



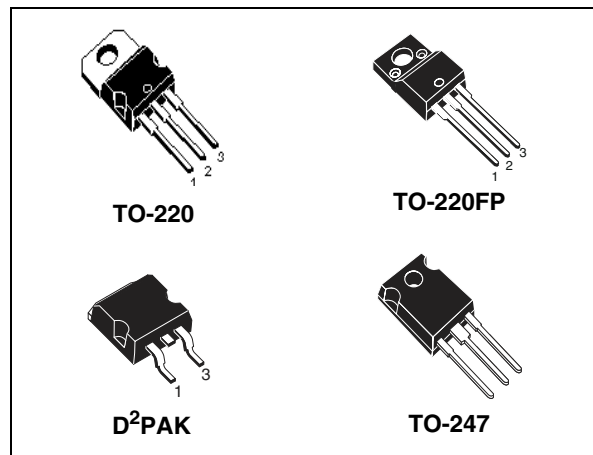
STP6NK90Z - STP6NK90ZFP STB6NK90Z - STW7NK90Z

N-channel 900V - 1.56Ω - 5.8A - TO-220/TO-220FP/D²PAK/TO-247
Zener-protected SuperMESH™ Power MOSFET

Features

Type	V _{DSS}	R _{DS(on)}	I _D
STP6NK90Z	900 V	< 2 Ω	5.8 A
STP6NK90ZFP	900 V	< 2 Ω	5.8 A
STB6NK90Z	900 V	< 2 Ω	5.8 A
STW7NK90Z	900 V	< 2 Ω	5.8 A

- Extremely high dv/dt capability
- 100% avalanche tested
- Gate charge minimized
- Very low intrinsic capacitances
- Very good manufacturing repeatability



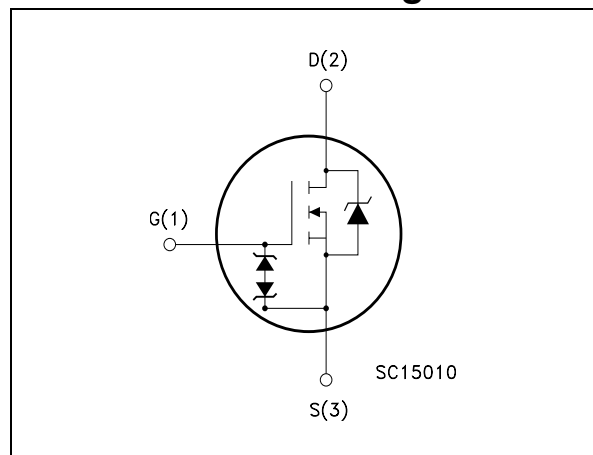
Description

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.

Application

- Switching application

Internal schematic diagram



Order codes

Part number	Marking	Package	Packaging
STP6NK90Z	P6NK90Z	TO-220	Tube
STP6NK90ZFP	P6NK90ZFP	TO-220FP	Tube
STB6NK90ZT4	B6NK90Z	D ² PAK	Tape e reel
STW7NK90Z	W7NK90Z	TO-247	Tube

Contents

1	Electrical ratings	3
1.1	Protection features of gate-to-source zener diodes	4
2	Electrical characteristics	5
2.1	Electrical characteristics (curves)	7
3	Test circuit	10
4	Package mechanical data	11
5	Packaging mechanical data	16
6	Revision history	17

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-220/ D ² PAK/TO247	TO220FP	
V _{DS}	Drain-source voltage (V _{GS} = 0)	900		V
V _{GS}	Gate-source voltage	± 30		V
I _D	Drain current (continuous) at T _C = 25°C	5.8	5.8 ⁽¹⁾	A
I _D	Drain current (continuous) at T _C = 100°C	3.65	3.65 ⁽¹⁾	A
I _{DM} ⁽²⁾	Drain current (pulsed)	23.2	23.2 ⁽¹⁾	A
P _{TOT}	Total dissipation at T _C = 25°C	140	30	W
	Derating factor	1.12	0.24	W/°C
dv/dt ⁽³⁾	Peak diode recovery voltage slope	4.5		V/ns
V _{ISO}	Insulation withstand voltage (RMS) from all three leads to external heat sink (t=1s; T _c = 25°C)	-	2500	V
T _j T _{stg}	Max operating junction temperature Storage temperature	-55 to 150		°C °C

- Limited only by maximum temperature allowed
- Pulse width limited by safe operating area
- I_{SD} ≤ 5.8 A, di/dt ≤ 200A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}.

Table 2. Thermal data

Symbol	Parameter	Value				Unit
		TO-220	D ² PAK	TO-220FP	TO-247	
R _{thj-case}	Thermal resistance junction-case max	0.89		4.2	0.89	°C/W
R _{thj-pcb}	Thermal resistance junction-case max		60			°C/W
R _{thj-amb}	Thermal resistance junction-ambient max	62.5			50	°C/W
T _l	Maximum lead temperature for soldering purpose	300				°C

Table 3. Avalanche characteristics

Symbol	Parameter	Value	Unit
I_{AR}	Avalanche current, repetitive or not-repetitive (pulse width limited by Tj Max)	5.8	A
E_{AS}	Single pulse avalanche energy (starting Tj=25°C, Id=Iar, Vdd=50V)	300	mJ

Table 4. Gate-source zener diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
BV_{GSO}	Gate-source breakdown voltage	Igs=± 1mA (Open Drain)	30			V

1.1 Protection features of gate-to-source zener diodes

The built-in back-to-back Zener diodes have specifically been designed to enhance not only the device's ESD capability, but also to make them safely absorb possible voltage transients that may occasionally be applied from gate to source. In this respect the Zener voltage is appropriate to achieve an efficient and cost-effective intervention to protect the device's integrity. These integrated Zener diodes thus avoid the usage of external components.