

**Super Junction Power MOSFET** $V_{DS}=650V, I_D=11A, R_{DS(ON)}=318m\Omega(\text{typ})$ **Features**

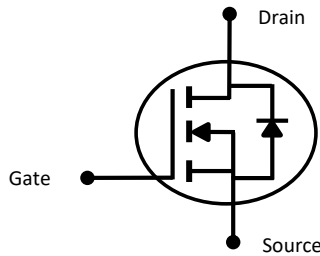
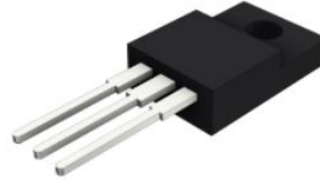
- Low drain-source on-resistance: $R_{DS(ON)}=318m\Omega(\text{typ})$
- Easy to control gate switching
- Enhancement mode: $V_{GS(th)}=2.8V$ to $4.2V$
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

Applications

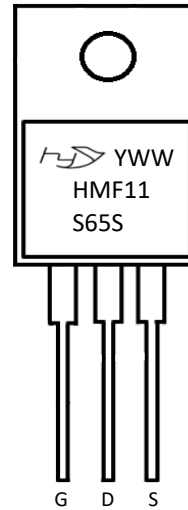
- Telecom / Server Power Supplies
- Industrial Power Supplies
- UPS / Solar
- Lighting / Charger / Adapter

Ordering Information

- Package : ITO-220AB
- Quantity Per Tube : 50 pcs

Device Schematic**Package Outline**

ITO-220AB Top View

Marking Information

Date Code : Y=Year WW=Week
Marking : HMF11S65S

Maximum Ratings (@T_J = +25°C, unless otherwise specified.)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage (Static)	V _{GS}	±20	V
Gate-Source Voltage (Dynamic)		±30	V
Continuous Drain Current @ T _C =25°C (Note 1.)	I _D	11	A
Pulsed Drain Current @ T _C =25°C (Note 2.)	I _{D,pulse}	33	
Avalanche Current (Single pulse) T _C =25°C, V _{DD} =50V, L = 49.9mH, R _G =25Ω	I _{AS}	5	A
Avalanche Energy (Single pulse) T _C =25°C, V _{DD} =50V, L = 49.9mH, R _G =25Ω	E _{AS}	624	mJ
Power Dissipation @ T _C =25°C	P _D	31	W
Soldering Temperature Distance of 1.6mm from case for 10s	T _L	260	° C
Junction & Storage Temperature	T _J , T _{STG}	-55 to +150	° C

Notes: 1.Limited by T_{j,max}. Maximum Duty Cycle D = 0.50

2.Pulse width t_p limited by T_{j,max}

Thermal characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction- case	R _{thJC}	4	° C/W
Thermal resistance, junction- ambient (device on PCB, minimal footprint)	R _{thJA}	80	° C/W

Electrical Characteristics (@T_J = +25°C, unless otherwise specified.)

Static Characteristics

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	V(BR)DSS	655	-	-	V
Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V	I _{GSS}	-	-	±100	nA
Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	I _{DSS}	-	-	1.0	μA
Gate-Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	V _{GS(th)}	2.8	-	4.2	V
Static Drain-Source On-Resistance	V _{GS} =10V, I _D =5.5A	R _{DS(ON)}	-	318	350	mΩ
Gate Resistance (Intrinsic)	F=1MHz, open drain	R _G	-	11	-	Ω

Dynamic Characteristics

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Input Capacitance	V _{GS} =0V, V _{DS} =50V, F=10kHz	C _{ISS}	-	901	-	pF
Output Capacitance		C _{OSS}	-	59	-	pF
Reverse Transfer Capacitance		C _{RSS}	-	5.3	-	pF
Turn-On Delay Time	V _{DD} =400V, V _{GS} =13V I _D =4.8A, R _G =3.4Ω	t _{d(on)}	-	7	-	ns
Turn-On Rise Time		t _r	-	21	-	ns
Turn-Off Delay Time		t _{d(off)}	-	29.2	-	ns
Turn-Off Fall Time		t _f	-	19.2	-	ns

