HMS20N80T

800V N-Channel Super Junction MOSFET

Features

- Very Low FOM ($R_{DS(on)}$ X 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	20	A
$R_{DS(on),\ max}$	0.25	Ω
$Qg_{,\ Typ}$	13.7	nC

Package & Internal Circuit

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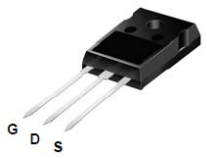
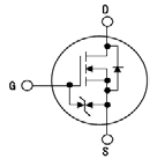
	

Absolute Maximum Ratings

T_C=25℃ 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℃)	20 *	A
	Drain Current - Continuous (T_C = 100℃)	14 *	A
I_{DM} [1)]	Drain Current - Pulsed	60 *	A
E_{AS} [2)]	Single Pulsed Avalanche Energy	56	mJ
I_{AR}	Avalanche Current	1.15	A
dv/dt	MOSFET dv/dt ruggedness, VDS=0…400V	50	V/ns
dv/dt	Reverse diode dv/dt, V_{DS}=0…400V, I_{DS}≤I_D	15	V/ns
P_D	Power Dissipation (T_C = 25℃)	27	W
$V_{ESD(G-S)}$	Gate source ESD(HBM-C=100pF, R=1.5KΩ)	2000	V
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃

* Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

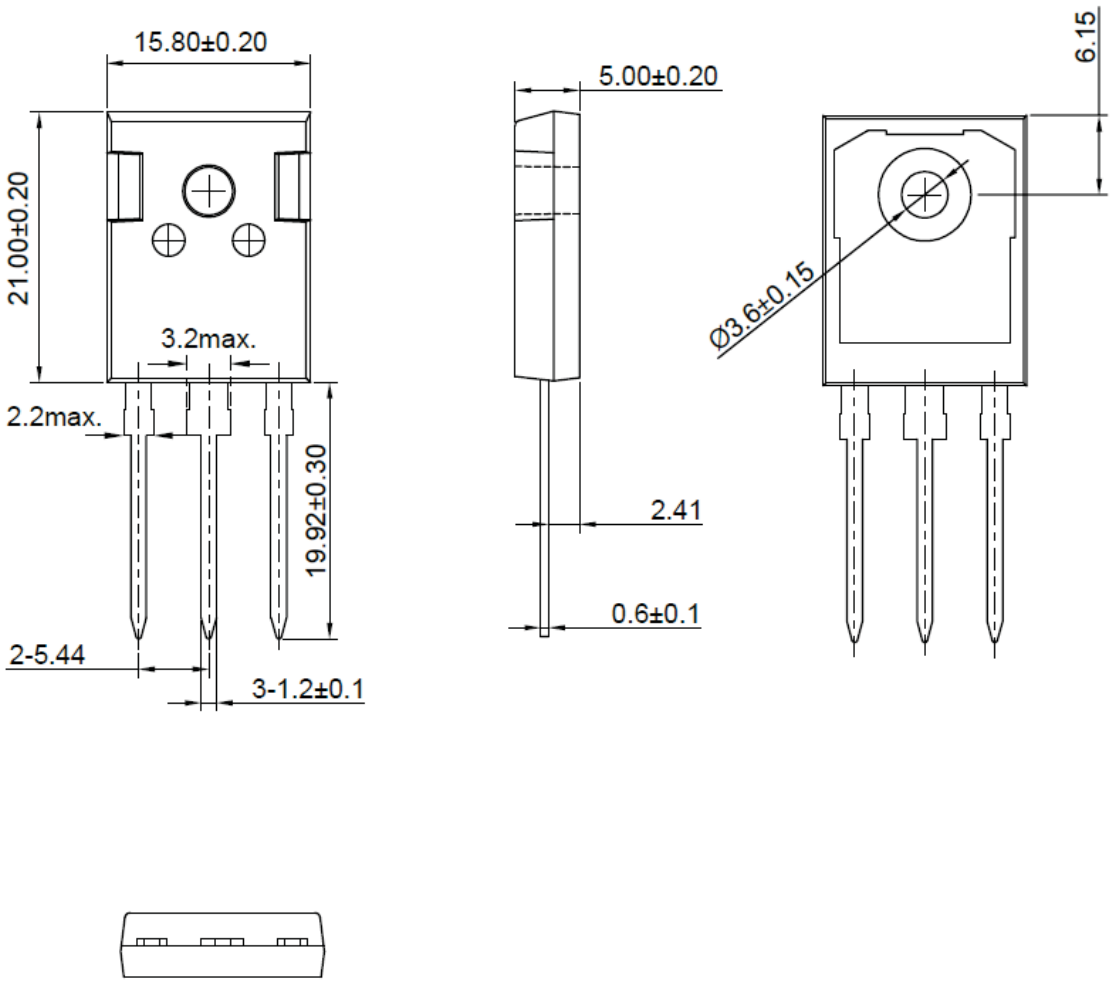
Symbol	Parameter	Value	Unit
$R_{θJC}$	Thermal Resistance, Junction-to-Case, Max.	4.57	℃/W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient , Max.	80	℃/W

Electrical Characteristics T_J=25 °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 μA	2.0	-	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 1.6 A	-	0.22	0.25	Ω
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1mA	800	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V, V_{GS} = 0	-	-	1	μA
		V_{DS} = 800 V, T_C = 150℃	-	-	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±1	μA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 500 V, V_{GS} = 0 V, f = 1.0 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 V, I_D = 2.8 A, R_G = 25 Ω (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 V, I_D = 2.8 A, V_{GS} = 10 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 V, I_S = 2.8 A	-	-	1.3	V
trr	Reverse Recovery Time	V_R = 400 V, I_F = 2.8 A, di_F/dt = 100 A/μs	-	230	-	ns
Qrr	Reverse Recovery Charge		-	1.7	-	μC

Notes :

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=1.15A V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
4. Essentially Independent of Operating Temperature

Package Dimension

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