

STP36NE06 STP36NE06FP

N - CHANNEL 60V - 0.032Ω - 36A - TO-220/TO-220FP STripFET™ POWER MOSFET

TYPE	V _{DSS}	R _{D(on)}	I _D
STP36NE06	60 V	< 0.040 Ω	36 A
STP36NE06FP	60 V	< 0.040 Ω	20 A

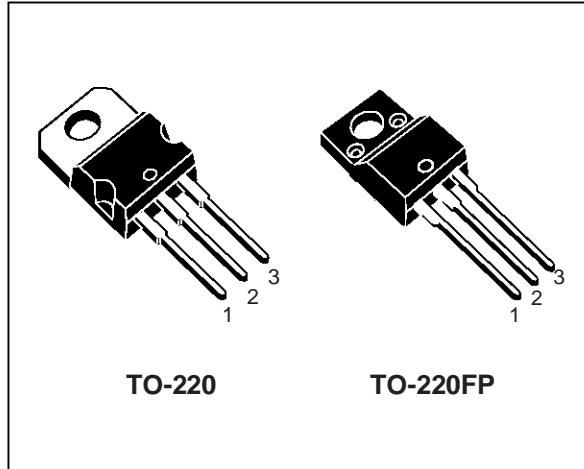
- TYPICAL R_{D(on)} = 0.032 Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- LOW GATE CHARGE 100 °C
- APPLICATION ORIENTED CHARACTERIZATION

DESCRIPTION

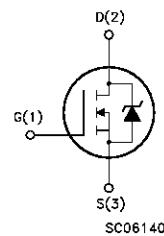
This Power Mosfet is the latest development of SGS-THOMSON unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC & DC-AC CONVERTERS



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STP36NE06	STP36NE06FP	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	60		V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	60		V
V _{GS}	Gate-source Voltage	± 20		V
I _D	Drain Current (continuous) at T _c = 25 °C	36	20	A
I _D	Drain Current (continuous) at T _c = 100 °C	24	14	A
I _{DM(•)}	Drain Current (pulsed)	144	144	A
P _{tot}	Total Dissipation at T _c = 25 °C	100	35	W
	Derating Factor	0.66	0.27	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	—	2000	V
dv/dt	Peak Diode Recovery voltage slope	7		V/ns
T _{stg}	Storage Temperature	-65 to 175		°C
T _j	Max. Operating Junction Temperature	175		°C

(•) Pulse width limited by safe operating area

(1) I_{SD} ≤ 36 A, di/dt ≤ 300 A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}

STP36NE06FP

THERMAL DATA

			TO-220	TO-220FP	
R _{thj-case}	Thermal Resistance Junction-case	Max	1.51	4.28	°C/W
R _{thj-amb} R _{thc-sink}	Thermal Resistance Junction-ambient Thermal Resistance Case-sink	Max Typ	62.5 0.5	300	°C/W °C/W °C
T _I	Maximum Lead Temperature For Soldering Purpose				

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max)	36	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 25V)	180	mJ

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA V _{GS} = 0	60			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating °C			1 10	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 20 V			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250 μA	2	3	4	V
R _{DSS(on)}	Static Drain-source On Resistance	V _{GS} = 10V I _D = 18 A		0.032	0.04	Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} × R _{DSS(on)max} V _{GS} = 10 V	36			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{DSS(on)max} I _D = 18 A	7	15		S
C _{iiss} C _{oiss} C _{riss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		2115 260 65	2800 350 90	pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Time Rise Time	$V_{DD} = 30 \text{ V}$ $I_D = 18 \text{ A}$ $R_G = 4.7 \Omega$ $V_{GS} = 10 \text{ V}$		28 85	40 115	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 48 \text{ V}$ $I_D = 36 \text{ A}$ $R_G = 4.7 \Omega$ $V_{GS} = 10 \text{ V}$		250		A/ μs
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 48 \text{ V}$ $I_D = 36 \text{ A}$ $V_{GS} = 10 \text{ V}$		50 13 18	70	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	$V_{DD} = 48 \text{ V}$ $I_D = 36 \text{ A}$ $R_G = 4.7 \Omega$ $V_{GS} = 10 \text{ V}$		12 25 40	16 35 55	ns ns ns

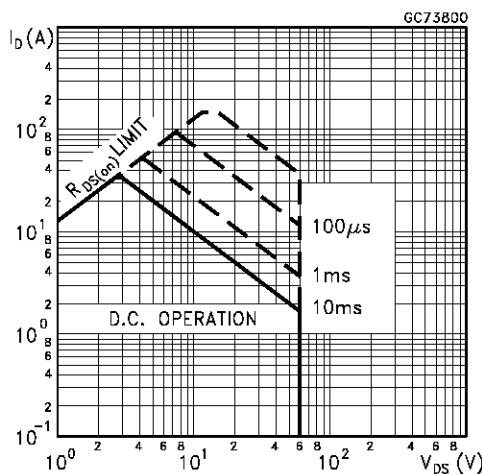
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM}(\bullet)$	Source-drain Current Source-drain Current (pulsed)				36 144	A A
$V_{SD} (\ast)$	Forward On Voltage	$I_{SD} = 36 \text{ A}$ $V_{GS} = 0$			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 36 \text{ A}$ $di/dt = 100 \text{ A}/\mu\text{s}$ $V_{DD} = 30 \text{ V}$ $T_j = 150^\circ\text{C}$		75 245 6.5		ns μC A

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

(*) Pulse width limited by safe operating area

Safe Operating Area for TO-220



Safe Operating Area for TO-220FP

