

N And P-Channel Enhancement Mode MOSFET

Description

The CP6666D6-S uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

◆ N-channel:

$V_{DS} = 30V$, $I_D = 30A$

$R_{DS(ON)} = 7.5m\Omega$ (typical) @ $V_{GS} = 10V$

$R_{DS(ON)} = 9.5m\Omega$ (typical) @ $V_{GS} = 4.5V$

P-Channel:

$V_{DS} = -30V$, $I_D = -30A$

$R_{DS(ON)} = 13m\Omega$ (typical) @ $V_{GS} = -10V$

$R_{DS(ON)} = 16m\Omega$ (typical) @ $V_{GS} = -4.5V$

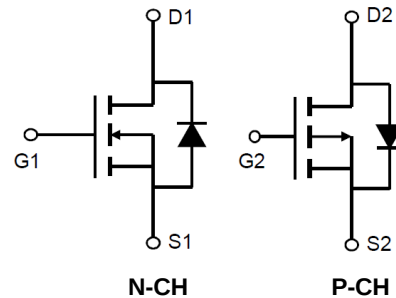
- ◆ Excellent gate charge x $R_{DS(ON)}$ product(FOM)
- ◆ Very low on-resistance $R_{DS(ON)}$
- ◆ 150 °C operating temperature
- ◆ Pb-free lead plating
- ◆ 100% UIS tested



Application

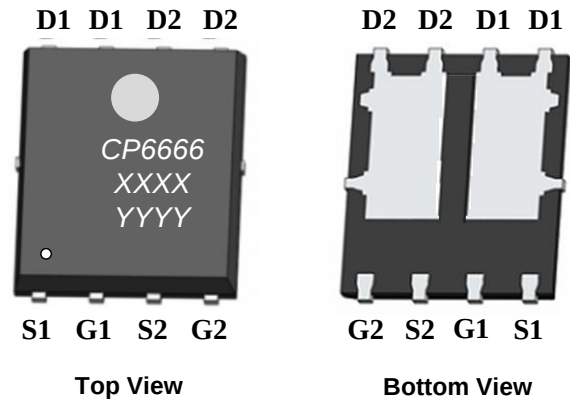
- ◆ Pch+Nch Complementary MOSFET for DC-FAN
- ◆ H-Bridge application

Schematic diagram



Marking and pin assignment

PDFN5×6-8L-B



XXXX—Wafer Information

YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
CP6666D6-S-G	-55°C to +150°C	PDFN5*6-8L-B	5000

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter		Symbol	Limit		Unit
			N	P	
Drain-source voltage		V _{DS}	30	-30	V
Gate-source voltage		V _{GS}	±20	±20	V
Operating junction Temperature range		T _j	-55—150	-55—150	°C
Drain Current-Continuous (Silicon Limited)	T _A =25°C	I _D	30	-30	A
	T _A =75°C		22	-22	

Pulsed Drain Current (Package Limited)		I_{DM}	55	-55	A
Avalanche Current ^C		I_{AS}, I_{AR}	24	-32	A
Avalanche energy $L=0.1mH^C$		E_{AS}, E_{AR}	18	36	mJ
Power Dissipation ^B	$T_A=25^{\circ}C$	P_D	10	20	W
	$T_A=75^{\circ}C$		4	8	
Junction and Storage Temperature Range		T_J, T_{STG}	-55—150		$^{\circ}C$

N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-body leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.5	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	7.5	11	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	9.5	14	
Forward transconductance	gfs	$V_{DS}=5V, I_D=20A$	-	15	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V$ $f=1.0\text{MHz}$	-	1199	-	pF
Output capacitance	C_{OSS}		-	185	-	
Reverse transfer capacitance	C_{RSS}		-	140	-	
Gate resistance	Rg	$V_{GS}=0V, V_{DS}=0V,$ $f=1.0\text{MHz}$	-	2.6	-	Ω
Switching Characteristics						
Turn-on delay time	$t_{D(on)}$	$V_{DS}=15V$ $V_{GS}=10V$ $R_L=1.8\Omega$ $R_{GEN}=3\Omega$	-	5	-	ns
Rise time	tr		-	3.5	-	
Turn-off delay time	$t_{D(off)}$		-	9	-	
Fall time	tf		-	3.5	-	
Total gate charge	Qg	$V_{DS}=15V, I_D=20A$ $V_{GS}=10V$	-	20.6	-	nC
Gate-source charge	Qgs		-	3	-	
Gate-drain charge	Qgd		-	7.3	-	

