STP11NM80 - STF11NM80
STB11NM80 - STW11NM80

N-CHANNEL 800V - 0.35 Ω - 11 A TO-220 /FP/D²PAK/TO-247
MDmesh™ MOSFET

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	$R_{DS(on)}*Q_g$	I_D
STP11NM80	800 V	< 0.40 Ω	14 Ω∗nC	11 A
STF11NM80	800 V	< 0.40 Ω	14 Ω∗nC	11 A
STB11NM80	800 V	< 0.40 Ω	14 Ω∗nC	11 A
STW11NM80	800 V	< 0.40 Ω	14 Ω∗nC	11 A

- TYPICAL R_{DS}(on) = 0.35 Ω
- LOW GATE INPUT RESISTANCE
- LOW INPUT CAPACITANCE AND GATE CHARGE
- BEST R_{DS}(on)*Qg IN THE INDUSTRY

Figure 1: Package

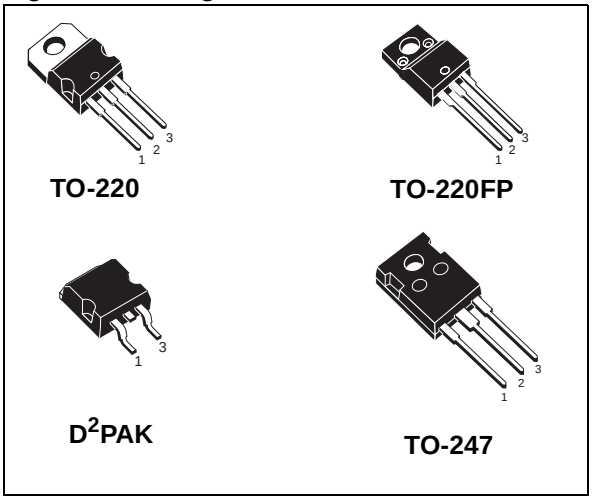
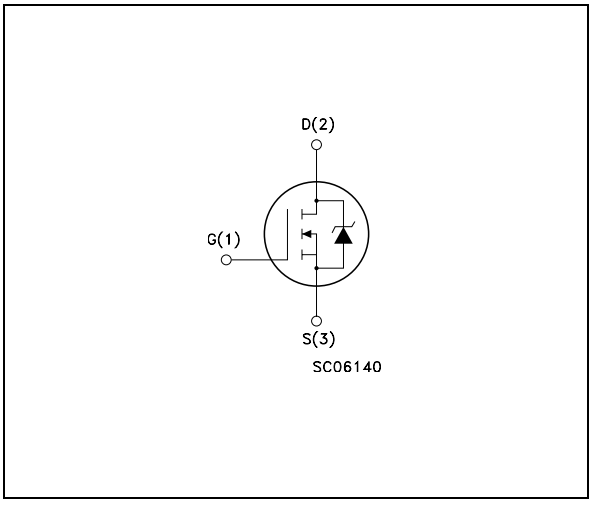


Figure 2: Internal Schematic Diagram



DESCRIPTION

The MDmesh™ associates the Multiple Drain process with the Company's PowerMesh™ horizontal layout assuring an oustanding low on-resistance. The adoption of the Company's proprietary strip technique yields overall dynamic performance that is significantly better than that of similar competition's products.

APPLICATIONS

The 800 V MDmesh™ family is very suitable for single switch applications in particular for Flyback and Forward converter topologies and for ignition circuits in the field of lighting.

Table 2: Order Codes

SALES TYPE	MARKING	PACKAGE	PACKAGING
STP11NM80	P11NM80	TO-220	TUBE
STF11NM80	F11NM80	TO-220FP	TUBE
STB11NM80T4	B11NM80	D²PAK	TAPE & REEL
STW11NM80	W11NM80	TO-247	TUBE

Table 3: Absolute Maximum ratings

Symbol	Parameter	Value		Unit
		TO-220/D^{2}PAK TO-247	TO-220FP	
V_{DS}	Drain-source Voltage (V_{GS} = 0)	800		V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	800		V
V_{GS}	Gate- source Voltage	± 30		V
I_D	Drain Current (continuous) at T_C = 25°C	11	11 (*)	A
I_D	Drain Current (continuous) at T_C = 100°C	4.7	4.7 (*)	A
I_{DM} (•)	Drain Current (pulsed)	44	44 (*)	A
P_{TOT}	Total Dissipation at T_C = 25°C	150	35	W
	Derating Factor	1.2	0.28	W /°C
T_j T_{stg}	Operating Junction Temperature Storage Temperature	-65 to 150		°C

(•) Pulse width limited by safe operating area
(*) Limited only by the Maximum Temperature Allowed

Table 4: Thermal Data

		TO-220/D^{2}PAK TO-247	TO-220FP	Unit
Rthj-case	Thermal Resistance Junction-case Max	0.83	3.6	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	62.5		°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	300		°C

Table 5: Avalanche Characteristics

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max)	2.5	A
E_{AS}	Single Pulse Avalanche Energy (starting T_j = 25 °C, I_D = 2.5A, V_{DD} = 50 V)	400	mJ

ELECTRICAL CHARACTERISTICS (T_{CASE} =25°C UNLESS OTHERWISE SPECIFIED)

Table 6: On/Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	800			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating, T_C = 125 °C			10 100	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 30V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA	3	4	5	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V, I_D =5.5 A		0.35	0.40	Ω

