

HMS7N80F

800V N-Channel Super Junction MOSFET

Features

- Very Low FOM ($R_{DS(on)} \times Q_g$)
- Extremely low switching loss
- Excellent stability and uniformity
- 100% Avalanche Tested
- Built-in ESD Diode

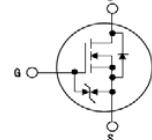
Key Parameters

Parameter	Value	Unit
$BV_{DSS} @ T_{j,max}$	850	V
I_D	7.0	A
$R_{DS(on), max}$	0.85	Ω
Q_g, Typ	13.7	nC

Application

- Switch Mode Power Supply (SMPS)
- TV power & LED Lighting Power
- AC to DC Converters
- Telecom

Package & Internal Circuit

TO-220FS	SYMBOL
	

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	800	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	7.0 *	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$)	4.9 *	A
$I_{DM}^1)$	Drain Current - Pulsed	21 *	A
$E_{AS}^2)$	Single Pulsed Avalanche Energy	56	mJ
I_{AR}	Avalanche Current	1.15	A
dv/dt	MOSFET dv/dt ruggedness, $V_{DS}=0\dots 400\text{V}$	50	V/ns
dv/dt	Reverse diode dv/dt , $V_{DS}=0\dots 400\text{V}$, $I_{DS} \leq I_D$	15	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	27	W
$V_{ESD(G-S)}$	Gate source ESD(HBM-C=100pF, $R=1.5\text{K}\Omega$)	2000	V
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

* Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	4.57	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient , Max.	80	$^\circ\text{C/W}$

Electrical Characteristics $T_J=25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
On Characteristics						
V_{GS}	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 220\text{ }\mu\text{A}$	2.0	-	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}$, $I_D = 1.6\text{ A}$	-	0.74	0.85	Ω
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 1\text{ mA}$	800	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800\text{ V}$, $V_{GS} = 0$	-	-	1	μA
		$V_{DS} = 800\text{ V}$, $T_C = 150^{\circ}\text{C}$	-	-	100	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$	-	-	± 1	μA
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$	-	564	-	pF
C_{oss}	Output Capacitance		-	13.6	-	pF
C_{rss}	Reverse Transfer Capacitance		-	2.1	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	$V_{DS} = 400\text{ V}$, $I_D = 2.8\text{ A}$, $R_G = 25\text{ }\Omega$ (Note 3,4)	-	18	-	ns
t_r	Turn-On Rise Time		-	16	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	72	-	ns
t_f	Turn-Off Fall Time		-	13	-	ns
$Q_{g(}}$	Total Gate Charge	$V_{DS} = 640\text{ V}$, $I_D = 2.8\text{ A}$, $V_{GS} = 10\text{ V}$ (Note 3,4)	-	13.7	-	nC
Q_{gs}	Gate-Source Charge		-	2.5	-	nC
Q_{gd}	Gate-Drain Charge		-	4.3	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current	-	-	7.0	A	
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	-	-	21	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 2.8\text{ A}$	-	-	1.3	V
trr	Reverse Recovery Time	$V_R = 400\text{ V}$, $I_F = 2.8\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$	-	230	-	ns
Qrr	Reverse Recovery Charge		-	1.7	-	μC

Notes :

- Repetitive Rating : Pulse width limited by maximum junction temperature
- $I_{AS}=1.15\text{ A}$ $V_{DD}=50\text{ V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
- Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- Essentially Independent of Operating Temperature

Package Dimension

TO-220FS-FM(Full Mold)

