HMHL065N185C

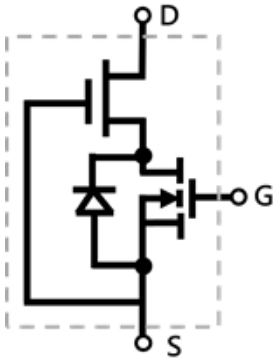
650-V Cascode GaN HEMT

Description

These miniature surface mount GaN HEMT utilize a GaN transistor technologys to provide low RDS(on) and using the Cascode in the DFN pacakge to realize the normal-off high electron mobility transistor.

Also provides high breakdown voltage, high current and high operating speed which is suitable for high power applications.

Graphic Symbol



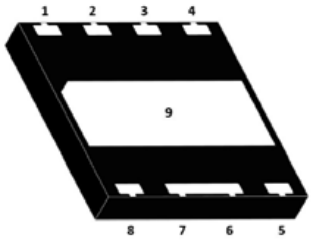
Features

- Gate drive voltage compatibility (-20V to 20V)
- High operating frequency
- Low Q_{rr}

Typical Applications

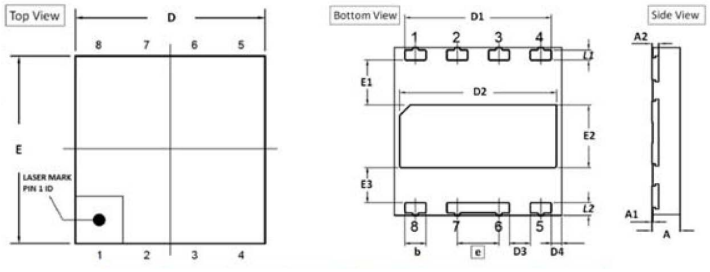
- Switch Mode Power Supplies (SMPS)
- AC-DC/ DC-DC Converters
- Motor Drives

Package type：DFN 8X8



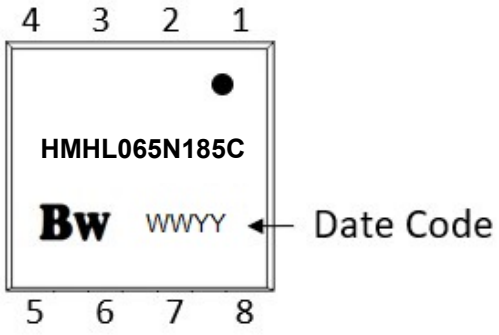
Drain: 1, 2, 3, 4
Source: 5, 6, 7, 9
Gate: 8

Package Dimension



SYMBOL	DIMENSION(unit : mm)			SYMBOL	DIMENSION(unit : mm)		
	MIN	TYP	MAX		MIN	TYP	MAX
A	1.20	1.25	1.30	e	2.00 BSC		
A1	--	0.02	0.05	E	7.90	8.00	8.10
A2	0.203 REF			E1	2.00	2.10	2.20
b	0.95	1.00	1.05	E2	2.90	3.00	3.10
D	7.90	8.00	8.10	E3	1.60	1.70	1.80
D1	6.90	7.00	7.10	L1	0.38	0.48	0.58
D2	7.40	7.50	7.60	L2	0.50	0.60	0.70
D3	0.90	1.00	1.10				
D4	0.40	0.50	0.60				

Marking



RoHS Compliant

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings			
Symbol	**Parameter**	**Value**	**Units**
V_{DS}	Drain-Source Voltage	650	V
$V_{(TR)DSS}$	Transient drain to source voltage[1]	800	V
V_{GS}	Gate-Source Voltage	-20 / +20	V
I_D	Continuous Drain Current at T_C =25°C	12	A
	Continuous Drain Current at T_C =100°C	8	A
$I_{D\ pulse}$	Pulse Drain Current (Pulse width =10 μs)[2]	21	A
T_J/T_{STG}	Operating Junction and Storage Temperature	-55…150	°C
T_{SOLD}	Soldering peak temperature	260	°C

Notes

1. In off-state, spike duty cycle D<0.01, spike duration <1 μs
2. Value is not tested to full current in production.

Thermal Resistance Ratings			
Symbol	**Parameter**	**Maximum**	**Units**
$R_{\theta JA}$	Maximum Junction-to-Ambient	54	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case	2.8	°C/W

