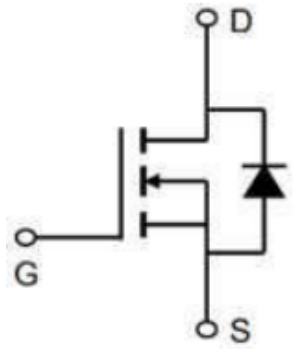
N-Channel Enhancement Mode MOSFET

Primary characteristics			
Symbol	**Parameter**	**Value**	**Unit**
I_D	Continuous drain current (V_{GS}=4.5V, T_C=25°C)	4.2	A
V_{DS}	Drain-source voltage	20	V
$R_{DS(ON)}$-Typ.	Static drain-source on-resistance (V_{GS}=4.5V, I_D=3A)	24	mΩ

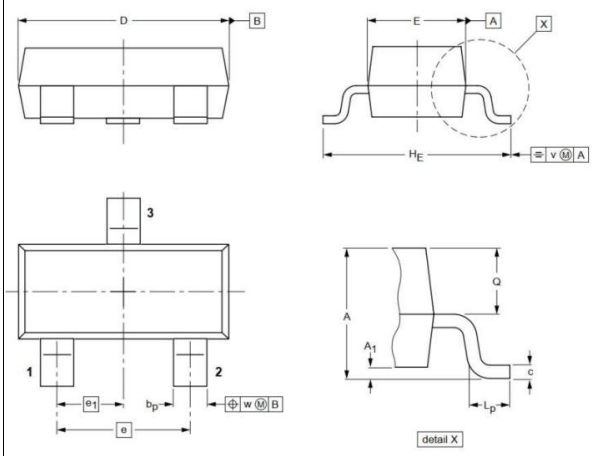
Applications

- Battery protection
- Load switch
- Uninterruptible power supply

Pinning



Case dimensions



SOT-23

Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.9	1.15	35	45
A1	0.1		3.9	
bp	0.38	0.48	15	19
C	0.09	0.15	3.54	5.9
D	2.8	3.0	110	118
E	1.2	1.4	47	55
e	1.9		75	
e1	0.95		37	
H_E	2.1	2.55	83	100
L_p	0.15	0.45	5.9	18
Q	0.45	0.55	18	22
v	0.2		7.9	
W	0.1		4	

Maximum and thermal ratings (T_C = 25°C unless otherwise specified)

Characteristics		Symbol	Value	Unit
Drain-source voltage		V_{DS}	20	V
Gate-source voltage		V_{GS}	±12	V
Continuous drain current	V_{GS}=4.5V [1], T_A=25°C	I_D	4.2	A
	V_{GS}=4.5V [1], T_A=70°C		2.7	A
Pulsed drain current [2]		I_{DM}	14.4	A
Total power dissipation [4]	T_A=25°C	P_D	1	W
Storage temperature range		T_{STG}	-55 to +150	°C
Operating junction temperature range		T_J	-55 to +150	°C

Thermal resistance junction-ambient [1]	$R_{\theta JA}$	125	°C/W
Thermal resistance junction-case [1]	$R_{\theta JC}$	80	°C/W

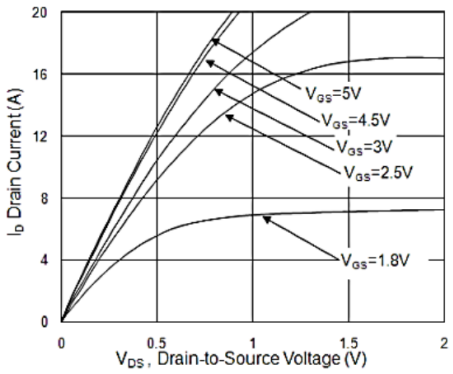
Maximum ratings (T_C = 25°C unless otherwise specified)

