STB80NF55-08T4
STP80NF55-08, STW80NF55-08

N-channel 55 V, 0.0065 Ω, 80 A, TO-220, D²PAK, TO-247
STripFET™ Power MOSFET

Features

Type	V_{DSS}	$R_{DS(on)}$ max	I_D
STB80NF55-08T4	55 V	< 0.008 Ω	80 A
STP80NF55-08	55 V	< 0.008 Ω	80 A
STW80NF55-08	55 V	< 0.008 Ω	80 A

- Standard threshold drive

Application

- Switching applications

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 avalance characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

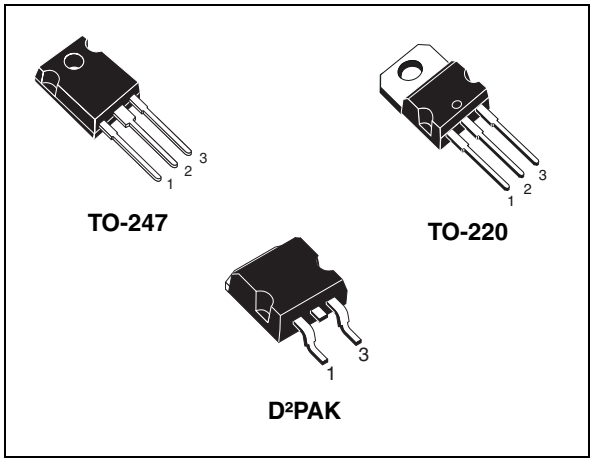

Figure 1. Internal schematic diagram

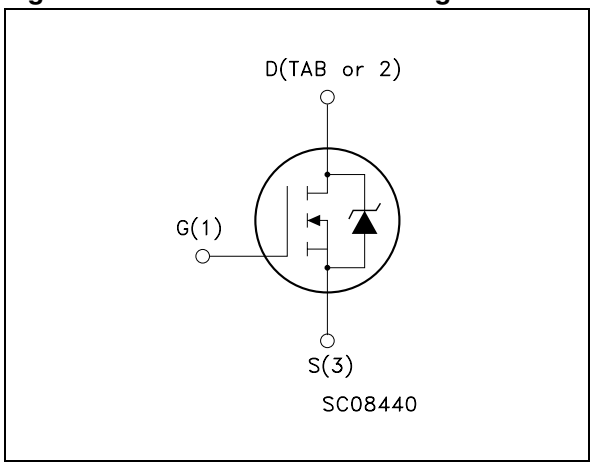

Table 1. Device summary

Order codes	Marking	Package	Packaging
STB80NF55-08T4	B80NF55-08	D²PAK	Tape and reel
STP80NF55-08	P80NF55-08	TO-220	Tube
STW80NF55-08	W80NF55-08	TO-247	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage (V_{GS} = 0)	55	V
V_{GS}	Gate- source voltage	±20	V
I_D (1)	Drain current (continuos) at T_C = 25 °C	80	A
I_D (1)	Drain current (continuos) at T_C = 100 °C	80	A
I_{DM}(2)	Drain current (pulsed)	320	A
P_{TOT}	Total dissipation at T_C = 25 °C	300	W
	Derating factor	2	W/°C
T_j T_{stg}	Operating junction temperature Storage temperature	-55 to 175	°C

1. Current limited package
2. Pulse width limited by safe operating area

Table 3. Thermal resistance

Symbol	Parameter	Value			Unit
		D^2PAK	TO-220	TO-247	
$R_{thj-case}$	Thermal resistance junction-case max	0.5			°C/W
$R_{thj-amb}$	Thermal resistance junction-ambient max	35(1)	62.5	50	°C/W
T_l	Maximum lead temperature for soldering purpose	300			°C

1. When mounted on 1 $inch^2$ FR-4 board, 2 oz Cu

Table 4. Avalanche characteristics

Symbol	Parameter	Max value	Unit
I_{AR}	Avalanche current, repetitive or not-repetitive (pulse width limited by T_j max)	40	A
E_{AS}	Single pulse avalanche energy (starting T_j = 25 °C, I_D = I_{AR}, V_{DD} = 30 V)	1000	mJ

2 Electrical characteristics

(T_{CASE} = 25 °C unless otherwise specified)

Table 5. 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	55			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} = ±20 V			±100	nA
$V_{GS(th)}$	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} = 10 V, I_D = 40 A		0.0065	0.008	Ω

Table 6. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward transconductance	V_{DS} =15 V , I_D = 18 A		40		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS}= 0		3740 830 265		pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD}= 27 V, I_D = 80 A V_{GS} =10 V		112 20 40	155	nC nC nC

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

Table 7. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off-delay time Fall time	V_{DD} = 27 V, I_D = 40 A R_G = 4.7 Ω V_{GS} = 10 V		20 110 75 35		ns ns ns ns

Table 8. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
I_{SD}	Source-drain current				80	A
I_{SDM} (1)	Source-drain current (pulsed)				320	A
V_{SD}	Forward on voltage	I_{SD} = 80 A, V_{GS} = 0			1.5	V
t_{rr}(2) Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD} = 80 A,V_{DD} = 25 V di/dt=100 A/µs, T_j =150 °C		80 230 5.7		ns nC A