Gate Charge Characteristics

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Gate Plateau Voltage	V _{DD} =400V, I _D =4.8A V _{GS} =0 to 10V	V _{plateau}	-	5.3	-	V
Total Gate Total		Q _g	-	22	-	nC
Gate Source Charge		Q _{gs}	-	5.8	-	nC
Gate Drain Charge		Q _{gd}	-	17	-	nC

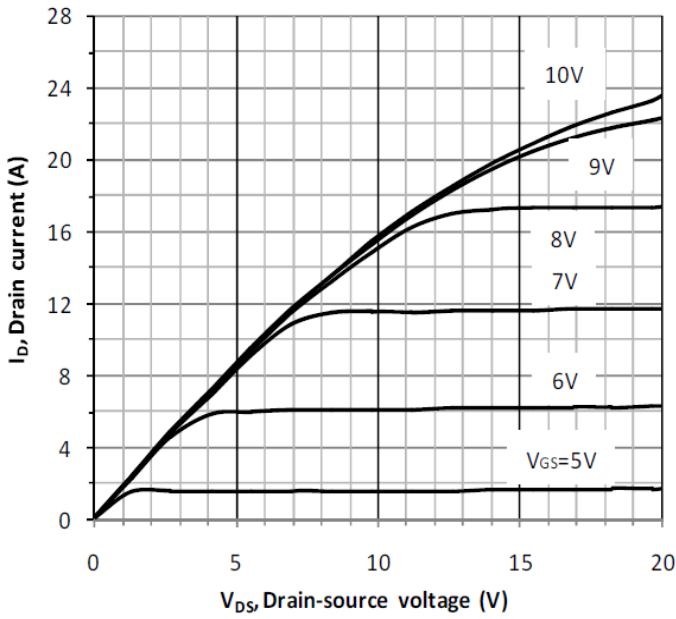
Reverse diode characteristics

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Drain Forward Voltage	I _F =1A, V _{GS} =0V	V _{SD}	-	0.74	-	V
Body Diode Reverse Recovery Time	V _R =400V, I _F =4.8A diF/dt=100A/μs	t _{rr}	-	250	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}	-	2.572	-	nC
Peak Reverse Recovery Current		I _{rrm}	-	19.6	-	A