Table 7: 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 = 7.5 A		8		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		1630 750 30		pF pF pF
R_G	Gate Input Resistance	f=1 MHz Gate DC Bias = 0 Test Signal Level = 20mV Open Drain		2.7		Ω
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on Delay Time Rise Time Turn-off Delay Time Fall Time	V_{DD} = 400 V, I_D = 5.5 A R_G = 4.7Ω V_{GS} = 10 V (Resistive Load see, Figure 4)		22 17 46 15		ns ns ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 640 V, I_D = 11 A, V_{GS} = 10V		43.6 11.6 21		nC nC nC

Table 8: Source Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (2)	Source-drain Current Source-drain Current (pulsed)				11 44	A A
V_{SD} (1)	Forward On Voltage	I_{SD} = 11 A, V_{GS} = 0			0.86	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 11 A, di/dt = 100 A/µs V_{DD} = 50 V, T_j = 25°C (see test circuit, Figure 5)		612 7.22 23.6		ns µC A
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 11 A, di/dt = 100 A/µs V_{DD} = 50 V, T_j = 150°C (see test circuit, Figure 5)		970 11.25 23.2		ns µC A

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

Figure 3: Safe Operating Area For D²PAK/ TO-247 / TO-220

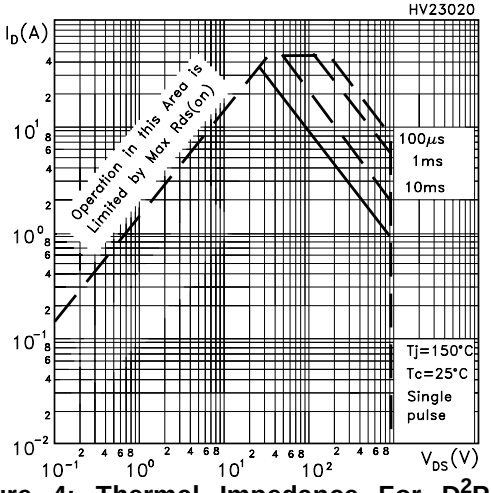


Figure 6: Safe Operating Area For TO-220FP

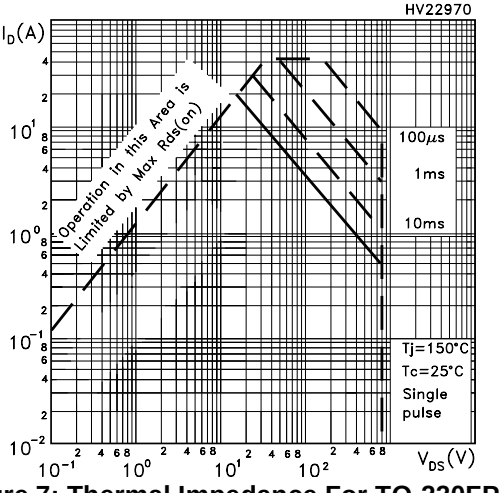


Figure 4: Thermal Impedance For D²PAK/ TO-247 / TO-220

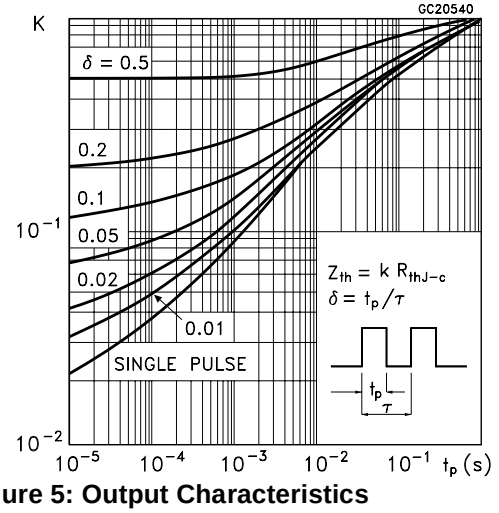


Figure 7: Thermal Impedance For TO-220FP

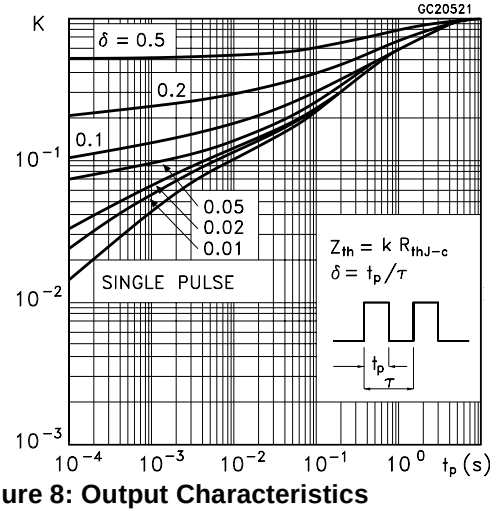


Figure 5: Output Characteristics

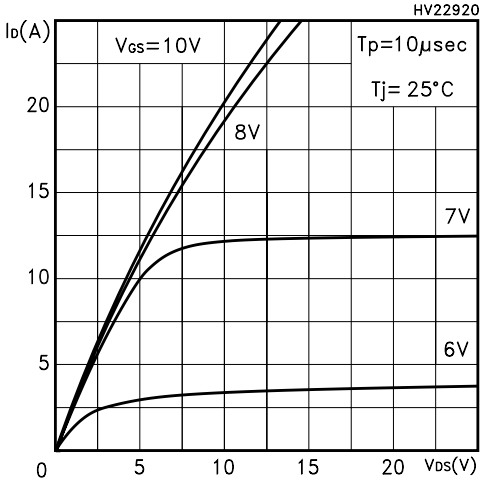


Figure 8: Output Characteristics