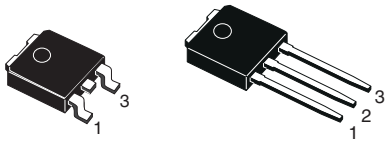
STD20NF06L
STD20NF06L-1

N-channel 60V - 0.032Ω - 24A - DPAK - IPAK
STripFET™ II Power MOSFET

General features

Type	V_{DSS}	$R_{DS(on)}$	I_D
STD20NF06L	60V	<0.040Ω	24A
STD20NF06L-1	60V	<0.040Ω	24A

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

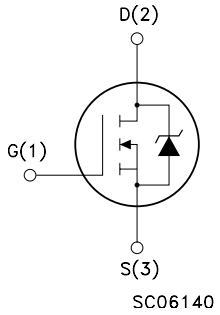


DPAK IPAK

Description

This Power MOSFET is the latest development of STMicroelectronics unique “Single Feature Size™” stripbased 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.

Internal schematic diagram



Applications

- Switching application

Order codes

Part number	Marking	Package	Packaging
STD20NF06L	D20NF06L	DPAK	Tape & reel
STD20NF06L-1	D20NF06L-1	IPAK	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage (V_{GS} = 0)	60	V
V_{GS}	Gate-source voltage	± 18	V
I_D	Drain current (continuous) at T_C = 25°C	24	A
I_D	Drain current (continuous) at T_C = 100°C	17	A
I_{DM} (1)	Drain current (pulsed)	96	A
P_{TOT}	Total dissipation at T_C = 25°C	60	W
	Derating factor	0.4	W/°C
dv/dt (2)	Peak diode recovery voltage slope	10	V/ns
E_{AS} (3)	Single pulse avalanche energy	225	mJ
T_j T_{stg}	Operating junction temperature Storage temperature	-55 to 175	°C

1. Pulse width limited by safe operating area
2. $I_{SD} \leq 24A$, di/dt ≤ 300A/ns, V_{DD} = 80% $V_{(BR)DSS}$
3. Starting Tj = 25°C, $I_D = I_{AR}$, V_{DD} = 60V

Table 2. Thermal data

Symbol	Parameter	Value	Unit
Rthj-case	Thermal resistance junction-case Max	2.5	°C/W
Rthj-pcb(1)	Thermal resistance junction-pcb Max	50	°C/W
T_l	Maximum lead temperature for soldering purpose	275	°C

1. When mounted on 1 inch² FR-4 board, 2 oz of Cu

2 Electrical characteristics

(Tcase =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 rating, V_{DS} = Max rating,Tc = 125°C			1 10	µA µA
I_{GSS}	Gate body leakage current (V_{DS} = 0)	V_{GS} = ±18V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS}= V_{GS}, I_D = 250µA	1		2.5	V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS}= 10V, I_D= 12A V_{GS}= 5V, I_D= 12A		0.032	0.040 0.050	Ω Ω

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward transconductance	V_{DS} =25V, I_D = 12A		20		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} =25V, f=1MHz, V_{GS}=0		660 170 70		pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD}=30V, I_D = 20A V_{GS} =10V		13 3.5 8		nC nC nC

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

Table 5. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max	Unit
$t_{d(on)}$	Turn-on delay time	V_{DD}=30V, I_D=10A, R_G=4.7Ω, V_{GS}=10V		11		ns
t_r	Rise time			50		ns
$t_{d(off)}$	Turn-off delay time			20		ns
t_f	Fall time			12		ns

Table 6. Source drain diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain current				24	A
I_{SDM}	Source-drain current (pulsed)				96	A
V_{SD} (1)	Forward on voltage	I_{SD}=20A, V_{GS}=0			1.5	V
t_{rr}	Reverse recovery time	I_{SD}=20A, di/dt = 100A/µs, V_{DD}=20V, Tj=150°C		56		ns
Q_{rr}	Reverse recovery charge			108		nC
I_{RRM}	Reverse recovery current			4		A