Characteristics	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Drain-source breakdown voltage	V_{GS}=0V, I_D=250μA	BV_{DSS}	20	22	-	V
Static drain-source on-resistance [2]	V_{GS}=4.5V, I_D=3A	$R_{DS(ON)}$	-	24	32	mΩ
	V_{GS}=2.5V, I_D=2A		-	29	38	
Gate-threshold voltage	V_{DS}=V_{GS}, I_D=250μA	$V_{GS(th)}$	0.5	0.75	1.2	V
Drain-source leakage current	V_{DS}=16V, V_{GS}=0V, T_J=25°C	I_{DSS}	-	-	1	μA
	V_{DS}=16V, V_{GS}=0V, T_J=55°C		-	-	5	
Gate-source leakage current	V_{GS}±12V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Forward transconductance	V_{DS}=5V, I_D=3A	g_{fs}	-	10.5	-	S
Total gate charge (4.5V)	V_{DS}=15V, V_{GS}=4.5V, I_D=3A	Q_g	-	4.6	-	nC
Gate-source charge		Q_{gs}	-	0.7	-	
Gate-drain charge		Q_{gd}	-	1.5	-	
Turn-on delay time	V_{DD}=10V, V_{GS}=4.5V, R_G=3.3Ω, I_D=3A	$t_{d(on)}$	-	1.6	-	ns
Rise time		T_r	-	42	-	
Turn-off delay time		$t_{d(off)}$	-	14	-	
Fall time		t_f	-	7	-	
Input capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	C_{iss}	-	310	-	pF
Output capacitance		C_{oss}	-	49	-	
Reverse transfer capacitance		C_{rss}	-	35	-	
Continuous source current [1] [4]	V_{DS}=V_{GS}=0V, Force current	I_S	-	-	3.6	A
Diode forward voltage [2]	V_{GS}=0V, I_S=1A, T_J=25℃	V_{SD}	-	-	1.2	V

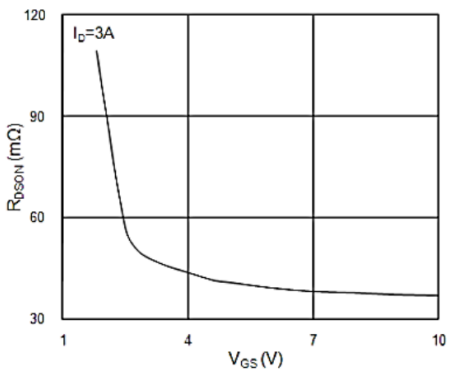
Notes:
[1] The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
[2] The data tested by pulsed, pulse width≦300us, duty cycle≦2%.
[3] The power dissipation is limited by 150℃ junction temperature.
[4] The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Ratings and characteristics curves