Typical Performance Characteristics

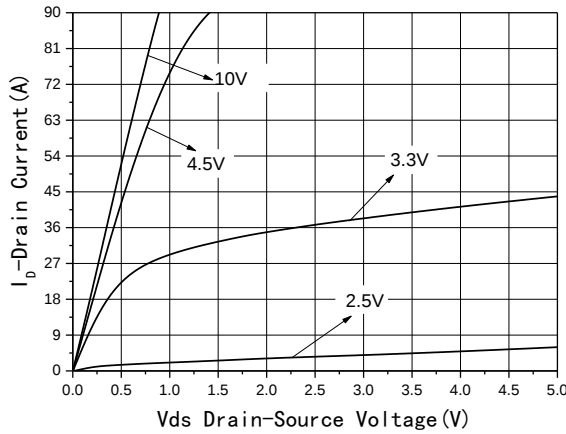


Fig1 Output Characteristics

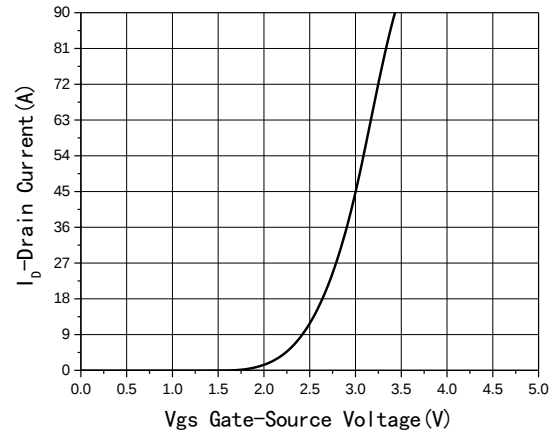


Fig2 Transfer Characteristics

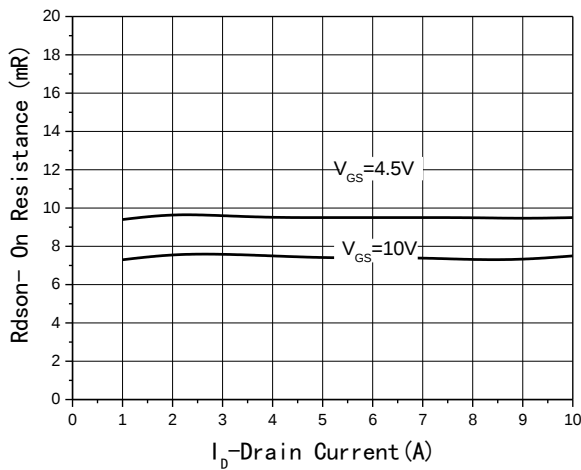


Fig3 Rdson-Drain current