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

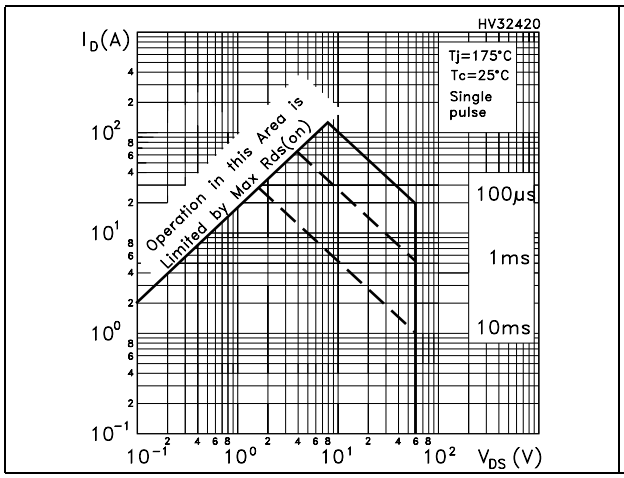


Figure 2. Thermal impedance

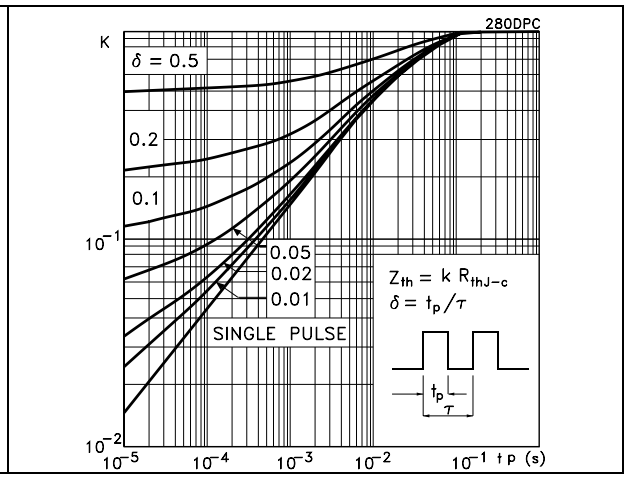


Figure 3. Output characterisics

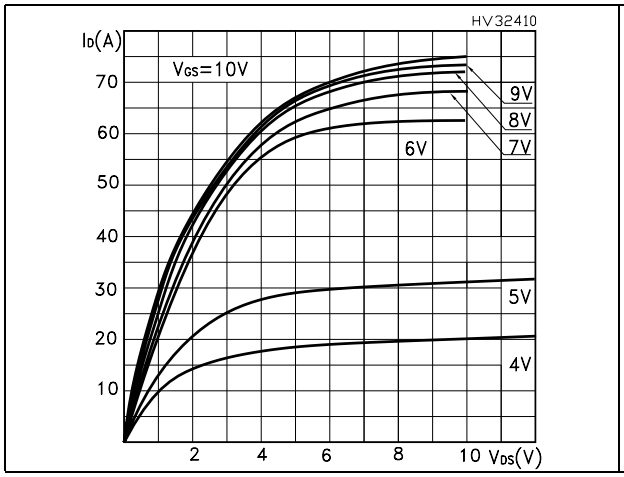


Figure 4. Transfer characteristics

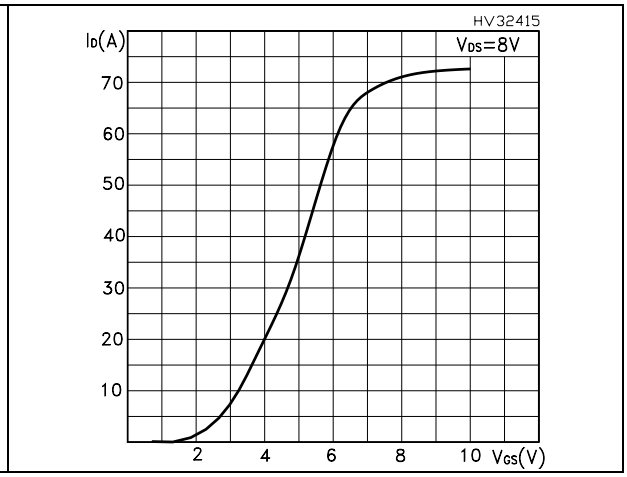


Figure 5. Normalized B_{VDSS} vs temperature

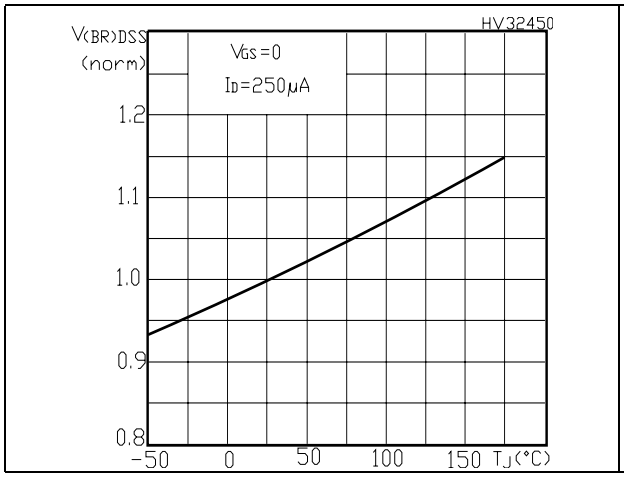


Figure 6. Static drain-source on resistance