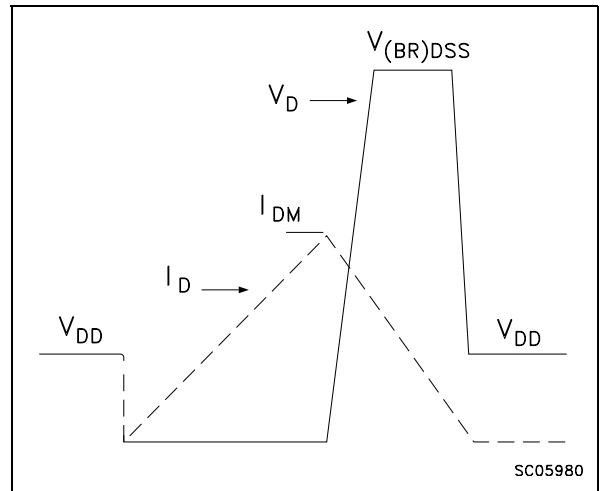
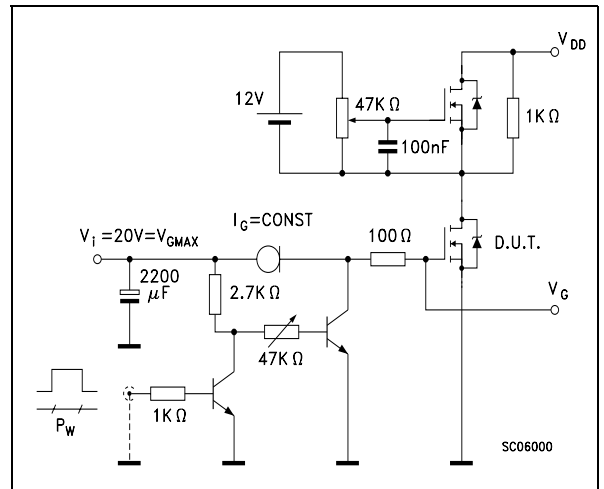
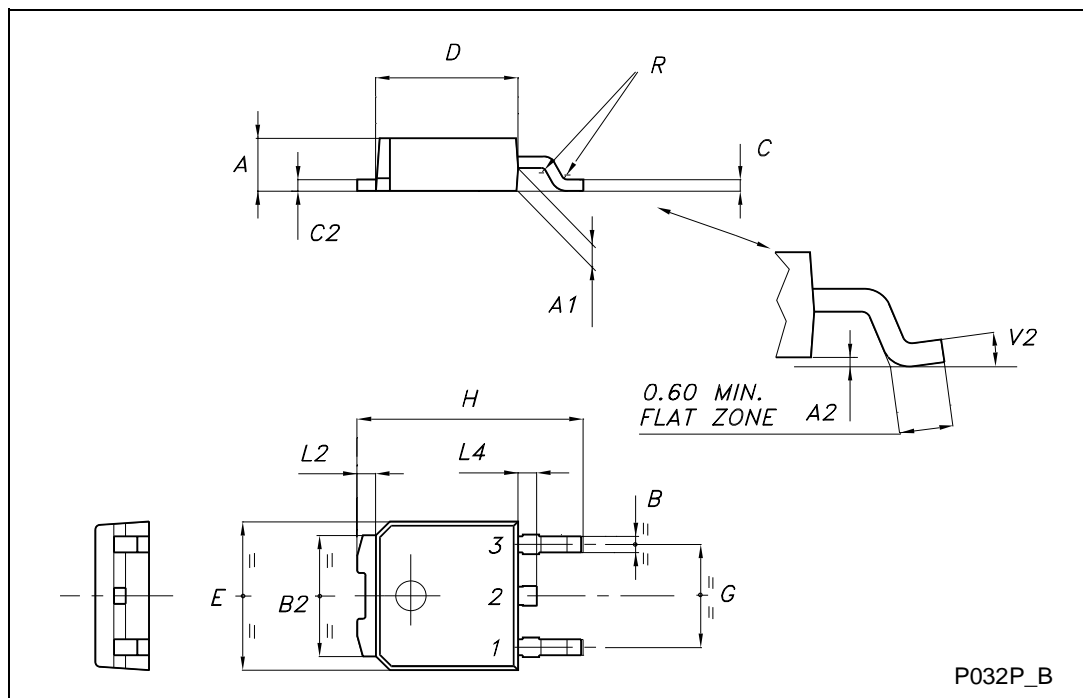


Figure 7: Gate Charge Test Circuit

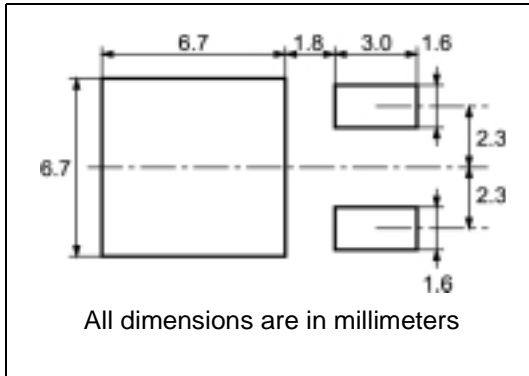


TO-252 (DPAK) MECHANICAL DATA

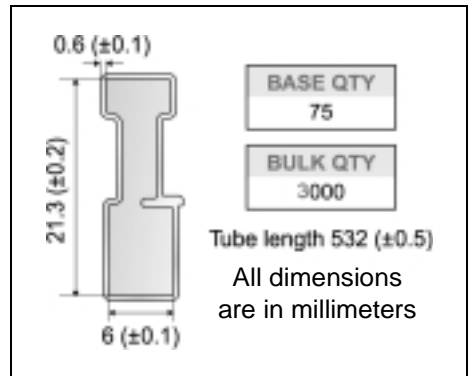
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L2		0.8			0.031	
L4	0.60		1.00	0.024		0.039
V2	0°		8°	0°		0°



DPAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*

40 mm min. Access hole at slot location

Full radius

Tape slot in core for tape start 2.5mm min. width

G measured at hub

REEL MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	16.4	18.4	0.645	0.724
N	50		1.968	
T		22.4		0.881

BASE QTY	BULK QTY
2500	2500

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A0	6.8	7	0.267	0.275
B0	10.4	10.6	0.409	0.417
B1		12.1		0.476
D	1.5	1.6	0.059	0.063
D1	1.5		0.059	
E	1.65	1.85	0.065	0.073
F	7.4	7.6	0.291	0.299
K0	2.55	2.75	0.100	0.108
P0	3.9	4.1	0.153	0.161
P1	7.9	8.1	0.311	0.319
P2	1.9	2.1	0.075	0.082
R	40		1.574	
W	15.7	16.3	0.618	0.641

10 pitches cumulative tolerance on tape +/- 0.2 mm

Center line of cavity

For machine ref. only including shaft and radii concentric around B0

TRL

FEED DIRECTION

User Direction of Feed

Bending radius R min.

* on sales type

Table 12: Revision History

Date	Revision	Description of Changes
20-Sep-2004	4	New Stylesheet. No document change.

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