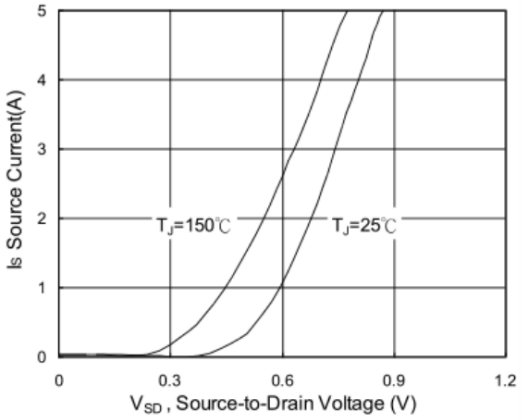
Typical output characteristics



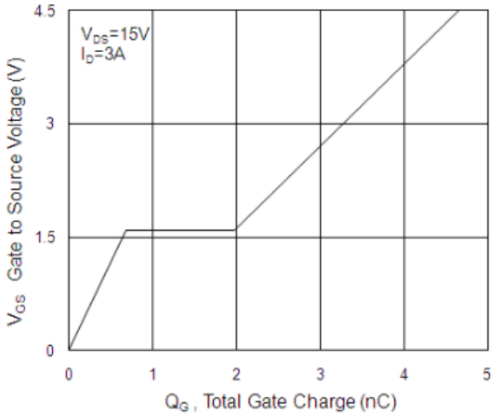
On-resistance vs. G-S voltage



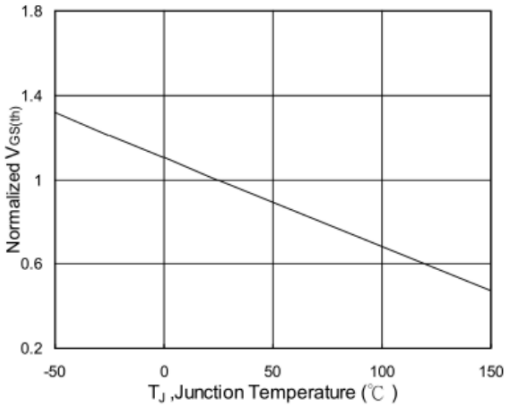
Source drain forward characteristics



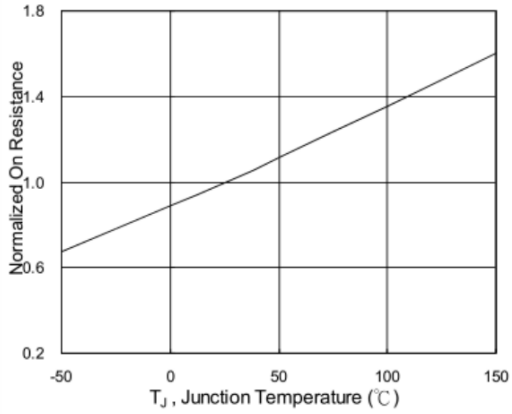
Gate-charge characteristics



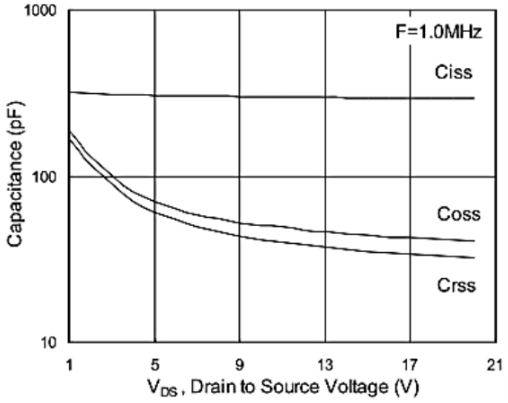
Normalized $V_{GS(th)}$ vs. T_J



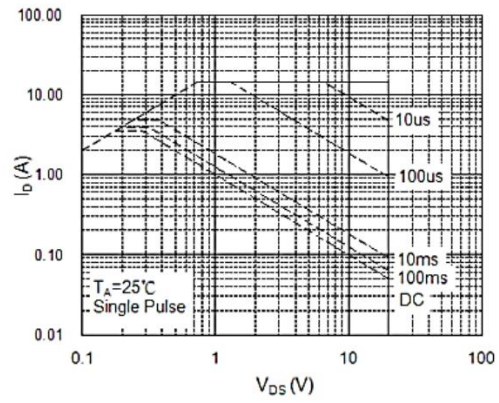
Normalized $R_{DS(ON)}$ vs. T_J



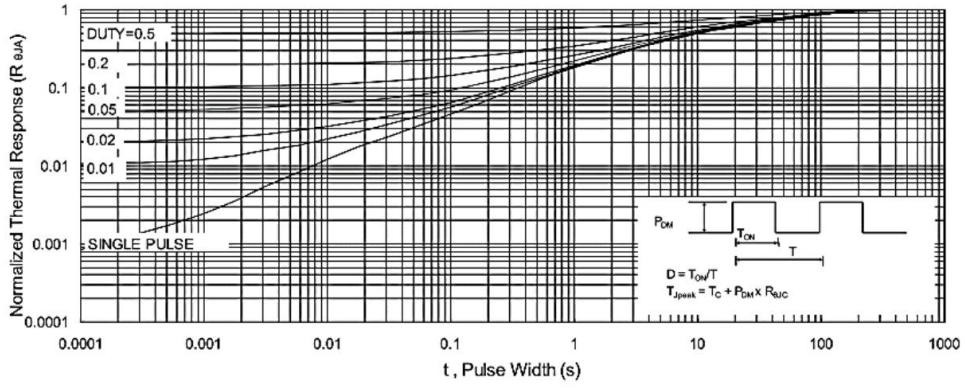
Capacitance

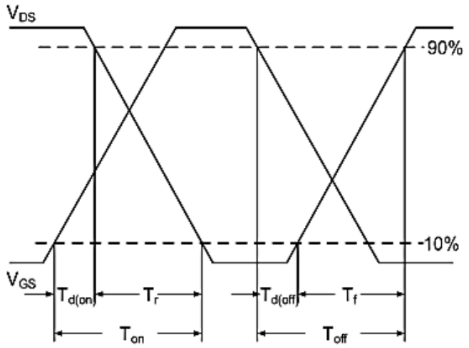
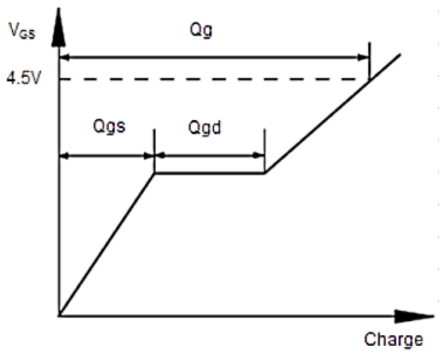


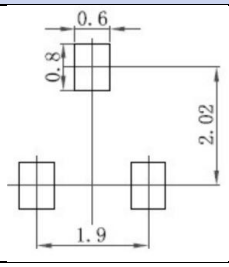
Safe operating area



Normalized maximum transient thermal impedance



Switching time waveform	Gate charge waveform
	

The recommended mounting pad size


Ordering information			
Part Number	**Package**	**Shipping Quantity**	**Packing quantity**
AK2302A	SOT-23	**3000 pcs / 7”reel**	24000 pcs / box 12000 pcs / carton

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