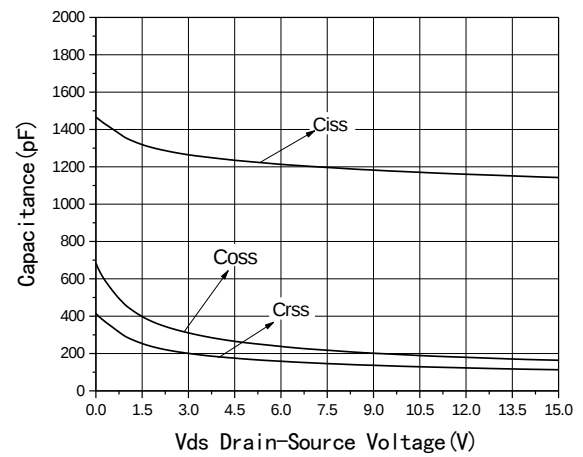


Fig4 Capacitance vs Vds

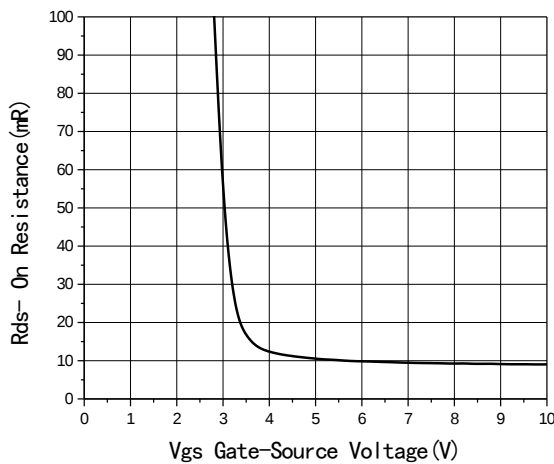


Fig5 Rdson-Gate Drain voltage

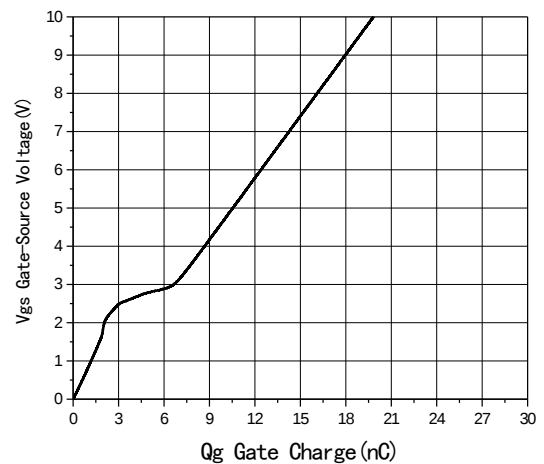
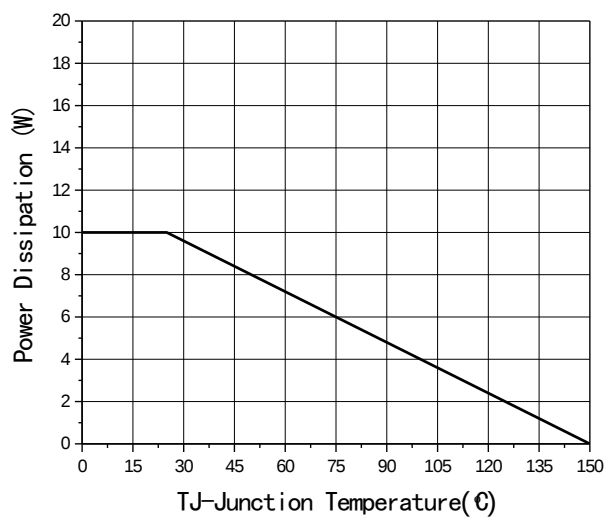
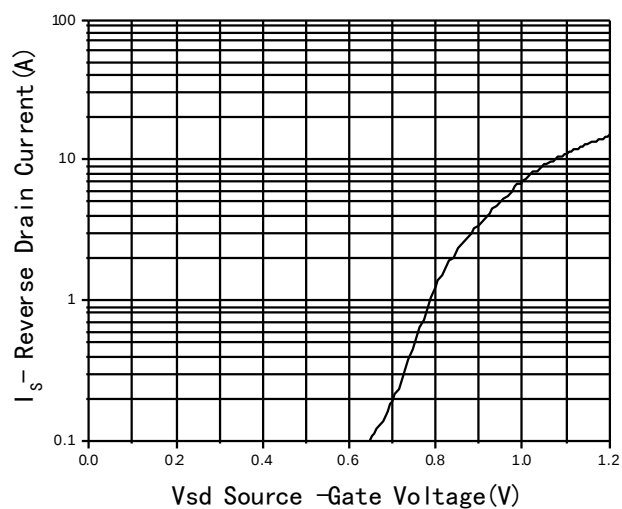


