STP36NF06
STP36NF06FP

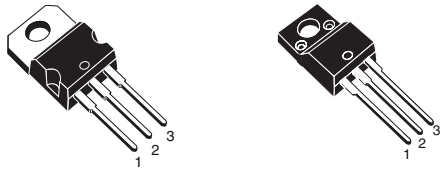
N-channel 60V - 0.032Ω - 30A - TO-220/TO-220FP
STripFET™ II Power MOSFET

General features

Type	V_{DSS}	$R_{DS(on)}$	I_D
STP36NF06	60V	<0.040Ω	30A
STP36NF06FP	60V	<0.040Ω	18A(1)

1. Current limited by package

- Exceptional dv/dt capability
- 100% avalanche tested
- Application oriented characterization



TO-220 TO-220FP

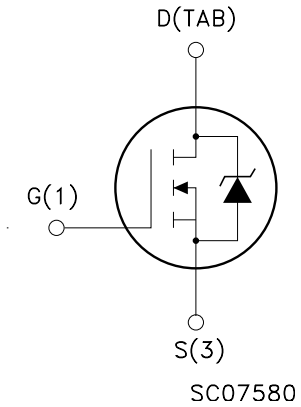
Description

This Power MOSFET is the latest development of STMicroelectronics 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

- Switching application

Internal schematic diagram



Order codes

Part number	Marking	Package	Packaging
STP36NF06	P36NF06	TO-220	Tube
STP36NF06FP	P36NF06	TO-220FP	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-220	TO-220FP	
V_{DS}	Drain-source voltage (V_{GS} = 0)	60		V
V_{GS}	Gate- source voltage	± 20		V
I_D	Drain current (continuous) at T_C = 25°C	30	18(1)	A
I_D	Drain current (continuous) at T_C = 100°C	21	12(1)	A
I_{DM}(2)	Drain current (pulsed)	120	72	A
P_{tot}	Total dissipation at T_C = 25°C	70	25	W
	Derating factor	0.47	0.17	W/°C
dv/dt (3)	Peak diode recovery voltage slope	20		V/ns
E_{AS} (4)	Single pulse avalanche energy	200		mJ
V_{ISO}	Insulation withstand voltage three leads to external heat (t = 1s; Tc = 25°C)	--	2500	V
T_{stg}	Storage temperature	-55 to 175		°C
T_j	Max. operating junction temperature			

1. Current limited by package's thermal resistance
2. Pulse width limited by safe operating area.
3. I_{SD} ≤36A, di/dt ≤400A/µs, V_{DD} ≤$V_{(BR)DSS}$, Tj ≤T_{JMAX}
4. Starting T_j = 25 °C, I_D = 18A, V_{DD} = 45V

Table 2. Thermal data

		TO-220	TO-220FP	
Rthj-case	Thermal resistance junction-case max	2.14	6	°C/W
Rthj-amb	Thermal resistance junction-ambient max	62.5		°C/W
T_J	Maximum lead temperature for soldering purpose(1)	300		°C

1. 1.6 mm from case, for 10 sec.

2 Electrical characteristics

(T_{CASE}=25°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 = 250µA, V_{GS} =0	60			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = max ratings V_{DS} = max ratings, T_C = 125°C			1 10	µA µA
I_{GSS}	Gate-body leakage current (V_{DS} = 0)	V_{GS} = ± 20V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250µA	2		4	V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS} = 10V, I_D = 15A		0.032	0.040	Ω

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward transconductance	V_{DS} = 25V, I_D = 15A		12		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 25V, f = 1MHz, V_{GS} = 0		690 170 68		pF pF pF
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off delay time Fall time	V_{DD} = 30V, I_D = 18A R_G = 4.7Ω V_{GS} = 10V		10 40 27 9		ns ns ns ns
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD} = 30V, I_D = 18A, V_{GS} = 10V		23 6 9	31	nC nC nC

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

Table 5. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (1)	Source-drain current Source-drain current (pulsed)				30 120	A A
V_{SD} (2)	Forward on voltage	I_{SD} = 30A, V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD} = 30A, di/dt = 100A/µs, V_{DD} = 30V, T_j = 150°C		65 155 4.8		ns nC 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 for TO-220