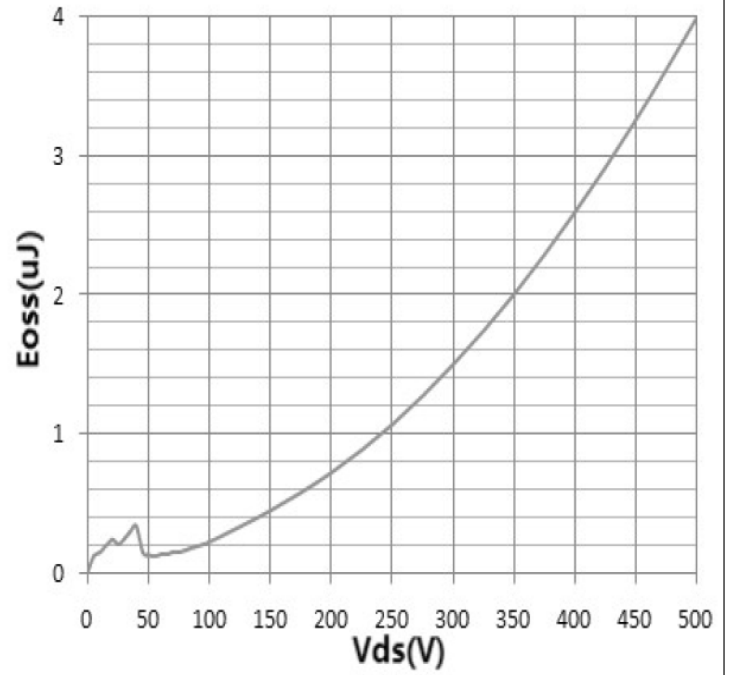
Rating and Characteristic Curves

Diagram 1: Typ. output characteristics



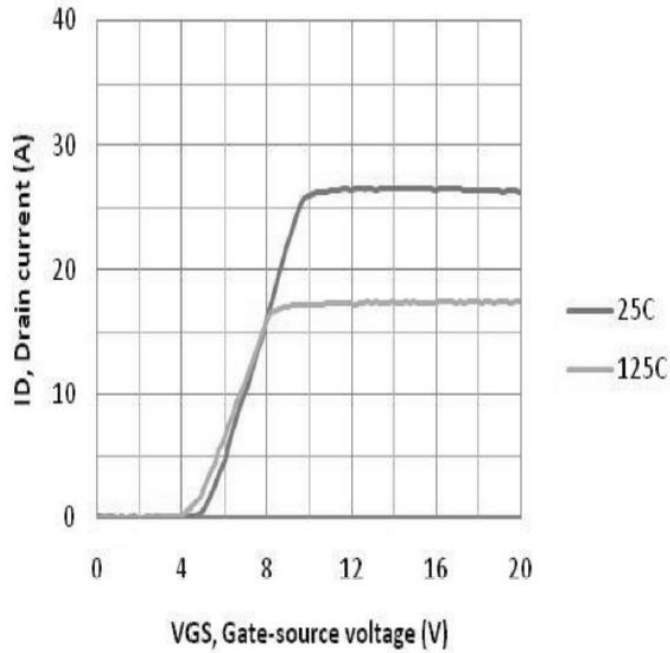
$I_D = f(V_{DS}); T_j = 25\text{ }^\circ\text{C}; \text{parameter: } V_{GS}$

