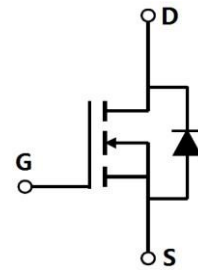


Description

The LM5D65N06 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 60V$ $I_D = 65A$

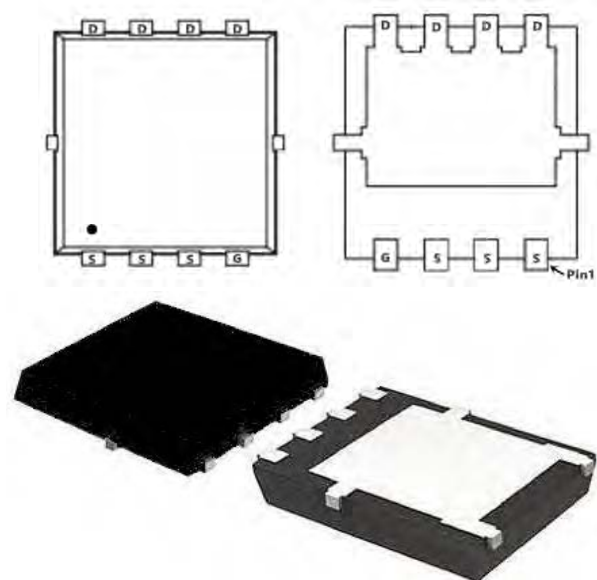
$R_{DS(ON)} < 10m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LM5D65N06	AP65N06NF	DFN5X6-8	-	-	5000 units

Absolute Maximum Ratings@ $T_j=25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Value	Unit
V _{DS}	Drain source voltage	60	V
V _{GS}	Gate source voltage	±20	V
I _D	Continuous drain current ¹⁾	65	A
I _{D, pulse}	Pulsed drain current ²⁾	138	A
P _D	Power dissipation ³⁾	60	W
EAS	Single pulsed avalanche energy ⁴⁾	30	mJ
T _{stg} , T _j	Operation and storage temperature	-55 to 150	°C
R _{θJC}	Thermal resistance, junction-case	2.1	°C/W
R _{θJA}	Thermal resistance, junction-ambient ⁵⁾	62	°C/W

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BVDSS	Drain-source breakdown voltage	V _{GS} =0 V, I _D =250 μA	60	68		V
VGS(th)	Gate threshold voltage	V _{DS} =V _{GS} , I _D =250 μA	1.2	1.5	2.5	V
RDS(ON)	Drain-source on-state resistance	V _{GS} =10 V, I _D =20 A		7.5	10	mΩ
RDS(ON)	Drain-source on-state resistance	V _{GS} =4.5 V, I _D =10 A		10	13	mΩ
IGSS	Gate-source leakage current	V _{GS} =±20 V			±100	nA
IDSS	Drain-source leakage current	V _{DS} =60 V, V _{GS} =0 V			1	μA
Ciss	Input capacitance	V _{GS} =0 V, V _{DS} =50 V, f=100 kHz		1182.1		pF
Coss	Output capacitance			199.5		pF
Crss	Reverse transfer capacitance			4.1		pF
td(on)	Turn-on delay time	V _{GS} =10 V, V _{DS} =50 V, R _G =2 Ω, I _D =10 A		17.9		ns
t _r	Rise time			4.0		ns
td(off)	Turn-off delay time			34.9		ns
t _f	Fall time			5.5		ns
Q _g	Total gate charge	I _D =10 A, V _{DS} =50 V, V _{GS} =10 V		18.4		nC
Q _{gs}	Gate-source charge			3.3		nC
Q _{gd}	Gate-drain charge			3.1		nC
V _{plateau}	Gate plateau voltage			2.8		V
I _S	Diode forward current	V _{GS} <V _{th}			60	A
ISP	Pulsed source current				180	
VSD	Diode forward voltage	I _S =20 A, V _{GS} =0 V			1.3	V
trr	Reverse recovery time	I _S =10 A, di/dt=100 A/μs		41.8		ns
Q _{rr}	Reverse recovery charge			36.1		nC
I _{rrm}	Peak reverse recovery current			1.4		A

Note

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Pd is based on max. junction temperature, using junction-case thermal resistance.
4. V_{DD}=50 V, R_G=50 Ω, L=0.3 mH, starting T_J=25 °C.
5. The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

