

HMS5N80R  
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

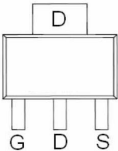
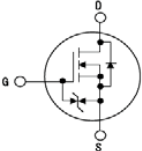
Application

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

Key Parameters

Parameter	Value	Unit
$BV_{DSS} @T_{j,max}$	850	V
$I_D$	5.0	A
$R_{DS(on), max}$	1.2	$\Omega$
$Q_g, Typ$	13.7	nC

Package & Internal Circuit

SOT223-3L	SYMBOL
	

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

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-Source Voltage	800	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_C = 25^{\circ}C$ )	5.0	A
	Drain Current - Continuous ( $T_C = 100^{\circ}C$ )	3.5	A
$I_{DM}^{1)}$	Drain Current - Pulsed	15	A
$E_{AS}^{2)}$	Single Pulsed Avalanche Energy	56	mJ
$I_{AR}$	Avalanche Current	1.15	A
dv/dt	MOSFET dv/dt ruggedness, $V_{DS}=0\ldots400V$	50	V/ns
dv/dt	Reverse diode dv/dt, $V_{DS}=0\ldots400V, I_{DS}\leq I_D$	15	V/ns
$P_D$	Power Dissipation ( $T_C = 25^{\circ}C$ )	66	W
$V_{ESD(G-S)}$	Gate source ESD(HBM-C=100pF, R=1.5K $\Omega$ )	2000	V
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^{\circ}C$

Thermal Resistance Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	1.9	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient , Max.	62.5	$^{\circ}C/W$

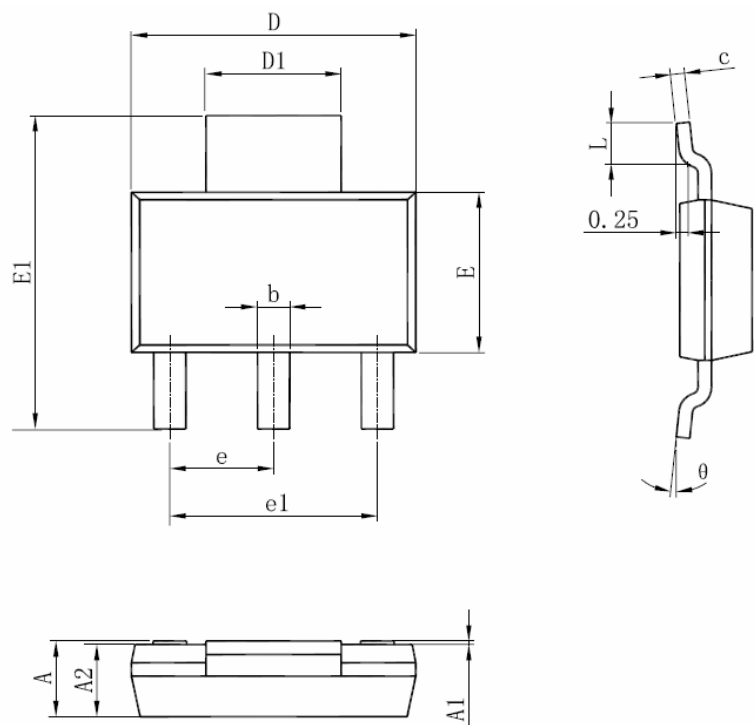
Electrical Characteristics  $T_J=25\text{ }^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
On Characteristics						
V <sub>GS</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 220 μA	2.0	-	4.0	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1.6 A	-	1.05	1.2	Ω
Off Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 1mA	800	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 800 V, V <sub>GS</sub> = 0	-	-	1	μA
		V <sub>DS</sub> = 800 V, T <sub>C</sub> = 150°C	-	-	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V	-	-	±1	μA
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 500 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz	-	564	-	pF
C <sub>oss</sub>	Output Capacitance		-	13.6	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	2.1	-	pF
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On Time	V <sub>DS</sub> = 400 V, I <sub>D</sub> = 2.8 A, R <sub>G</sub> = 25 Ω  (Note 3,4)	-	18	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	16	-	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		-	72	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	13	-	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 640 V, I <sub>D</sub> = 2.8 A, V <sub>GS</sub> = 10 V  (Note 3,4)	-	13.7	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	2.5	-	nC
Q <sub>gd</sub>	Gate-Drain Charge		-	4.3	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current		-	-	5.0	A
I <sub>SM</sub>	Maximum Pulsed Drain-Source Diode Forward Current		-	-	15	A
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 2.8 A	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> = 400 V, I <sub>F</sub> = 2.8 A di <sub>F</sub> /dt = 100 A/μs	-	230	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	1.7	-	μC

Notes :

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

SOT-223-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

Notes

- 1. All dimensions are in millimeters.
- 2. Tolerance ±0.10mm (4 mil) unless otherwise specified
- 3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
- 4. Dimension L is measured in gauge plane.
- 5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.