Fig6 Gate Charge


Fig7 Power De-rating

Fig8 Source-Drain Diode Forward

P-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
Gate-body leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-2.5	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-30A$	-	13	18	m Ω
		$V_{GS}=-4.5V, I_D=-20A$	-	16	20	
Forward transconductance	gfs	$V_{DS}=-5V, I_D=-20A$	-	18	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	$V_{DS}=-15V, V_{GS}=0V$ $f=1.0\text{MHz}$	-	2591	-	pF
Output capacitance	C_{OSS}		-	247	-	
Reverse transfer capacitance	C_{RSS}		-	222	-	
Gate resistance	Rg	$V_{GS}=0V, V_{DS}=0V,$ $f=1.0\text{MHz}$	-	4.7	-	Ω
Switching Characteristics						
Turn-on delay time	$t_{D(on)}$	$V_{DS}=-15V$ $V_{GS}=-10V$ $R_L=2.3\Omega$ $R_{GEN}=3\Omega$	-	10	-	ns
Rise time	tr		-	5.5	-	
Turn-off delay time	$t_{D(off)}$		-	3.6	-	
Fall time	tf		-	4.6	-	
Total gate charge	Qg	$V_{DS}=-15V, I_D=-20A$ $V_{GS}=-10V$	-	51	-	nC
Gate-source charge	Qgs		-	6	-	
Gate-drain charge	Qgd		-	7	-	

