STB140NF55
STP140NF55

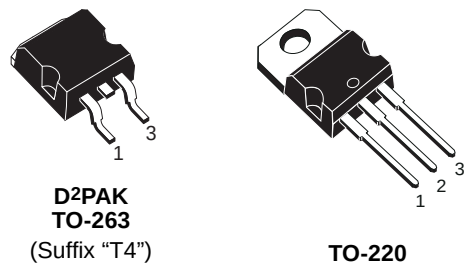
N-CHANNEL 55V - 0.0065 Ω - 80A TO-220/D²PAK
STripFET™ II POWER MOSFET

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STB140NF55	55 V	< 0.008 Ω	80 A
STP140NF55	55 V	< 0.008 Ω	80 A

- TYPICAL R_{DS}(on) = 0.0065 Ω

Figure 1:Package



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

- MOTOR CONTROL
- HIGH CURRENT, SWITCHING APPLICATIONS
- AUTOMOTIVE ENVIRONMENT

Figure 2: Internal Schematic Diagram

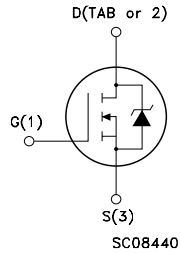


Table 2: Order Codes

Part Number	MARKING	PACKAGE	PACKAGING
STB140NF55T4	B140NF55	D²PAK	TAPE & REEL
STP140NF55	P140NF55	TO-220	TUBE

Table 3: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	Drain Current (continuous) at T_C = 25°C	80	A
I_D	Drain Current (continuous) at T_C = 100°C	80	A
I_{DM}(•)	Drain Current (pulsed)	320	A
P_{tot}	Total Dissipation at T_C = 25°C	300	W
	Derating Factor	2	W/°C
dv/dt(1)	Peak Diode Recovery voltage slope	10	V/ns
E_{AS}(2)	Single Pulse Avalanche Energy	1.3	mJ
T_{stg}	Storage Temperature	-55 to 175	°C
T_j	Operating Junction Temperature		

(•) Pulse width limited by safe operating area.
(**) Current Limited by Package

(1) I_{SD} ≤80A, di/dt ≤300A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_j ≤ T_{JMAX}
(2) Starting T_j = 25 °C, I_D = 40A, V_{DD} = 30V

Table 4: THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	0.5	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	62.5	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		300	°C

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Table 5: OFF

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 T_C = 125°C			1 10	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20 V			±100	nA

Table 6: 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} = 10 V I_D = 40 A		0.0065	0.008	Ω

Table 7: DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 25 V I_D = 40 A		100		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V f = 1 MHz V_{GS} = 0		5300 1000 290		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

Table 8: SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 27.5 V I_D = 40 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		30 150		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 44V I_D= 80A V_{GS}= 10V		142 27 55		nC nC nC

Table 9: SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 27.5 V I_D = 40 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		125 45		ns ns

Table 10: SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				80 320	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 80 A V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 80 A di/dt = 100A/µs V_{DD} = 20 V T_j = 150°C (see test circuit, Figure 5)		90 275 6.5		ns µC A

(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

Figure 3: Safe Operating Area

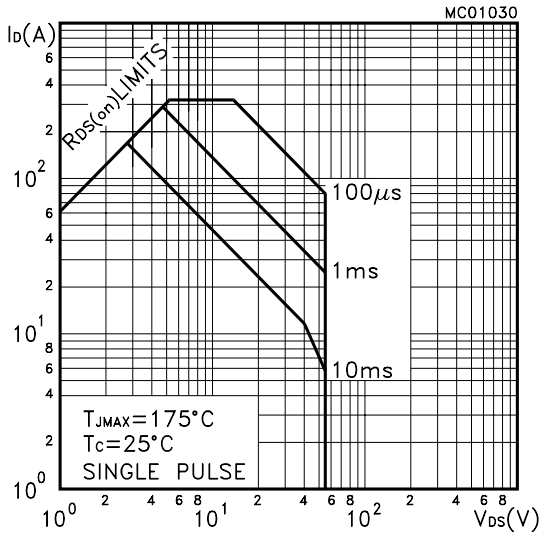


Figure 4: Thermal Impedance