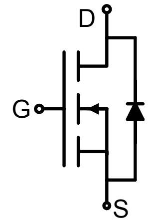
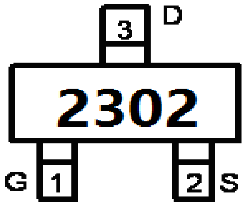
FNK Semiconductor

FNK2302



Schematic diagram



Marking and pin Assignment

SOT-23 top view

DESCRIPTION

The FNK 2302 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

GENERAL FEATURES

- V_{DS} = 20V,I_D =3.5A
  $R_{DS(ON)}$ < 38mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$ < 32mΩ @ V_{GS}=4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- Battery protection
- Load switch
- Power management

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2302A	FNK 2302A	SOT-23	Ø180mm	8 mm	3000 units

ABSOLUTE MAXIMUM RATINGS(TA=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D	3.5	A
	I_{DM}	14	A
Maximum Power Dissipation	P_D	1.2	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	140	℃/W

ELECTRICAL CHARACTERISTICS (TA=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20			V

Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.4	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=2.5V, I_D=1A		27	38	mΩ
		V_{GS}=4.5V, I_D=1A		23	32	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=4.0A		5		S
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz		500		PF
Output Capacitance	C_{oss}			250		PF
Reverse Transfer Capacitance	C_{rss}			90		PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V, R_L = 2.8 Ω V_{GS}=4.5V,R_{GEN}=6Ω, I_D=3.6A,		7		nS
Turn-on Rise Time	t_r			55		nS
Turn-Off Delay Time	$t_{d(off)}$			16		nS
Turn-Off Fall Time	t_f			10		nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=4.0A,V_{GS}=4.5V		10		nC
Gate-Source Charge	Q_{gs}			2.3		nC
Gate-Drain Charge	Q_{gd}			2.9		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1.3A			1.2	V

