N-Channel Power MOSFET

Primary characteristics			
Symbol	**Parameter**	**Value**	**Unit**
I_D	Continuous drain current (T_A=25°C)	12	A
V_{DS}	Drain-source voltage	20	V
$R_{DS(ON)}$	Max drain-source on-state resistance (V_{GS}=4.5V)	11	mΩ

Features

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

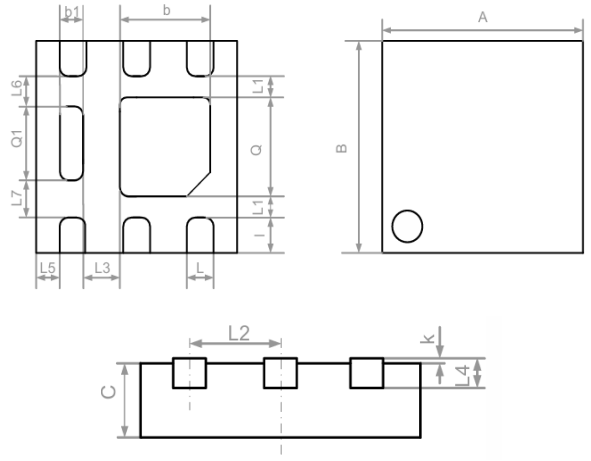
Applications

- Load/Power Switching
- PWM applications

Mechanical Data

- **Case**: SOT-23 (plastic package).
  Lead free; RoHS compliant； Halogen free
- **Molding Compound Flammability Rating**:
  UL 94 V-0
- **Terminals**: High temperature soldering guaranteed:
  260°C/10 sec. at terminals

Case dimensions



DFN2020-6L

Unit mm	A	Q	Q1	B	b	b1	C	l	k	L	L1	L2	L3	L4	L5	L6	L7
MIN	1.95	0.9	0.72	1.95	0.85	0.13	0.45	0.25	0.00	0.25	0.1	0.65	0.3	0.15	0.12	0.15	0.23
MAX	1.05	1.1	0.92	2.05	1.05	0.33	0.55	0.35	0.05	0.35	0.3	TYP	0.5	TYP	0.32	0.35	0.43

Absolute maximum ratings (T_A = 25°C unless otherwise specified)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-source voltage		V_{DS}	20	V
Gate-source voltage		V_{GS}	±12	V
Continuous drain current (T_J=150°C) [1]	T_A=25°C	I_D	12	A
	T_A=70°C		9.6	
Pulsed drain current [2]		I_{DM}	48	A
Power dissipation [1]	T_A=25°C	P_D	1.5	W
	T_A=70°C		0.95	
Operating junction and storage temperature range		T_J, T_{stg}	-55~+150	°C

Thermal characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Unit**
Maximum junction-to-ambient [1]	≤ 10s	$R_{\theta JA}$	28	36	°C/W
	Steady-State		58	75	
Maximum junction-to-foot	Steady-State	$R_{\theta JC}$	5.3	6.5	°C/W

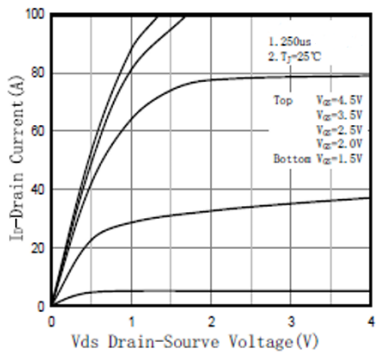
Notes:
[1] Surface mounted on 1" x 1" FR4 board
[2] Pulse width limited by maximum junction temperature

Electrical characteristics (T_A = 25°C unless otherwise specified)						
Parameter	**Test condition**	**Symbol**	**Value**			**Unit**
			Min	**Typ**	**Max**	
OFF characteristics						
Drain-source breakdown voltage	V_{GS}=0V, I_D=250μA	BV_{DSS}	20	-	-	V
Zero gate voltage drain current	V_{DS}=20V, V_{GS}=0V	I_{DSS}	-	-	1	μA
Gate-body leakage	V_{DS}=0V, V_{GS}=±12V	I_{GSS}	-	-	±100	nA
ON characteristics						
Gate threshold voltage	V_{DS}=V_{GS}, I_D=250μA	$V_{GS(th)}$	0.4	0.8	1.2	V
Drain-source on-state resistance [1]	V_{GS}=4.5V, I_D=10A	$R_{DS(ON)}$	-	8	11	mΩ
	V_{GS}=2.5V, I_D=5A		-	10	15	
Dynamic characteristics [2]						
Input capacitance	V_{DS}=10V V_{GS}=0V f=1.0MHz	C_{ISS}	-	1062	-	pF
Output capacitance		C_{OSS}	-	153	-	
Reverse transfer capacitance		C_{RSS}	-	137	-	
Switching characteristics						
Turn-on delay time	V_{DS}=10V I_D=15A V_{GEN}=4.5V R_{GEN}=3Ω	$t_{D(ON)}$	-	6	-	nS
Rise time		tr	-	17	-	
Turn-off delay time		$t_{D(OFF)}$	-	28	-	
Fall time		tf	-	9	-	
Total gate charge	V_{DS}=10V I_D=15A V_{GS}=4.5V	Q_g	-	12	-	nC
Gate-source charge		Q_{gs}	-	2	-	
Gate-drain charge		Q_{gd}	-	3	-	
Drain-source diode characteristics						
Diode forward voltage	V_{GS}=0V, I_S=6A	V_{SD}	-	-	1.2	V