Diagram 2: Typ. Coss stored energy



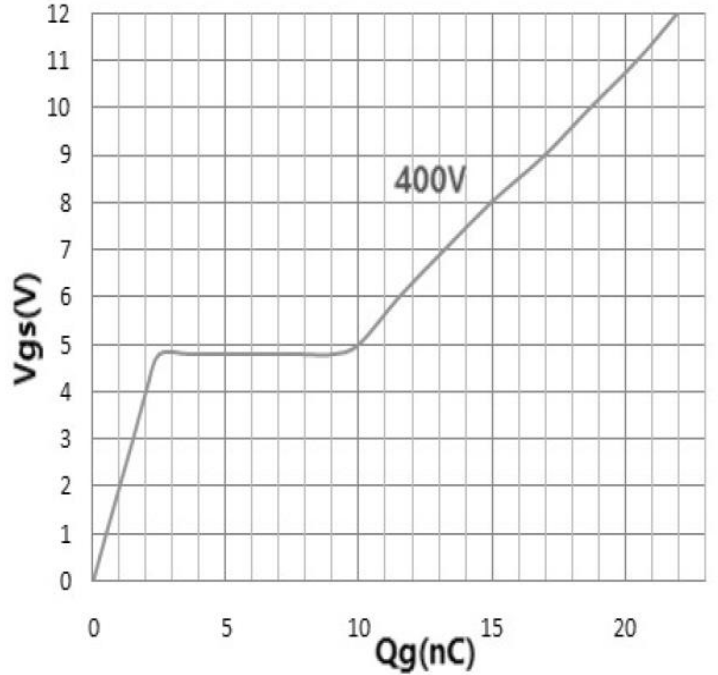
$E_{oss} = f(V_{DS})$

Diagram 3: Typ. transfer characteristics



$I_D = f(V_{GS}); \text{parameter: } T_j$

Diagram 4: Typ. gate charge

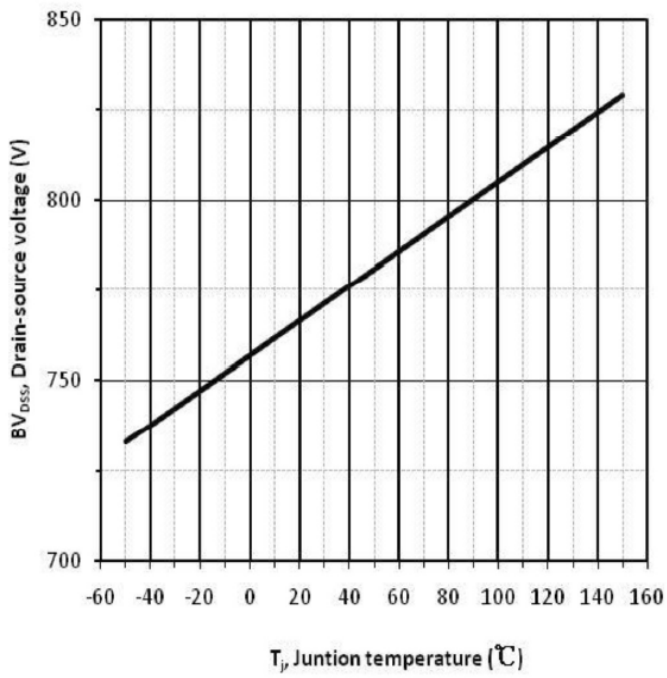


$V_{GS} = f(Q_{gate}); I_D = 4.8A \text{ pulsed}; \text{parameter: } V_{DD}$



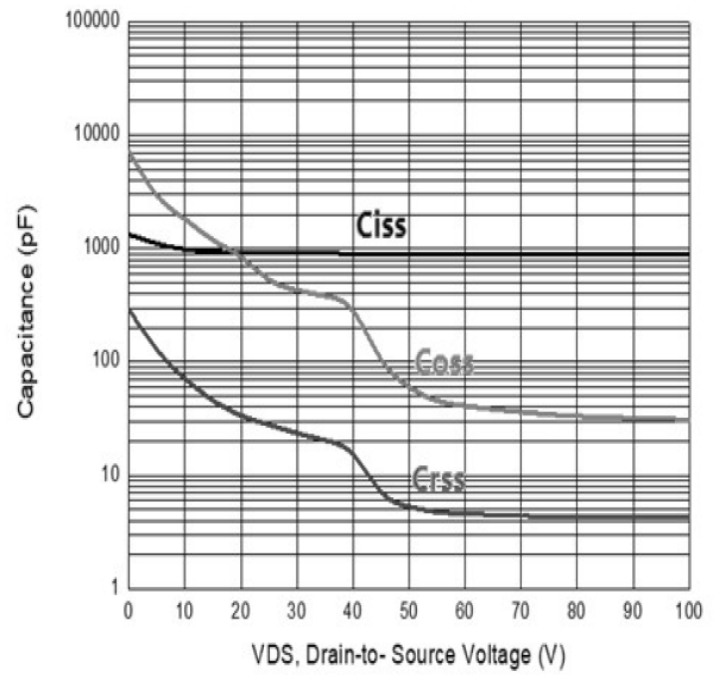
Rating and Characteristic Curves

Diagram 5: Drain-source breakdown voltage



$V_{BR(DSS)}=f(T_j); I_D=10mA$

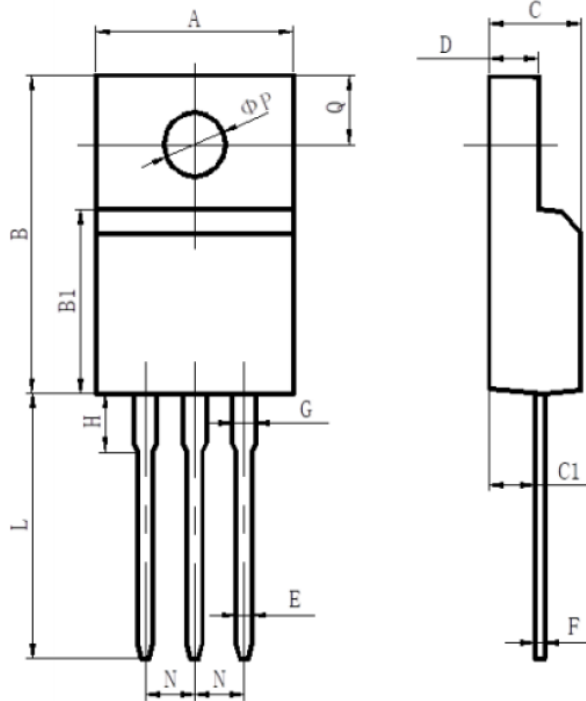
Diagram 6: Typ. capacitances



$C=f(V_{DS}); V_{GS}=0V; f=10\text{ kHz}$



Package Outline Dimensions



ITO-220AB Package		
Dim	Min	Max
A	9.70	10.30
B	15.50	16.10
B1	8.99	9.39
C	4.40	4.80
C1	2.15	2.55
D	2.50	2.90
E	0.70	0.90
F	0.40	0.60
G	1.12	1.42
H	3.20	3.80
L	12.60	13.60
N	2.34	2.74
Q	3.15	3.55
ϕP	3.00	3.30



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