Typical Electrical and Thermal Characteristics

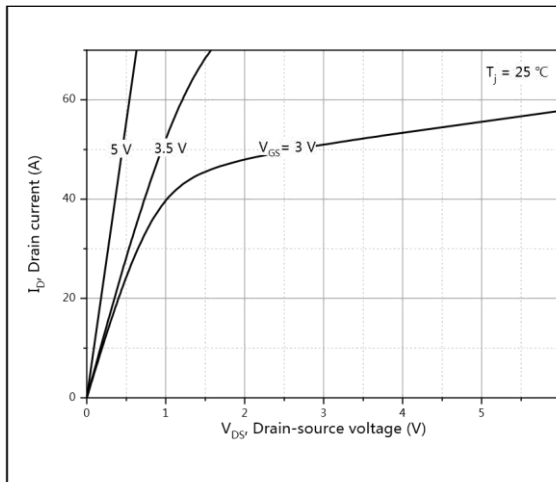


Figure 1, Typ. output characteristics

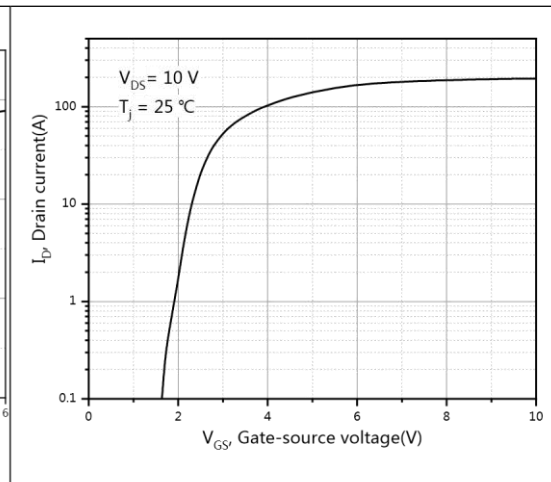


Figure 2, Typ. transfer characteristics

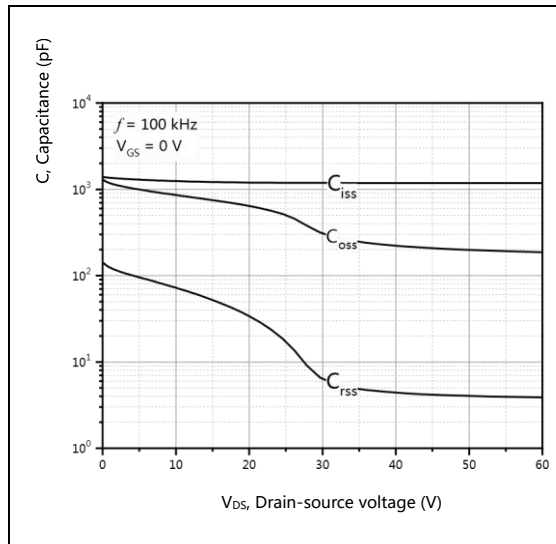


Figure 3, Typ. capacitances

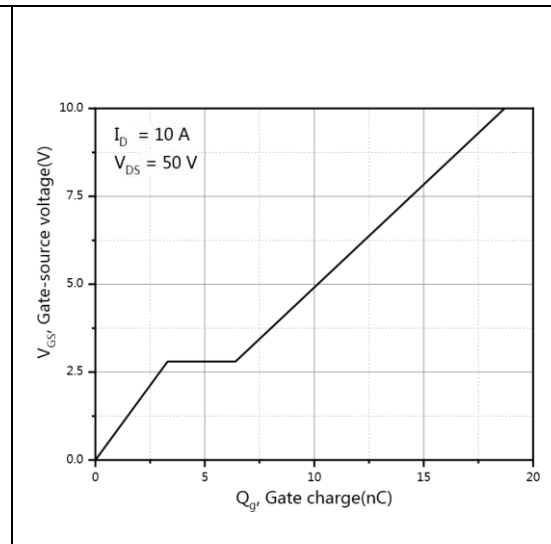


Figure 4, Typ. gate charge

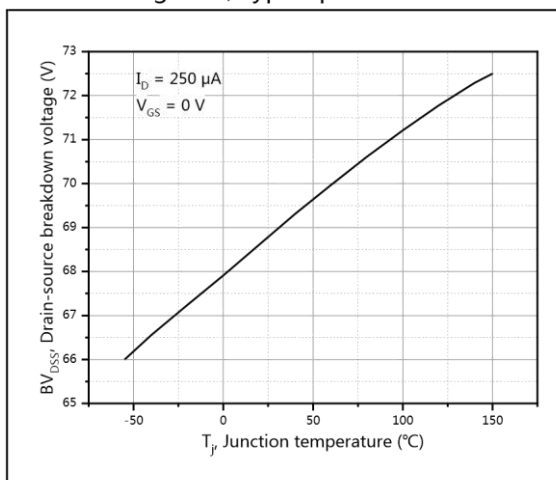


Figure 5, Drain-source breakdown voltage

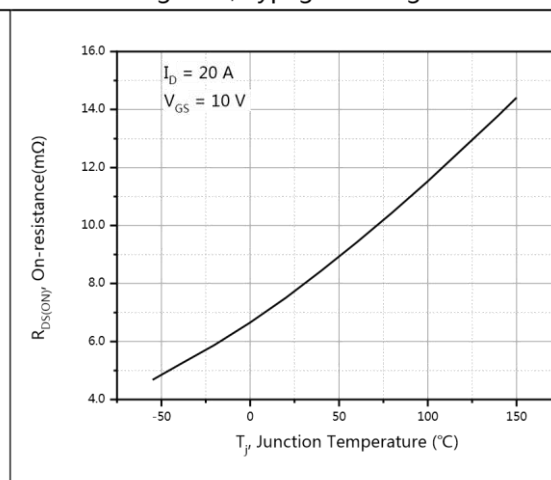


