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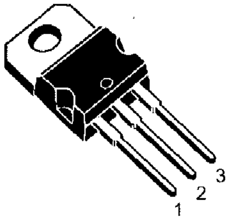
STP36NE06
STP36NE06FP

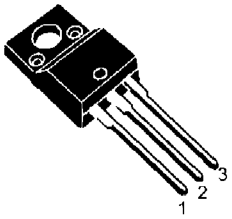
N - CHANNEL 60V - 0.032Ω - 36A - TO-220/TO-220FP
STripFET™ POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STP36NE06	60 V	< 0.040 Ω	36 A
STP36NE06FP	60 V	< 0.040 Ω	20 A

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

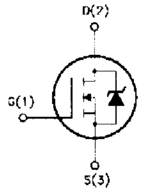


TO-220



TO-220FP

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STP36NE06	STP36NE06FP	
V_{DS}	Drain-source Voltage ($V_{GS} = 0$)	60		V
V_{DGR}	Drain- gate Voltage ($R_{GS} = 20\ k\Omega$)	60		V
V_{GS}	Gate-source Voltage	± 20		V
I_D	Drain Current (continuous) at $T_c = 25\ ^{\circ}C$	36	20	A
I_D	Drain Current (continuous) at $T_c = 100\ ^{\circ}C$	24	14	A
$I_{DM}(\bullet)$	Drain Current (pulsed)	144	144	A
P_{tot}	Total Dissipation at $T_c = 25\ ^{\circ}C$	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) $I_{SD} \leq 36$ A, $di/dt \leq 300$ A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX}$

Quality Semi-Conductors

THERMAL DATA

		TO-220	TO-220FP	
$R_{thj\text{-}case}$	Thermal Resistance Junction-case Max	1.51	4.28	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient Max	62.5		°C/W
$R_{thc\text{-}sink}$	Thermal Resistance Case-sink Typ	0.5		°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	300		°C

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 T_c = 125 °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
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V I_D = 18 A		0.032	0.04	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ V_{GS} = 10 V	36			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ I_D =18 A	7	15		S
C_{iss} C_{oss} C_{rss}	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 V I_D = 18 A R_G =4.7Ω V_{GS} = 10 V		28 85	40 115	ns ns
$(di/dt)_{on}$	Turn-on Current Slope	V_{DD} = 48 V I_D = 36 A R_G = 4.7 Ω V_{GS} =10 V		250		A/μs
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 48 V I_D = 36 A V_{GS} = 10 V		50 13 18	70	nC nC nC

SWITCHING OFF

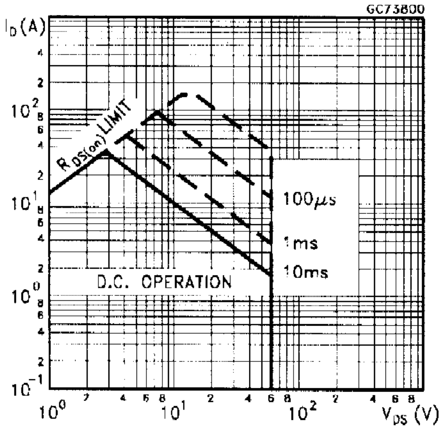
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	V_{DD} = 48 V I_D = 36 A R_G =4.7 Ω V_{GS} = 10 V		12 25 40	16 35 55	ns ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}(•)	Source-drain Current Source-drain Current (pulsed)				36 144	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 36 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 A di/dt = 100 A/μs V_{DD} = 30 V T_j = 150 °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