Typical Performance Characteristics

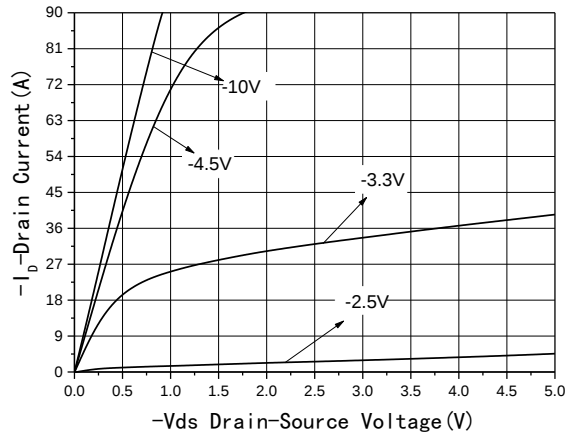


Fig1 Output Characteristics

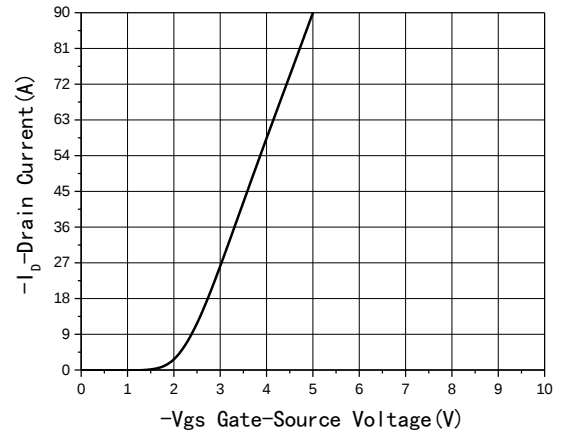


Fig2 Transfer Characteristics

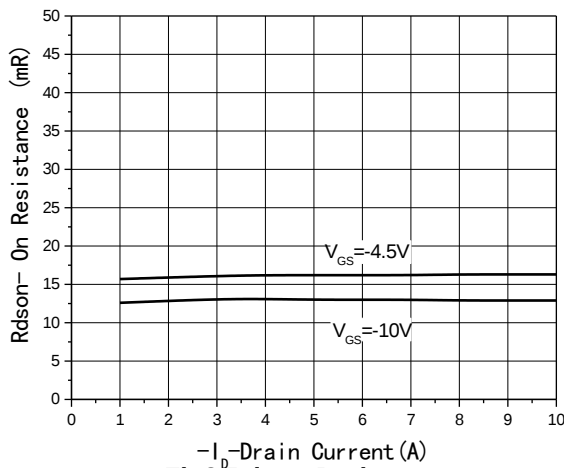


Fig3 Rdson-Drain current

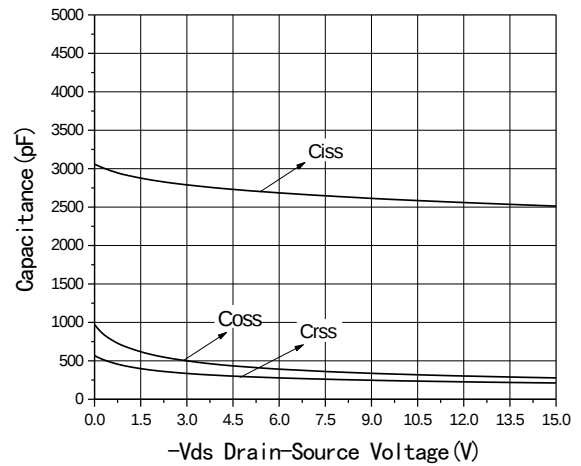


Fig4 Capacitance vs V_DS

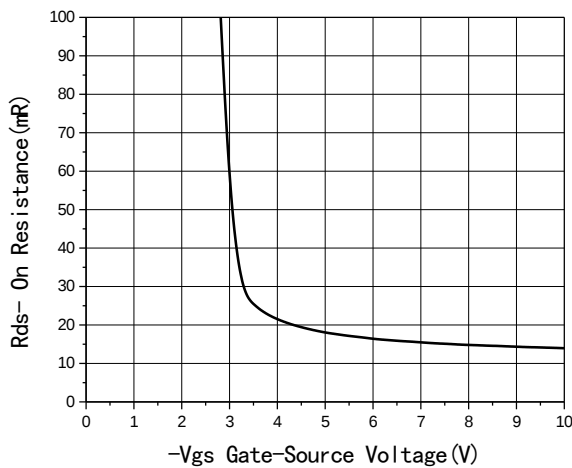


Fig5 Rdson-Gate Drain voltage