HMHL065N185C

650-V Cascode GaN HEMT

Static Electrical Characteristics, (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS\ (th)}$	Gate Threshold Voltage	V_{DS} =10V, I_D =1mA	-	1.7	2.2	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} =0V	650	-	-	V
I_{DSS}	Drain-Source Leakage Current	V_{DS} =650V, V_{GS} =0V, T_J =25°C	-	2.5	30	μA
		V_{DS} =650V, V_{GS} =0V, T_J =150°C	-	10	-	
$R_{DS\ (on)}$	Static Drain-Source On-Resistance	V_{GS} =6V, I_D =5A, T_J =25°C	-	150	185	mΩ
		V_{GS} =6V, I_D =5A, T_J =150°C	-	302	-	
I_{GSS}	Gate-Source Leakage Current	V_{GS} =+/- 20V	-	-	+/-100	nA

AC Electrical Characteristics, (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
C_{ISS}	Input Capacitance	V_{GS}=0 V, V_{DS}=400 V, f=100kHz	-	505	-	pF
C_{OSS}	Output Capacitance		-	29	-	
C_{RSS}	Reverse Transfer Capacitance		-	1	-	
Q_g	Total Gate Charge	VDS = 400V, VGS = 0 to 10V, IDS=5A	-	10	-	nC
Q_{GS}	Gate-Source Charge		-	4.3	-	
Q_{OSS}	Output Charge	VGS=0V, VDS=0~400V	-	36	-	
Q_{RR}	Reverse Recovery Charge	IS=5V, VDS=0V	-	46	-	
$t_{d(on)}$	Turn-On Delay Time	VDD = 400 V, VGS = 0 to 10V, IDS = 2A, RG(on) = 25 Ω,	-	9	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	20	-	

HMHL065N185C

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- **Typical Electrical Characteristics**

