AT0312K

30V N-Channel MOSFET

Features

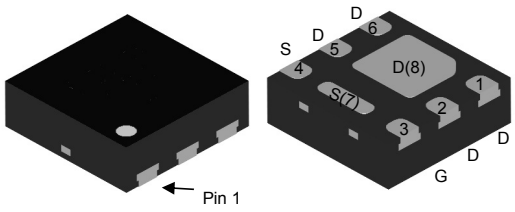
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

Product Summary

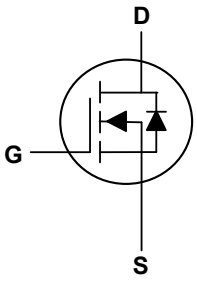
V_{DS}	30	V
I_D	12	A
$R_{DS(ON)}$(at V_{GS}=4.5V)	11.7	mΩ
$R_{DS(ON)}$(at V_{GS}=2.5V)	17.5	mΩ

Applications

- High Frequency Point-of-Load,Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



DFN2X2-6L Top View



Absolute Maximum Ratings(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current[1]	I_D@T_A=25℃	12	A
Continuous Drain Current[1]	I_D@T_A=70℃	8	A
Pulsed Drain Current[2]	I_{DM}	40	A
Total Power Dissipation[3]	P_D@T_A=25℃	2.8	W
Total Power Dissipation[3]	P_D@T_A=70℃	1.8	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1](t ≤10s)	$R_{\theta JA}$	---	45	℃/W
Thermal Resistance Junction-Ambient[1](Steady State)		---	80	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	30	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=8A	---	9.6	11.7	mΩ
		V_{GS}=4.5V , I_D=8A	---	13.6	17.5	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.2	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=20V , V_{GS}=0V , T_J=55℃	---	---	5	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±8V , V_{DS}=0V	---	---	±100	nA
On state drain current	$I_{D(ON)}$	V_{GS}=4.5V , V_{DS}=5V	32	---	---	A
Forward Transconductance	gfs	V_{DS}=5V , I_D=8A	---	41	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	3.4	---	Ω
Total Gate Charge	Q_g	V_{DS}=10V , V_{GS}=4.5V , I_D=8A	---	9	---	nC
Gate-Source Charge	Q_{gs}		---	4	---	
Gate-Drain Charge	Q_{gd}		---	1.5	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DS}=10V ,R_G=3Ω, V_{GS}=4.5V , R_L=1.25Ω	---	5	---	ns
Rise Time	T_r		---	3.3	---	
Turn-Off Delay Time	$T_{d(off)}$		---	18	---	
Fall Time	T_f		---	4	---	
Input Capacitance	C_{iss}	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	552	---	pF
Output Capacitance	C_{oss}		---	227	---	
Reverse Transfer Capacitance	C_{rss}		---	28	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[2]	I_S		---	---	3.5	A
Diode Forward Voltage[1]	V_{SD}	V_{GS}=0V ,I_F=12A , T_J=25℃	---	0.7	1.3	V
Reverse Recovery Time	t_{rr}	I_F=8A ,di/dt=100A/μs, T_J=25℃	---	15	---	nS
Reverse Recovery Charge	Q_{rr}		---	4	---	nC

Note:

1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The power dissipation is limited by 150℃ junction temperature