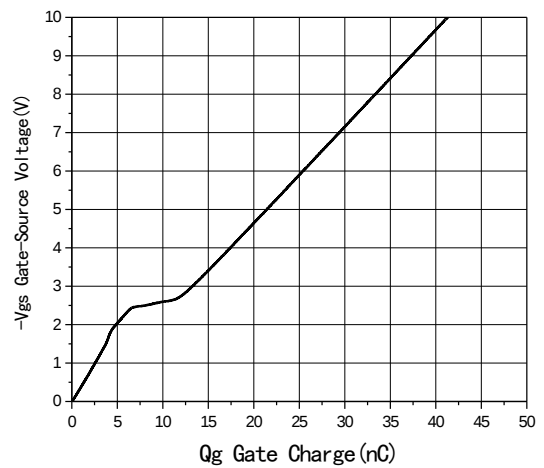
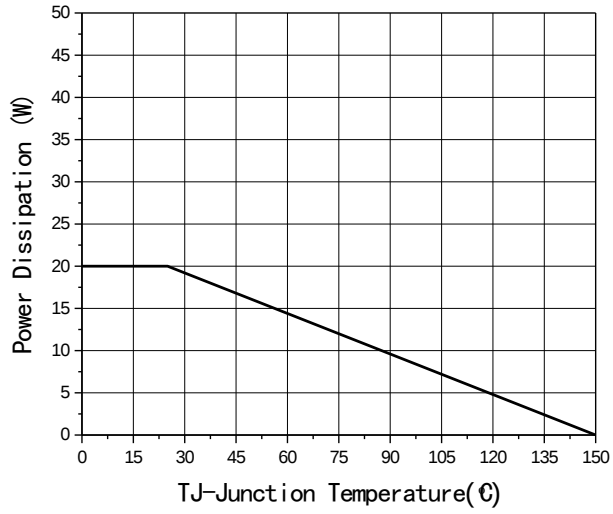
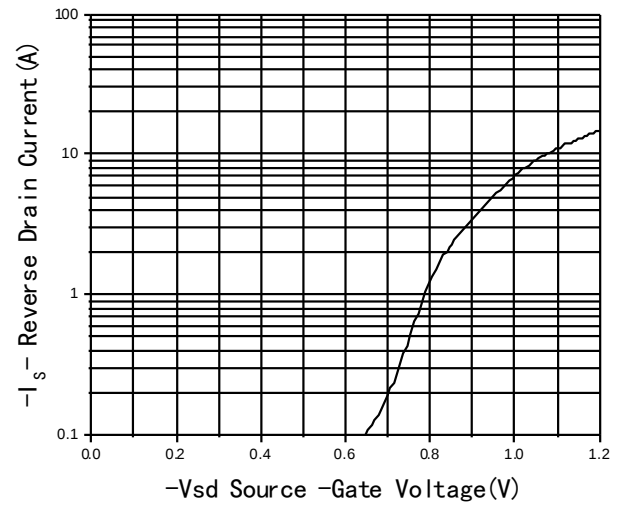
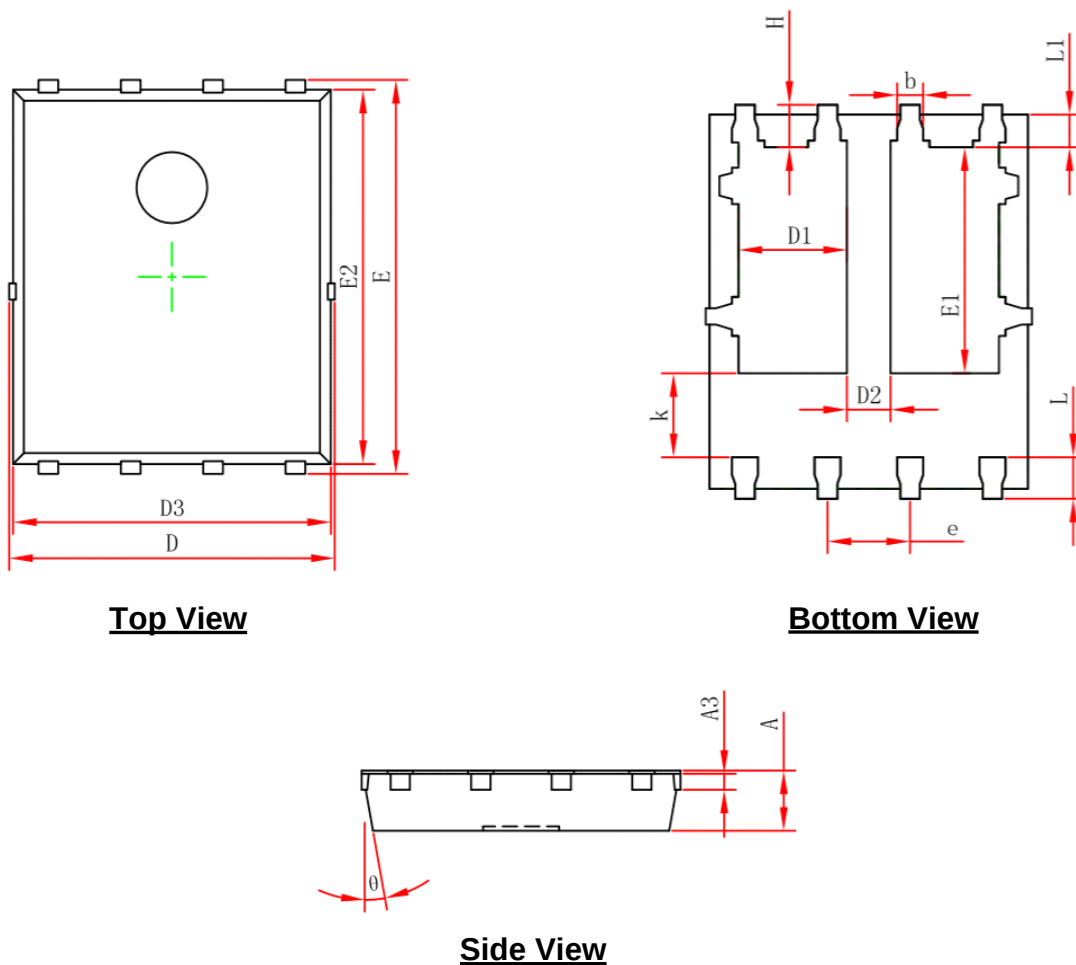


Fig6 Gate Charge


Fig7 Power De-rating

Fig8 Source-Drain Diode Forward

Package Information

- PDFN5*6-8L-B



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.154REF.		0.006REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°