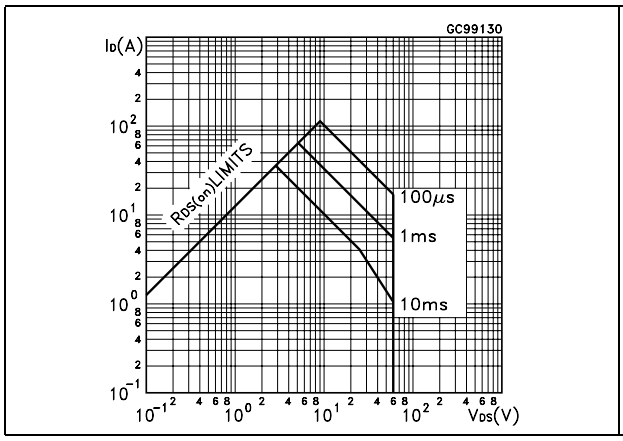


Figure 2. Thermal impedance for TO-220

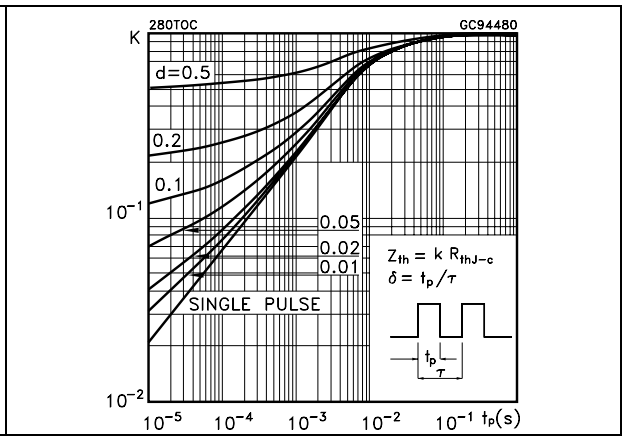


Figure 3. Safe operating area for TO-220FP

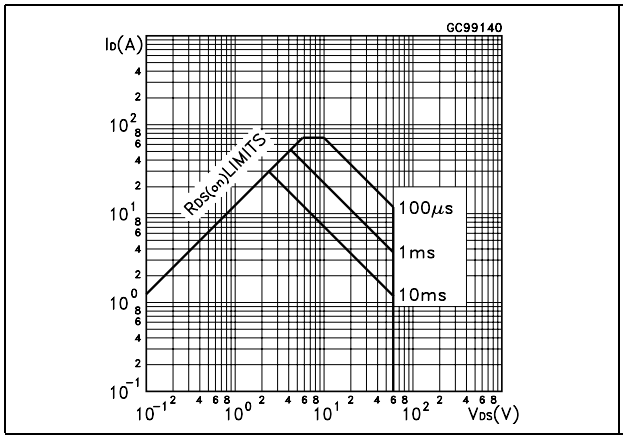


Figure 4. Thermal impedance for TO-220FP

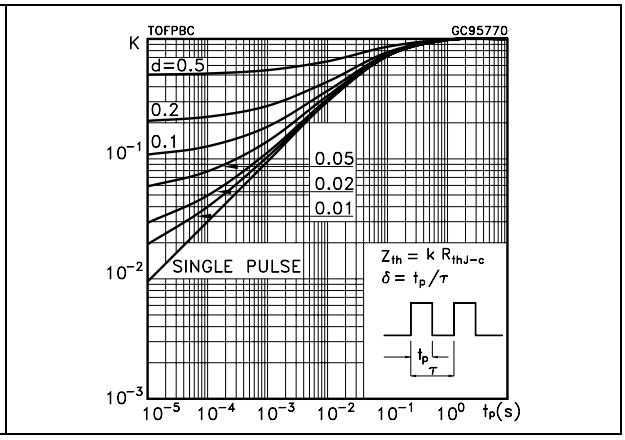


Figure 5. Output characteristics

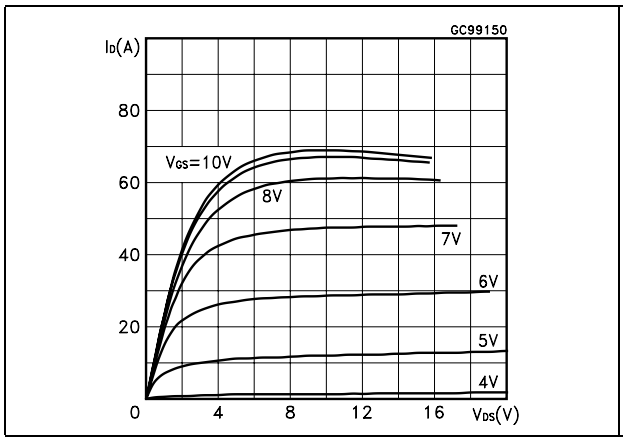


Figure 6. Transfer characteristics