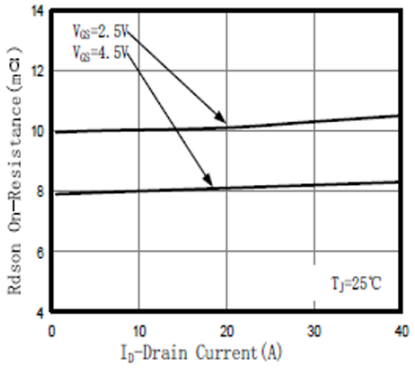
Notes:
[1] Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%
[2] Guaranteed by design, not subject to production testing

Typical characteristics (T_A = 25°C unless otherwise specified)

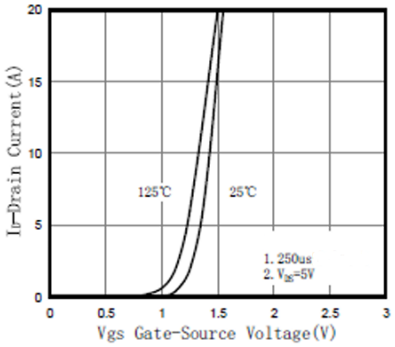
Output characteristics



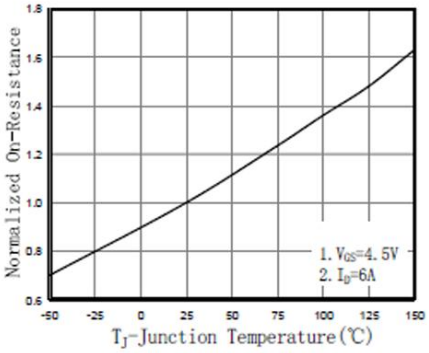
On-resistance vs. Drain current



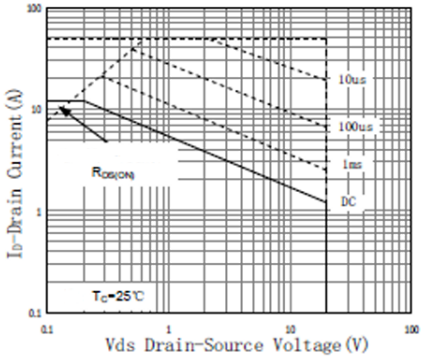
Transfer characteristic



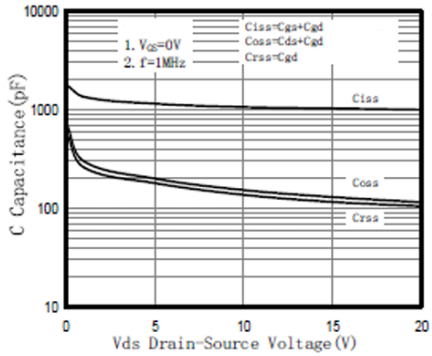
On-resistance vs. Junction temperature



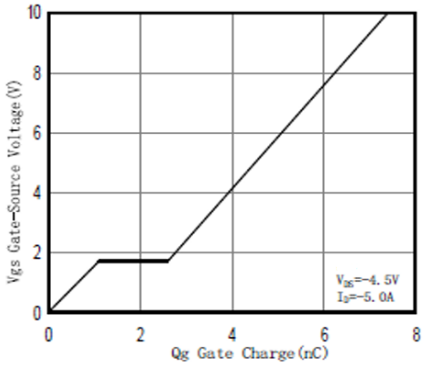
Safe operating area



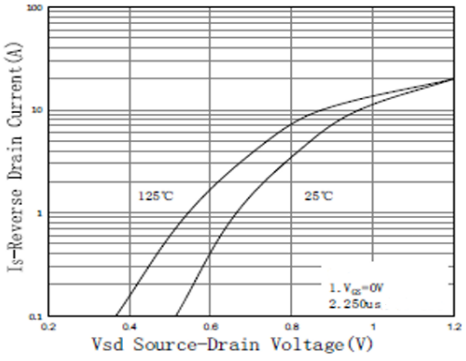
Capacitance characteristics



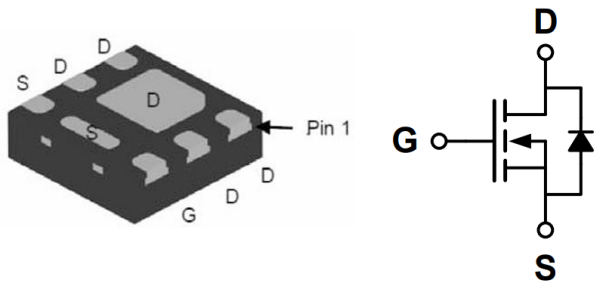
Gate-charge characteristic



Body diode characteristics



Pin configuration and schematic



Ordering information

Part Number	Package	Packaging option	Shipping Quantity
AKXF12N02D	DFN2020-6L	Tape and reel	**3000 pcs / reel**

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