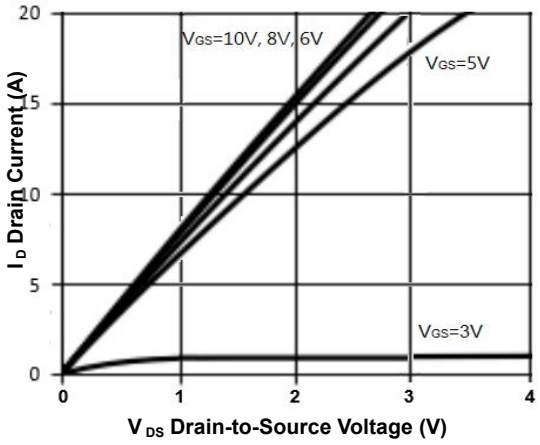

FIG.1-Output Characteristics T_J=25°C

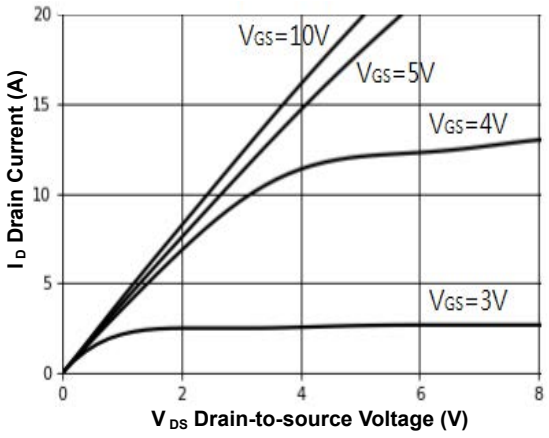

FIG.2- Output Characteristics T_J=150°C

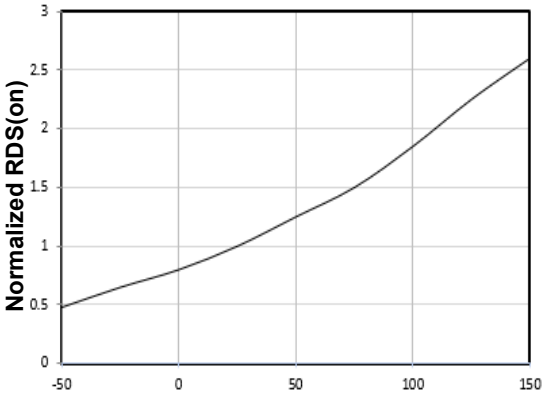

FIG.3- Normalized RDS(on) vs. Temperature

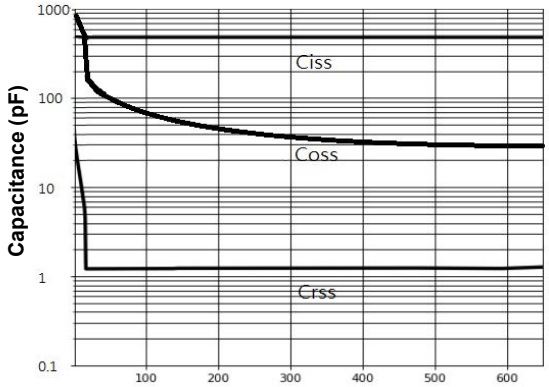

FIG.4- Capacitance vs Drain-Source Voltage

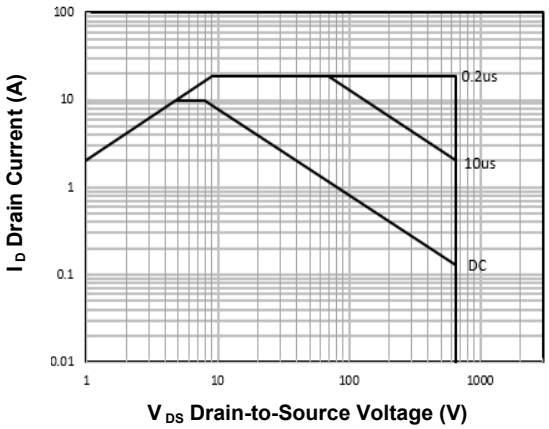

FIG.5- Safe Operating Area

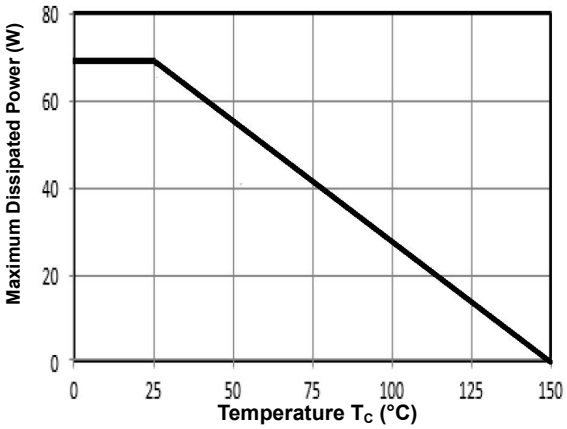

FIG.6- Maximum Power Dissipation Derating vs Case Temperature

HMHL065N185C

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- **Typical Electrical Characteristics**

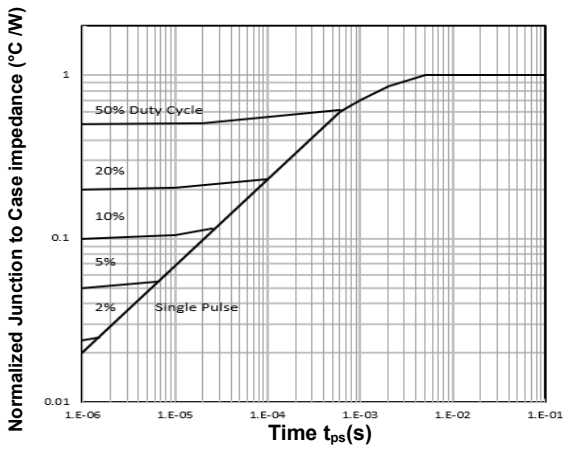

FIG.7- Transient Thermal impedance (Junction to Case)

