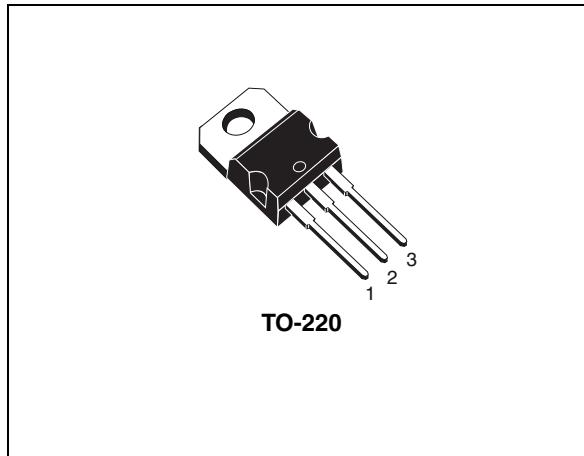


N-channel clamped 12.5mΩ - 62A - TO-220
 Fully protected MESH OVERLAY™ Power MOSFET

General features

Type	V_{DSS} (@Tjmax)	$R_{DS(on)}$	I_D
STP62NS04Z	Clamped	<0.015Ω	62A

- 100% avalanche tested
- Low capacitance and gate charge
- 175°C maximum junction temperature



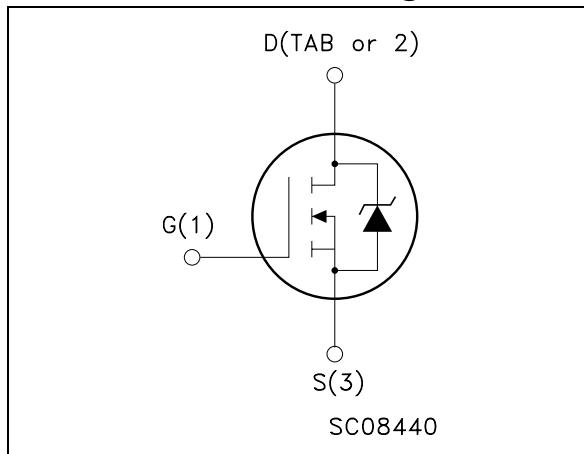
Description

This fully clamped MOSFET is produced by using the latest advanced Company's Mesh Overlay process which is based on a novel strip layout. The inherent benefits of the new technology coupled with the extra clamping capabilities make this product particularly suitable for the harshest operation conditions such as those encountered in the automotive environment. Any other application requiring extra ruggedness is also recommended.

Applications

- Switching application

Internal schematic diagram



Order codes

Part number	Marking	Package	Packaging
STP62NS04Z	P62NS04Z	TO-220	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	Clamped	V
V_{GS}	Gate-source voltage	Clamped	V
I_D	Drain current (continuous) at $T_C = 25^\circ\text{C}$	62	A
I_D	Drain current (continuous) at $T_C = 100^\circ\text{C}$	37.5	A
I_{DG}	Drain gate current (continuous)	± 50	
I_{GS}	Gate source current (continuous)	± 50	
$I_{DM}^{(1)}$	Drain current (pulsed)	248	A
P_{TOT}	Total dissipation at $T_C = 25^\circ\text{C}$	110	W
	Derating factor	0.74	W/ $^\circ\text{C}$
$dv/dt^{(2)}$	Peak diode recovery voltage slope	8	V/ns
$E_{AS}^{(3)}$	Single Pulse Avalanche Energy	500	mJ
V_{ESD}	ESD (HBM - C = 100pF, R = 1.5 k Ω)	8	V
T_J T_{stg}	Operating junction temperature Storage temperature	-55 to 175	$^\circ\text{C}$

1. Pulse width limited by safe operating area
2. $I_{SD} \leq 40\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX}$
3. Starting $T_J = 25^\circ\text{C}$, $I_D = 20\text{A}$, $V_{DD} = 20\text{V}$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case Max	1.36	$^\circ\text{C/W}$
R_{thJA}	Thermal resistance junction-ambient Max	62.5	$^\circ\text{C/W}$
T_I	Maximum lead temperature for soldering purpose	300	$^\circ\text{C}$

2 Electrical characteristics

($T_{CASE}=25^{\circ}\text{C}$ unless otherwise specified)

Table 3. On/off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 1\text{mA}$, $V_{GS} = 0$	33			V
I_{DSS}	Zero gate voltage drain current ($V_{GS} = 0$)	$V_{DS} = 16\text{V}$			10	μA
I_{GSS}	Gate body leakage current ($V_{DS} = 0$)	$V_{GS} = \pm 10\text{V}$			10	μA
V_{GSS}	Gate-Source Breakdown Voltage	$I_{GS} = 100 \mu\text{A}$	18			V
$V_{GS(\text{th})}$	Gate threshold voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2		4	V
$R_{DS(\text{on})}$	Static drain-source on resistance	$V_{GS} = 10\text{V}$, $I_D = 30\text{A}$		12.5	15	$\text{m}\Omega$

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$g_{fs}^{(1)}$	Forward transconductance	$V_{DS} = 15\text{V}$, $I_D = 30\text{A}$		20		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	$V_{DS} = 25\text{V}$, $f = 1 \text{ MHz}$, $V_{GS} = 0$		1330 420 135		pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	$V_{DD} = 20\text{V}$, $I_D = 40\text{A}$ $V_{GS} = 10\text{V}$		34 10 11.5	47	nC nC nC