Typical Characteristics

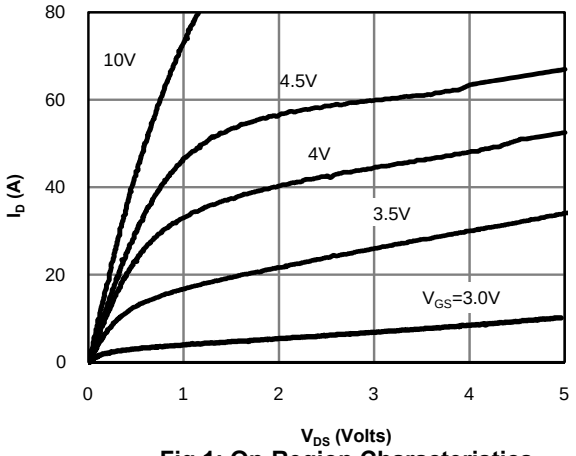


Fig 1: On-Region Characteristics

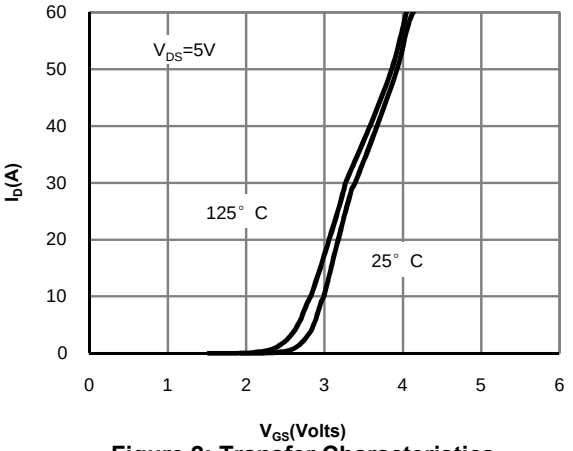


Figure 2: Transfer Characteristics

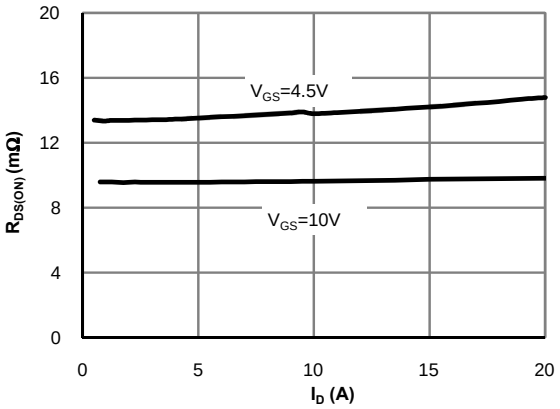


Figure 3: On-Resistance vs. Drain Current and Gate

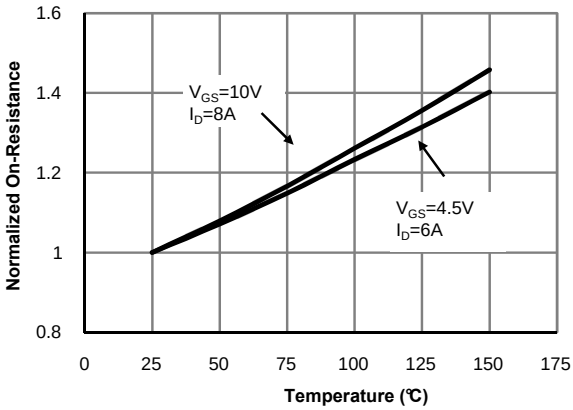


Figure 4: On-Resistance vs. Junction Temperature

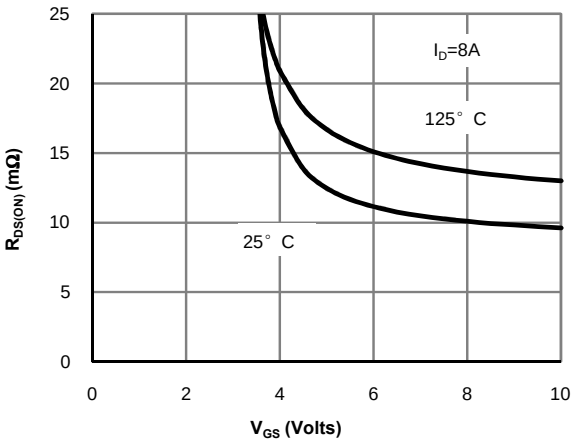


Figure 5: On-Resistance vs. Gate-Source Voltage

