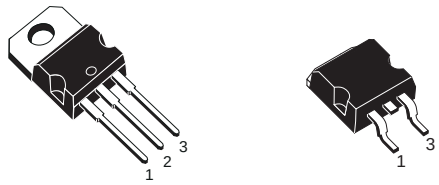
STB8NM60D
STP8NM60D

N-CHANNEL 600V - 0.9Ω - 8A - TO-220/D^{2}PAK
Fast Diode MDmesh™ Power MOSFET

General features

Type	V_{DSS}	$R_{DS(on)}$	I_D	P_{TOT}
STB8NM60D	600V	< 1.0Ω	8A	100W
STP8NM60D	600V	< 1.0Ω	8A	100W

- High dv/dt and avalanche capabilities
- 100% avalanche rated
- Low input capacitance and gate charge
- Low gate input resistance
- Fast internal recovery diode



TO-220 D²PAK

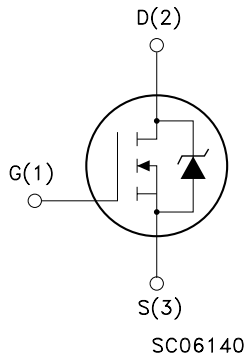
Description

The FDmesh™ associates all advantages of reduced on-resistance and fast switching with an intrinsic fast-recovery body diode. It is therefore strongly recommended for bridge topologies, in particular ZVS phase-shift converters

Applications

The MDmesh™ family is very suitable for increasing power density of high voltage converters allowing system miniaturization and higher efficiencies.

Internal schematic diagram



Order codes

Sales Type	Marking	Package	Packaging
STB8NM60D	B8NM60D	D²PAK	TAPE & REEL
STP8NM60D	P8NM60D	TO-220	TUBE

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS} = 0)	600	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20kΩ)	600	V
V_{GS}	Gate-Source Voltage	±30	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}(1)	Drain Current (pulsed)	32	A
P_{TOT}	Total Dissipation at T_C = 25°C	100	W
	Derating Factor	0.8	W/°C
dv/dt(2)	Peak Diode Recovery voltage slope	20	V/ns
T_J T_{stg}	Operating Junction Temperature Storage Temperature	-65 to 150	°C

1. Pulse width limited by safe operating area
2. I_{SD} ≤5A, di/dt ≤400A/µs, V_{DD} =80%$V_{(BR)DSS}$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case Max	1.25	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-ambient Max	62.5	°C/W
T_l	Maximum lead temperature for soldering purpose	300	°C

Table 3. Avalanche data

Symbol	Parameter	Value	Unit
I_{AR}	Avalanche current, repetitive or not repetitive (pulse width limited by Tjmax)	2.5	A
E_{AS}	Single pulse avalanche energy (starting Tj=25°C, I_D=I_{AR}, V_{DD}=50V)	200	mJ

2 Electrical characteristics

(T_{CASE}=25°C unless otherwise specified)

Table 4. On/off states

Symbol	Parameter	Test Condictions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250µA, V_{GS}= 0	600			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating, V_{DS} = Max Rating,Tc=125°C			1 10	µA µA
I_{GSS}	Gate Body Leakage Current (V_{DS} = 0)	V_{GS} = ±30V, V_{DS} = 0			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D = 250µA	3	4	5	V
$R_{DS(on)}$	Static Drain-Source On Resistance	V_{GS}= 10V, I_D=2.5A		0.9	1	Ω

Table 5. Dynamic

Symbol	Parameter	Test Condictions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} =$I_{D(on)}$ x $R_{DS(on)max}$ I_D = 2.5A		2.4		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} =25V, f=1 MHz, V_{GS}=0		380 170 14		pF pF pF
$C_{oss\ eq.}$ (2)	Equivalent Ouput Capacitance	V_{GS}=0, V_{DS} =0V to 480V		60		pF
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}=400V, I_D = 5A V_{GS} =10V (see Figure 13)		15 4 8	18	nC nC nC

1. Pulsed: pulse duration=300µs, duty cycle 1.5%
2. $C_{oss\ eq.}$ is defined as a constant equivalent capacitance giving the same charging time as C_{oss} when V_{DS} increases from 0 to 80% V_{DSS}

Table 6. Switching times

Symbol	Parameter	Test Condictions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on Delay Time Rise Time Turn-off Delay Time Fall Time	V_{DD}=300V, I_D=2.5A, R_G=4.7Ω, V_{GS}=10V (see Figure 12)		13 10 26 8		ns ns ns ns
$t_{d(off)}$ t_f t_c	Turn-off Delay Time Fall Time Cross-over Time	V_{DD}=480V, I_D=5A, R_G=4.7Ω, V_{GS}=10V (see Figure 12)		8 8 14		ns ns ns

Table 7. Source drain diode

Symbol	Parameter	Test Condictions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}(1)	Source-drain Current Source-drain Current (pulsed)				5 20	A A
V_{SD}(2)	Forward on Voltage	I_{SD}=5A, V_{GS}=0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD}=5A, di/dt = 100A/µs, V_{DD}=50 V, Tj=25°C		107 330 6		ns nC A
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD}=5A, di/dt = 100A/µs, V_{DD}=50 V, Tj=150°C		178 640 7		ns nC A

1. Pulse width limited by safe operating area
2. Pulsed: pulse duration=300µs, duty cycle 1.5%