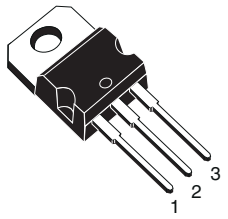
STP60NF03L

N-channel 30V - 0.008Ω - 60A TO-220
STripFET™ Power MOSFET

General features

Type	V_{DSS}	$R_{DS(on)}$	I_D
STP60NF03L	30V	<0.01Ω	60A

- Low threshold drive



TO-220

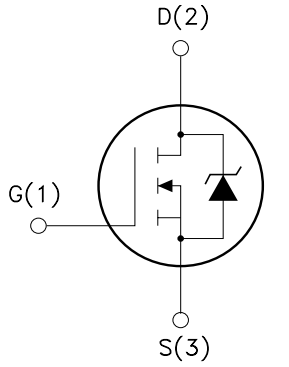
Description

This Power MOSFET is the latest development of STMicroelectronis 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
STP60NF03L	P60NF03L	TO-220	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{GS}	Gate-source voltage	30	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	30	V
V_{GS}	Gate- source Voltage	± 20	V
I_D	Drain current (continuous) at T_C = 25°C	60	A
I_D	Drain current (continuous) at T_C=100°C	42	A
I_{DM}(1)	Drain current (pulsed)	240	A
P_{TOT}	Total dissipation at T_C = 25°C	100	W
	Derating factor	0.67	W/°C
E_{AS}(2)	Single pulse avalanche energy	650	mJ
T_J T_{stg}	Operating junction temperature Storage temperature	175 -65 to 175	°C

1. Pulse width limited by safe operating area
2. Starting T_j = 25°C, I_D = 30A, V_{DD} = 20V

Table 2. Thermal data

$R_{thj-case}$	Thermal resistance junction-case Max	1.5	°C/W
R_{thj-a}	Thermal resistance junction-ambient Max	62.5	°C/W
Rthc-sink	Thermal resistance case-sink typ	0.5	°C/W
T_l	Maximum lead temperature for soldering purpose	300	°C

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 = 250 µA, V_{GS}= 0	30			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = Max rating, V_{DS} = Max rating @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	1	1.5	2.5	V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS}= 10V, I_D= 30A V_{GS}= 4.5V, I_D= 30A		0.008 0.0095	0.010 0.015	Ω Ω

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward transconductance	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, I_D = 30A		60		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} =25V, f=1 MHz, V_{GS}=0		2550 630 215		pF pF pF
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 15V, I_D = 30A, R_G = 4.7Ω, V_{GS} = 4.5V (see Figure 12)		40 250		ns ns
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD}=24V, I_D = 60A V_{GS} =5V		43 12 21	58	nC nC nC

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

Table 5. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
I_{SD}	Source-drain current				60	A
I_{SDM}(1)	Source-drain current (pulsed)				240	A
V_{SD}(2)	Forward on voltage	I_{SD}=60A, V_{GS}=0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD}=60A, di/dt = 100A/µs, V_{DD}=15V, Tj=150°C (see Figure 14)		75 100 2.6		ns µC A