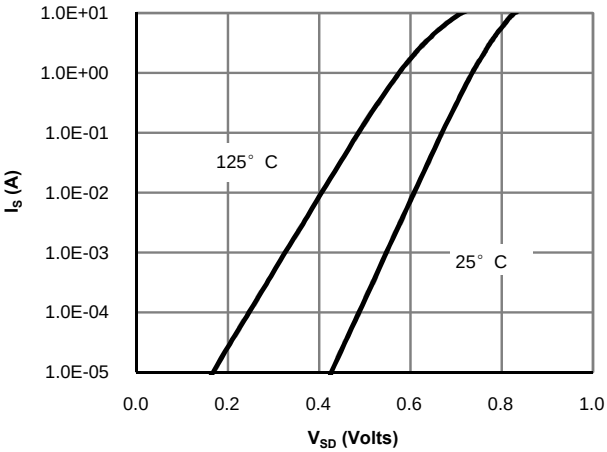


Figure 6: Body-Diode Characteristics

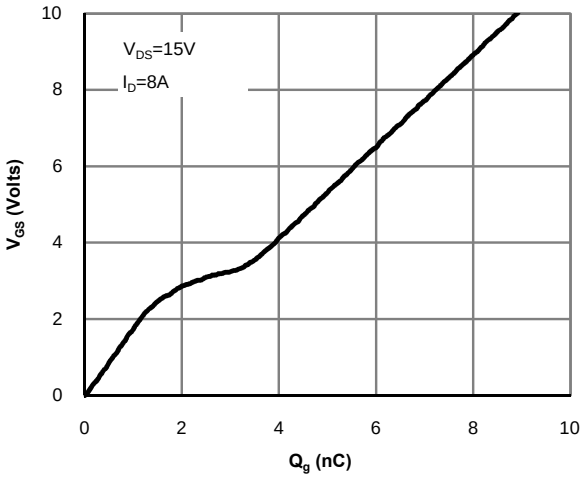


Figure 7: Gate-Charge Characteristics

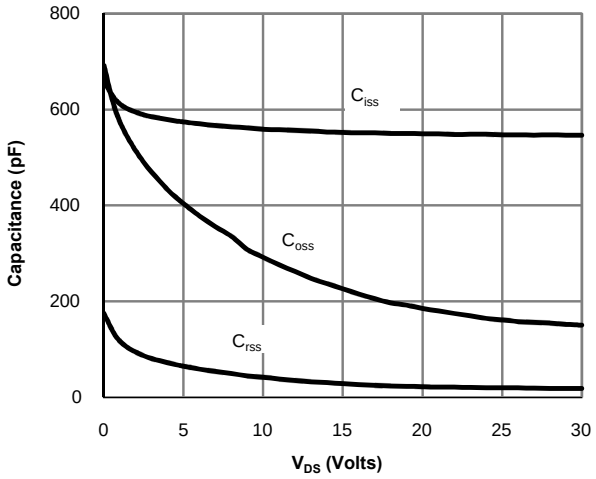


Figure 8: Capacitance Characteristics

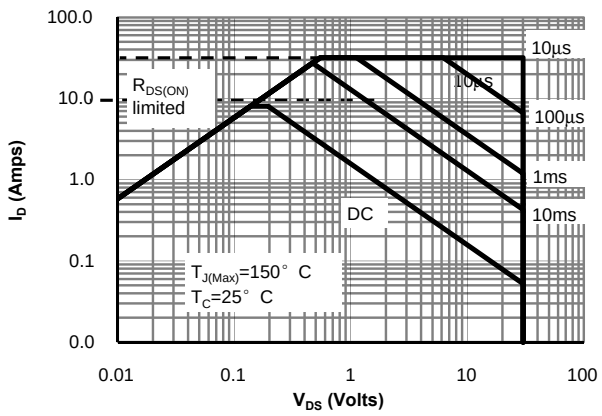


Figure 9: Maximum Forward Biased Safe Operaing Area

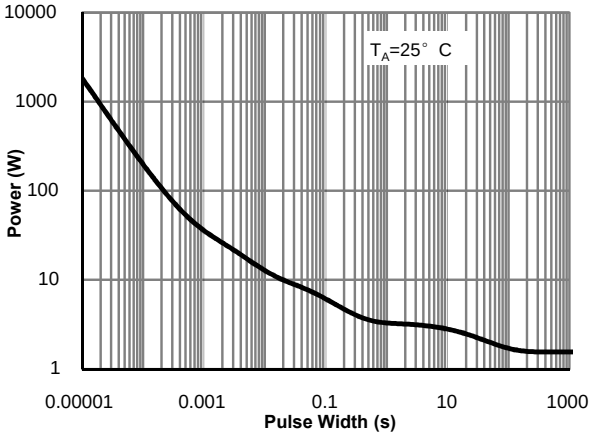


FIgure 11: Single Pulse Power Rating Junction-to-Ambient