Figure 6, Drain-source on-state resistance

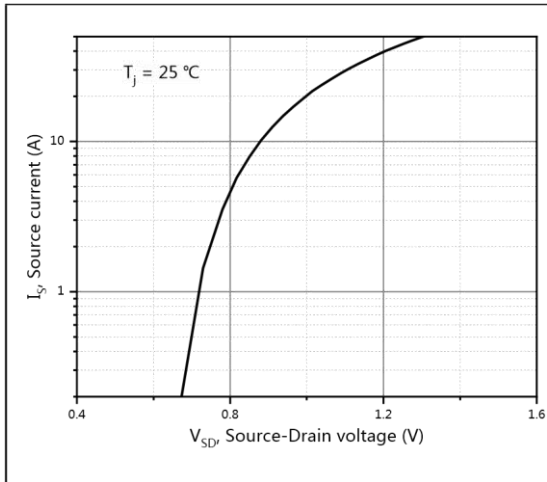


Figure 7, Forward characteristic of body

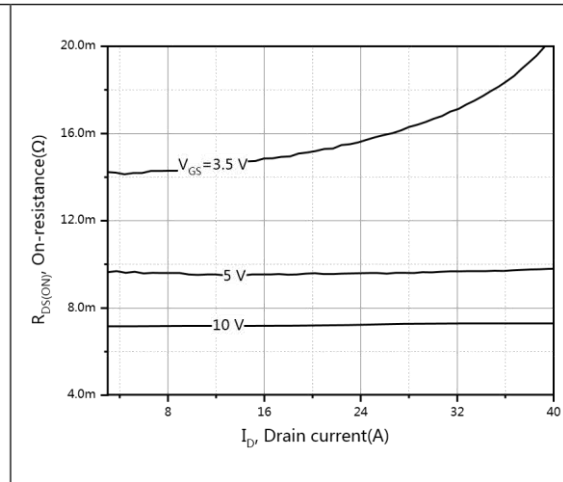


Figure 8, Drain-source on-state resistance diode

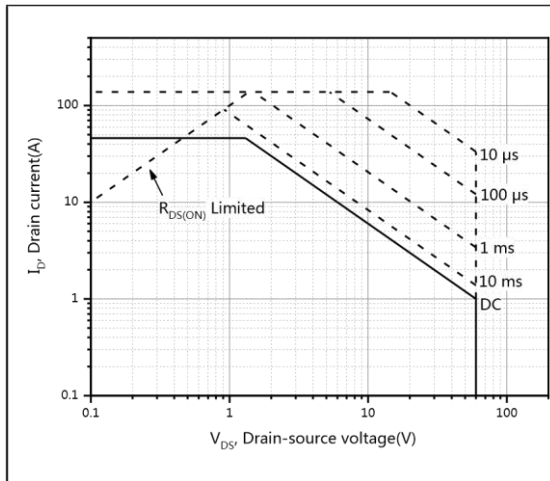
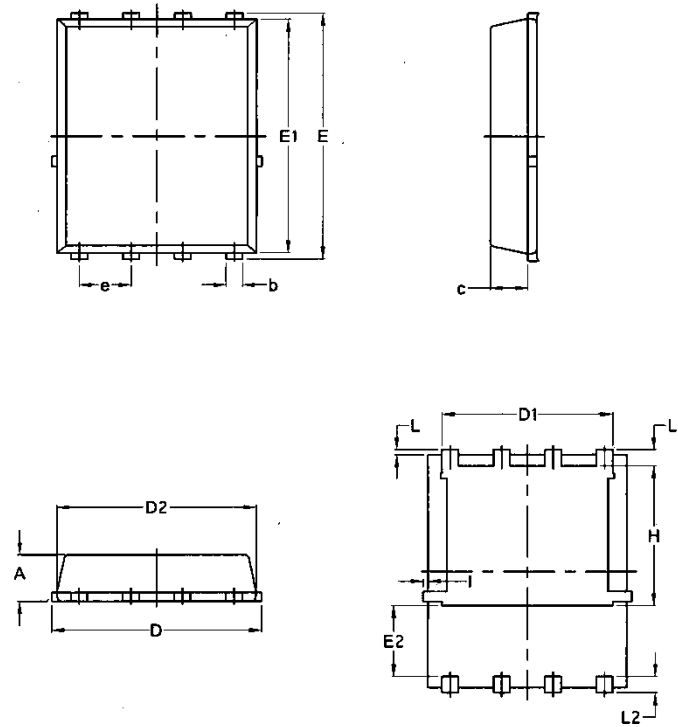


Figure 9, Safe operation area $T_c=25\text{ °C}$

Package Mechanical Data-DFN5*6-8-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070