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

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

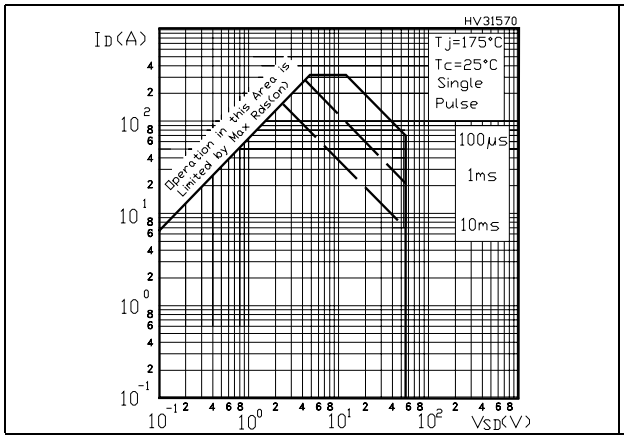

Figure 3. Thermal impedance

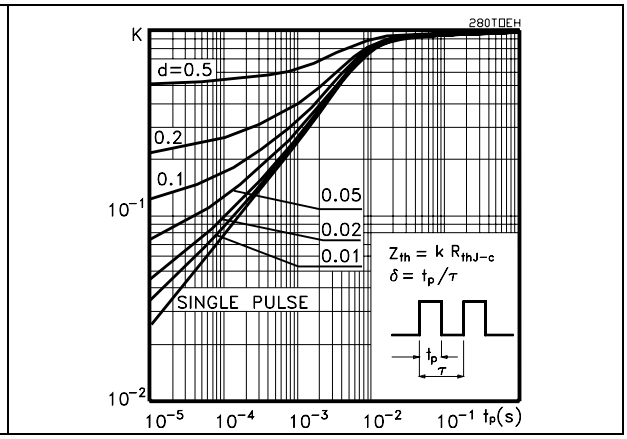

Figure 4. Output characteristics

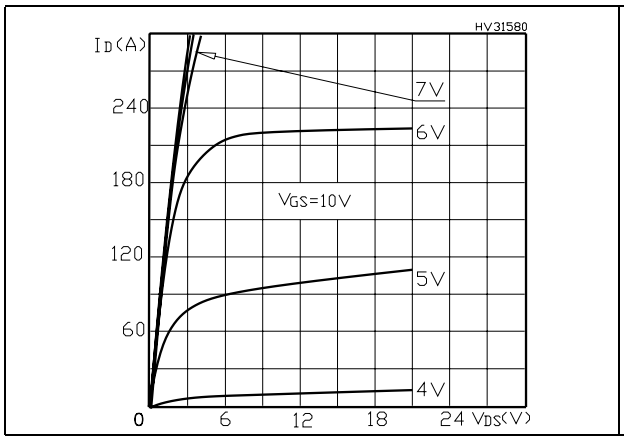

Figure 5. Transfer characteristics

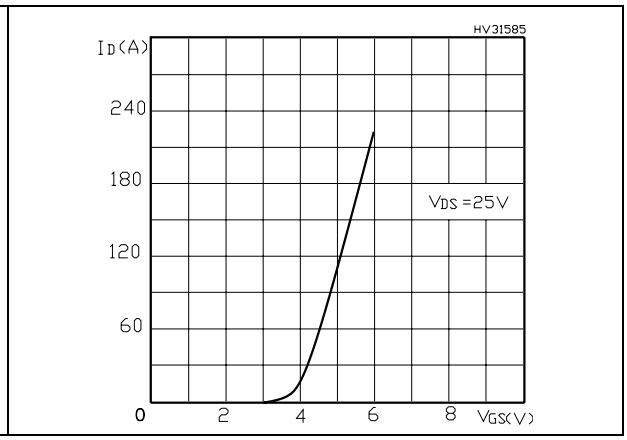

Figure 6. Normalized BV_{DSS} vs temperature

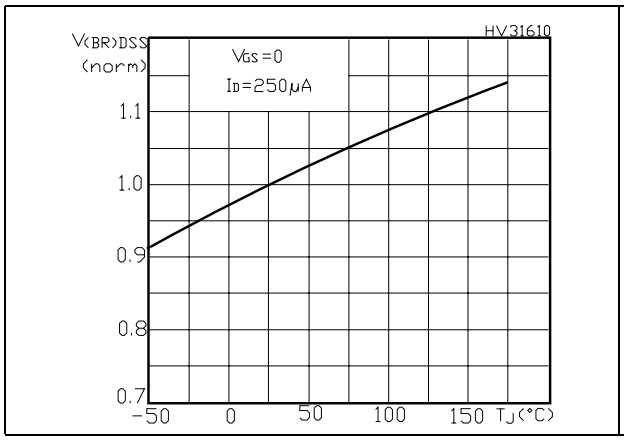

Figure 7. Static drain-source on resistance