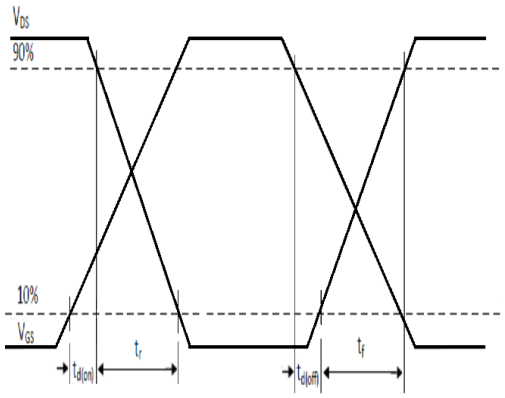

FIG.8- Switching Time Waveforms

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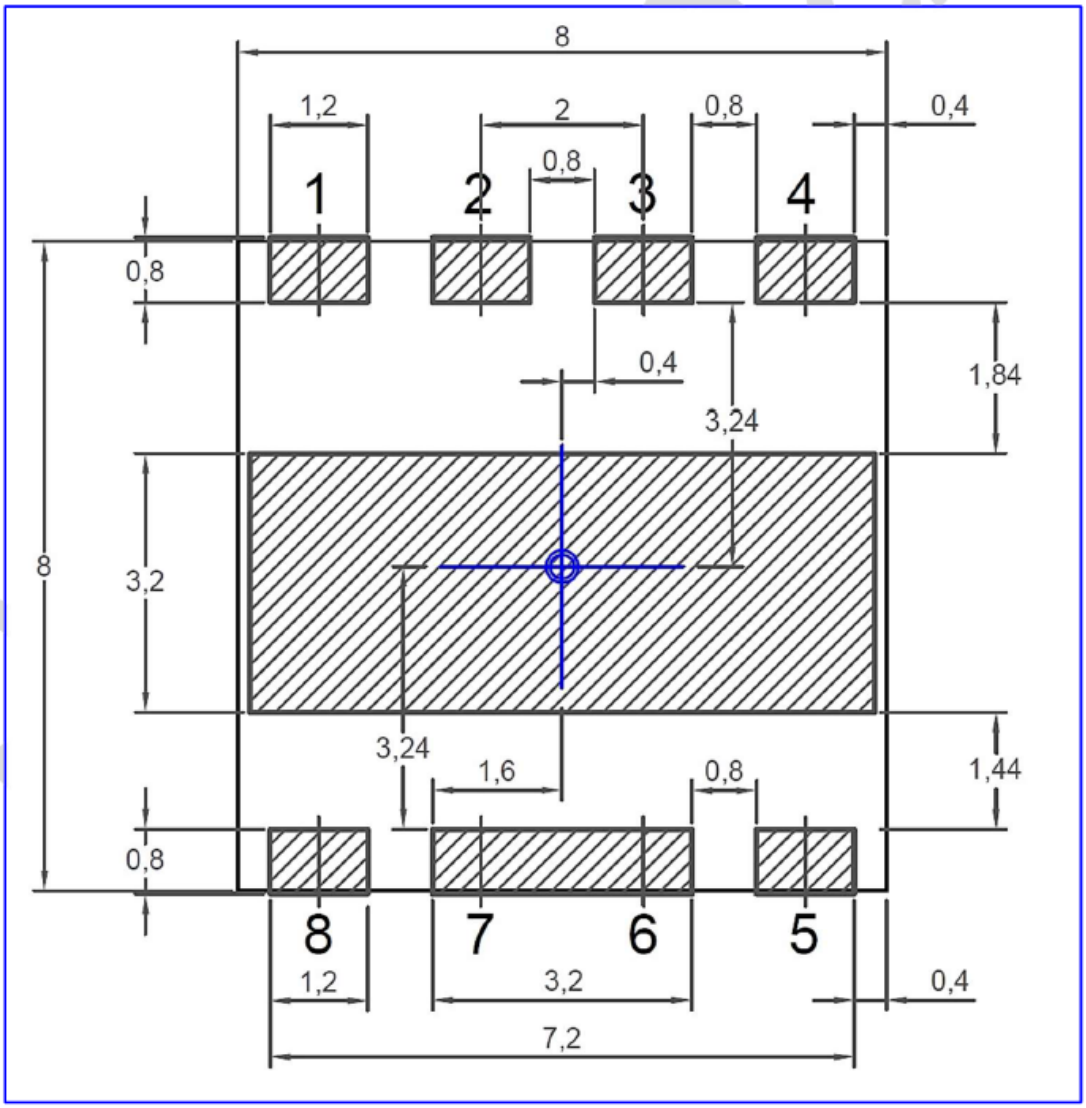
DFN-8X8 Recommended PCB Soldering Footprint



HMHL065N185C

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