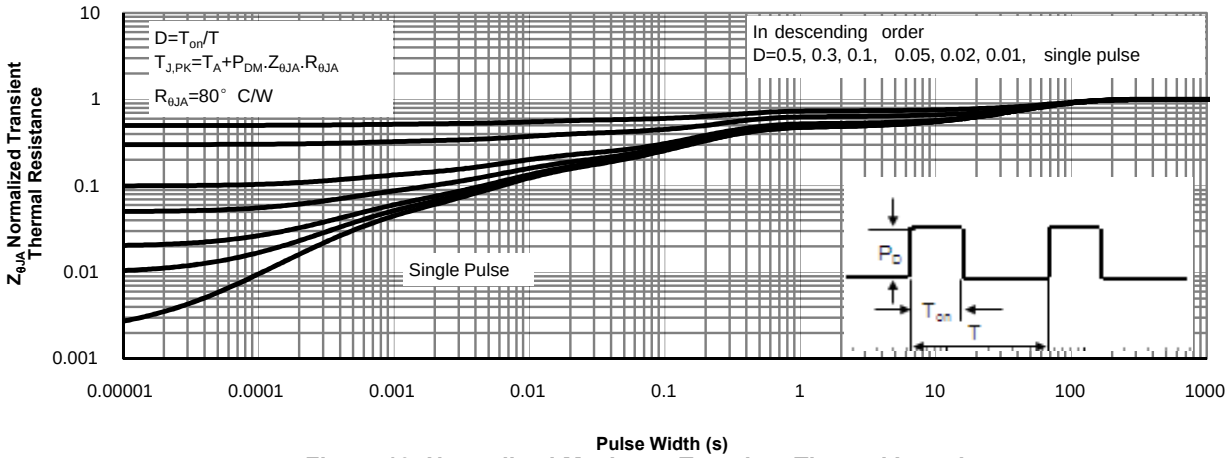
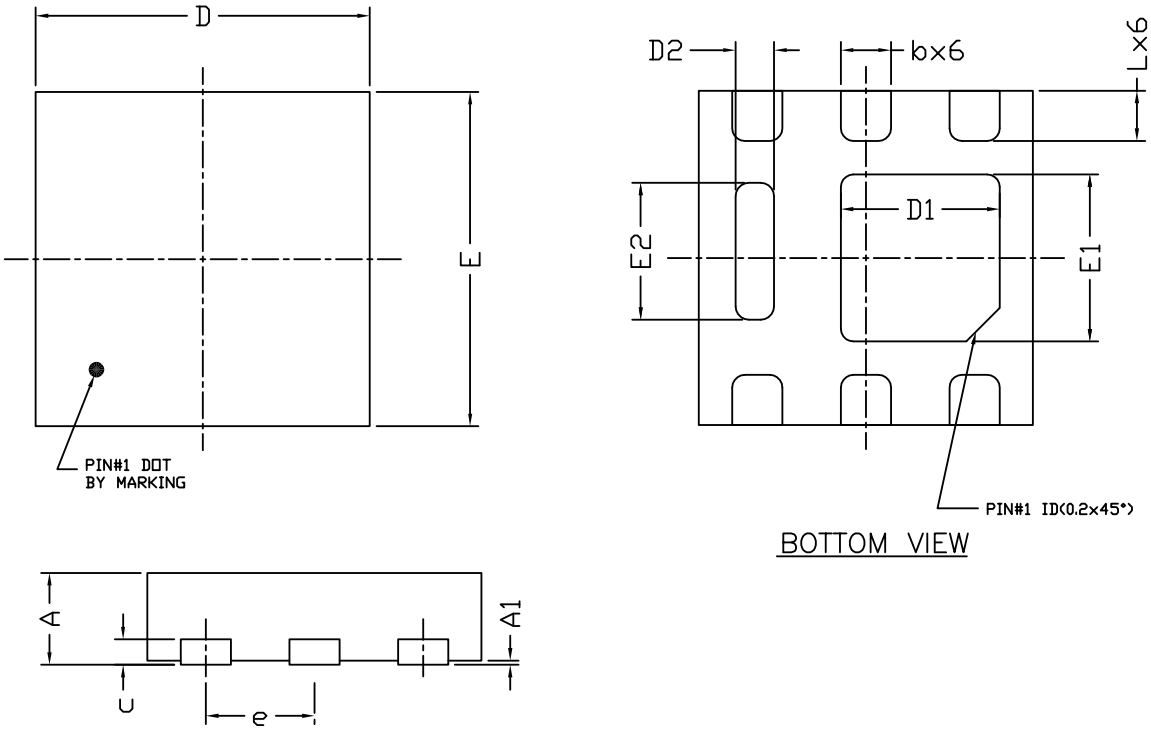


Figure 12: Normalized Maximum Transient Thermal Impedance

DFN2X2-6L Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	0.50	0.55	0.60	**D2**	0.13	0.23	0.33
A1	0.00	---	0.05	**E**	1.90	2.00	2.10
b	0.25	0.30	0.35	**E1**	0.90	1.05	1.25
c	0.15 REF			**E2**	0.70	0.82	0.92
D	1.90	2.00	2.10	**e**	0.65 REF		
D1	0.85	0.95	1.05	**L**	0.20	0.25	0.32