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

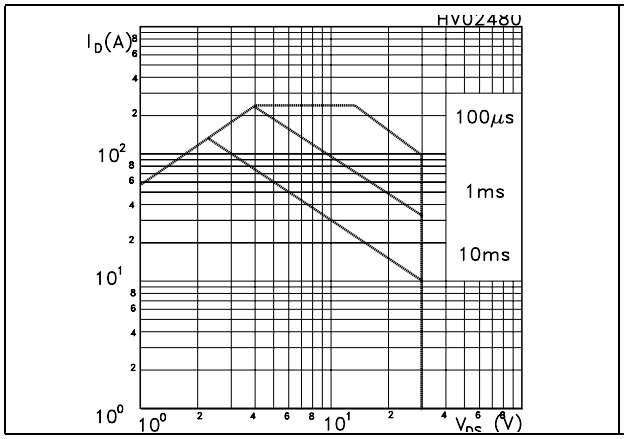


Figure 2. Thermal impedance

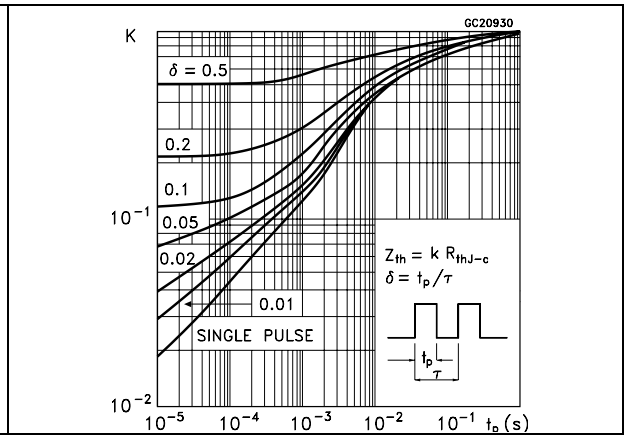


Figure 3. Output characterisics

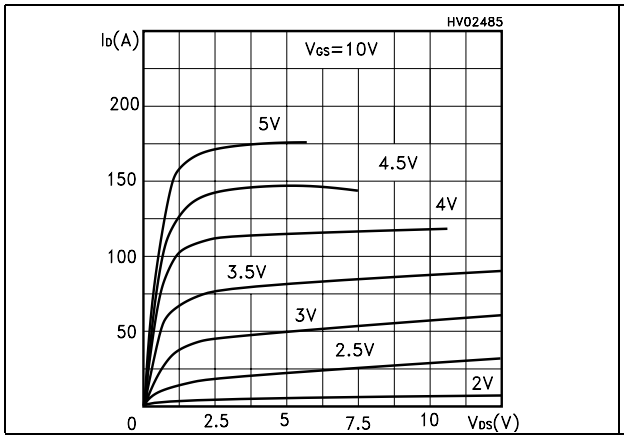


Figure 4. Transfer characteristics

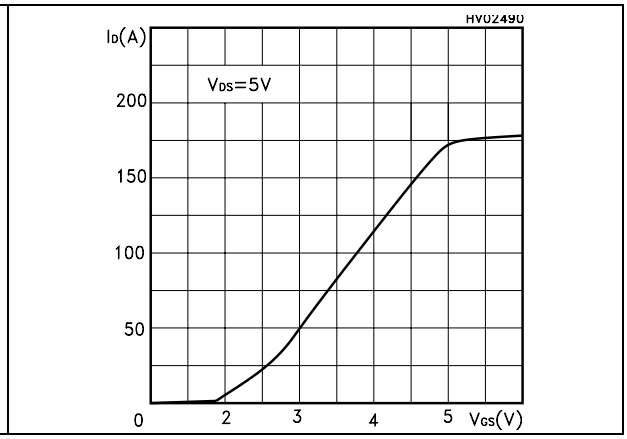


Figure 5. Transconductance

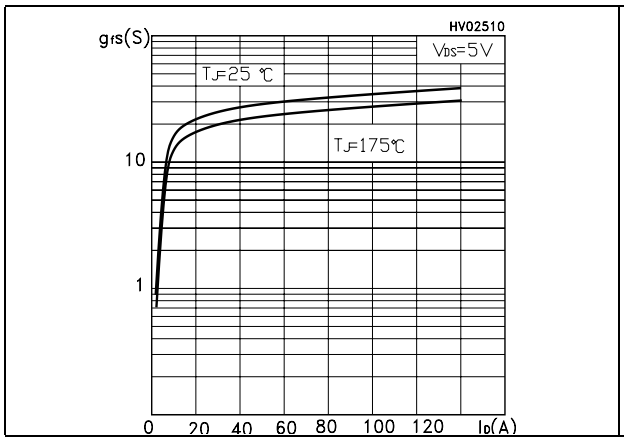
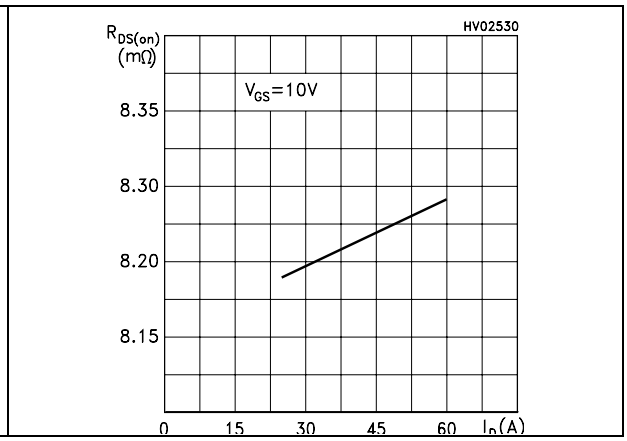



Figure 6. Static drain-source on resistance