1. Pulsed: pulse duration=300 μs , duty cycle 1.5%

Table 5. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on delay time Rise time	$V_{DD} = 20\text{V}$, $I_D = 20\text{A}$,		13 104		ns ns
$t_{d(off)}$ t_f	Turn-off delay time Fall time	$R_G = 4.7\Omega$, $V_{GS} = 10\text{V}$		41 42		ns ns
$t_{r(V_{off})}$ t_f t_c	Off-voltage rise time Fall time Cross-over time	$V_{clamp} = 30\text{V}$, $I_D = 40\text{A}$ $R_G = 4.7\Omega$, $V_{GS} = 10\text{V}$		30 54 90		ns ns ns

Table 6. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
I_{SD}	Source-drain current				62	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)				248	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 62A, V_{GS} = 0$			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	$I_{SD} = 40A,$ $di/dt = 100A/\mu s,$ $V_{DD} = 20V, T_J = 150^\circ C$		45 65 2.9		ns μC A

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

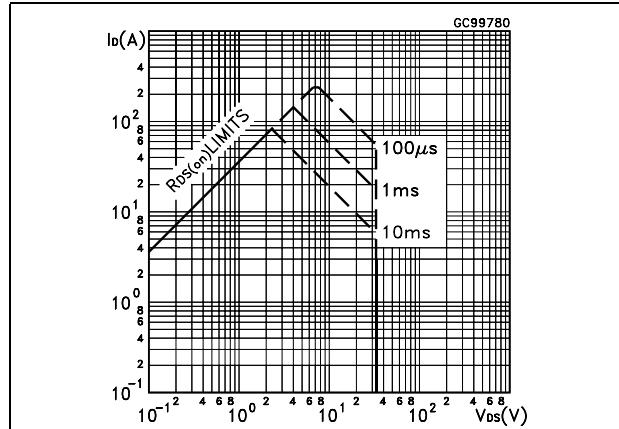


Figure 2. Thermal impedance

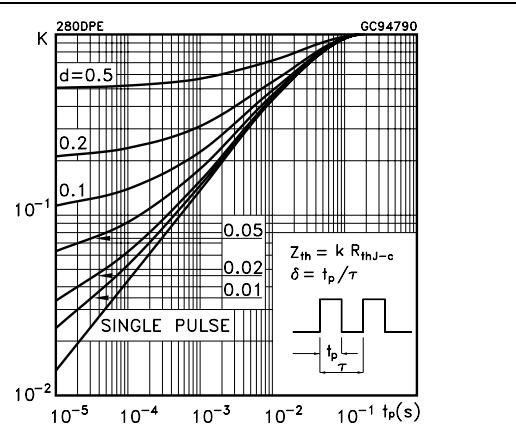


Figure 3. Output characteristics

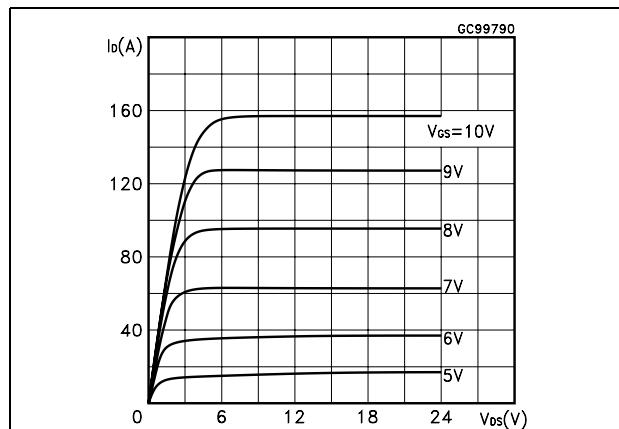


Figure 4. Transfer characteristics

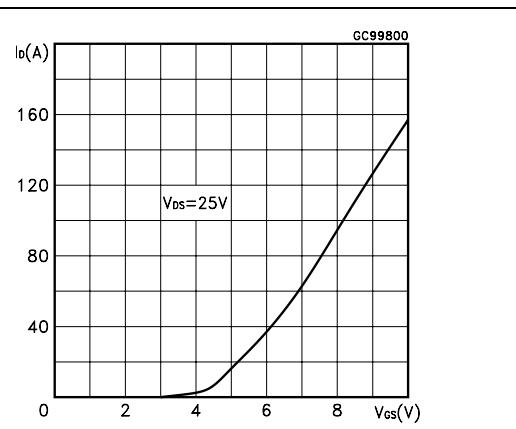


Figure 5. Transconductance

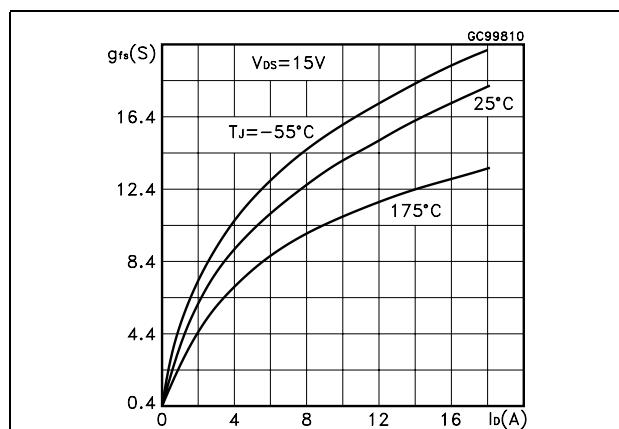


Figure 6. Static drain-source on resistance