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

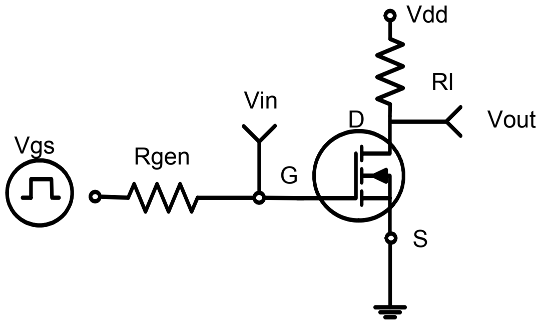


Figure 1:Switching Test Circuit

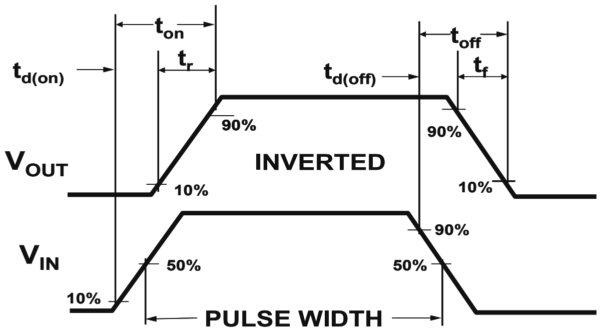


Figure 2:Switching Waveforms

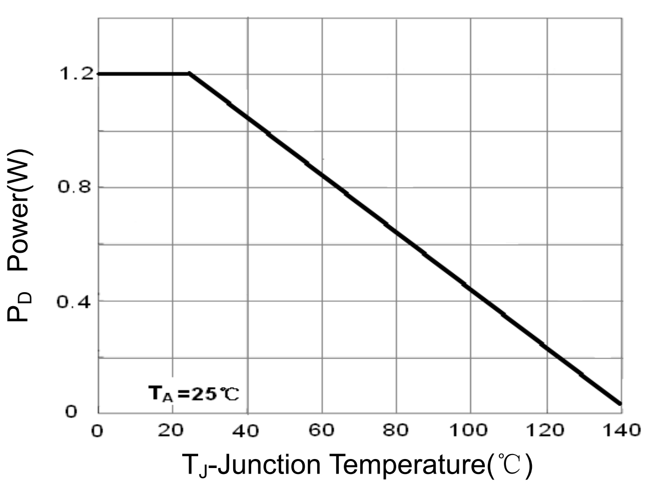


Figure 3 Power Dissipation

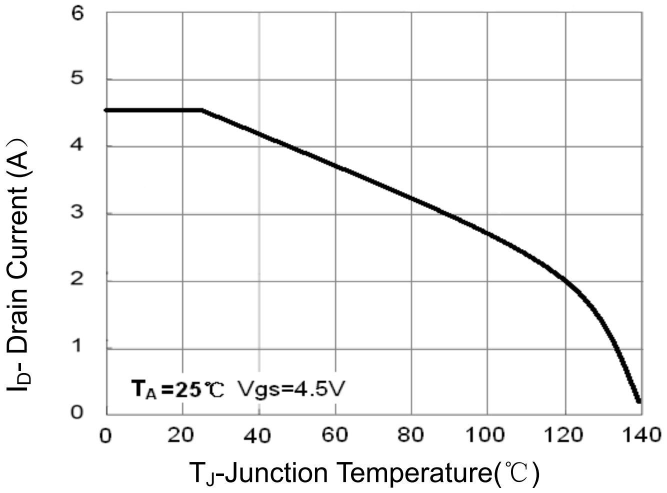


Figure 4 Drain Current

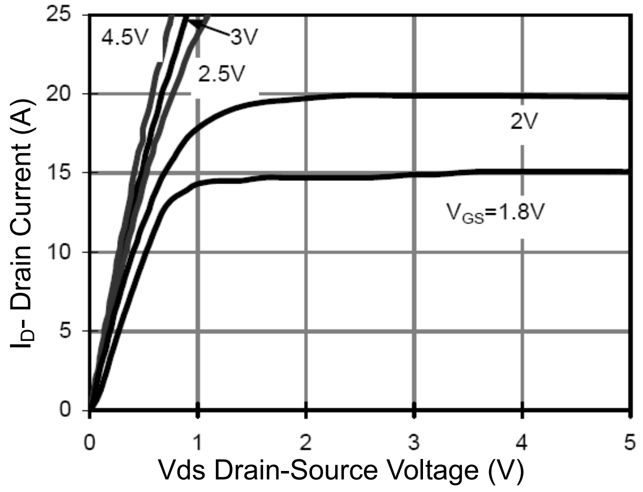


Figure 5 Output CHARACTERISTICS

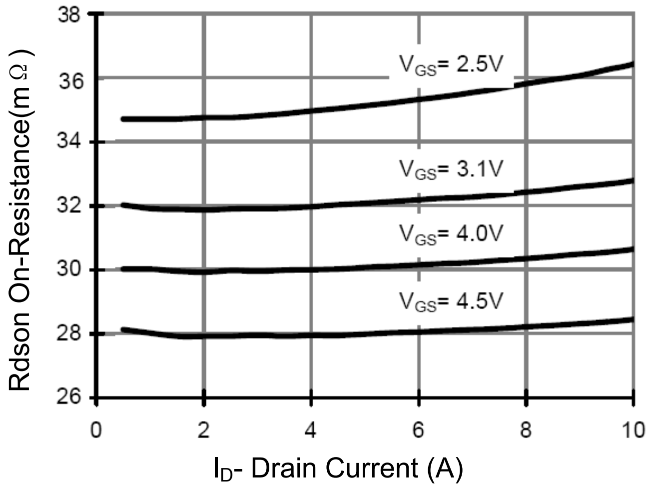


Figure 6 Drain-Source On-Resistance

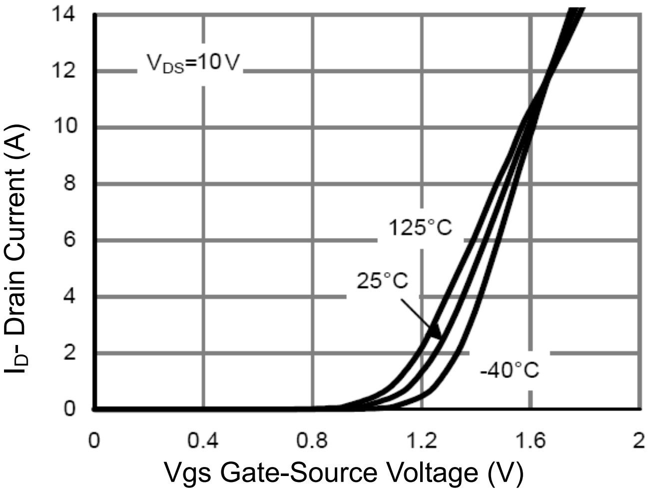


Figure 7 Transfer Characteristics

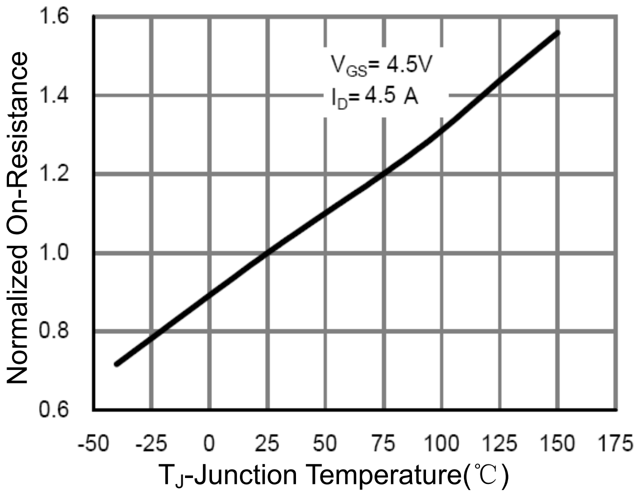


Figure 8 Drain-Source On-Resistance

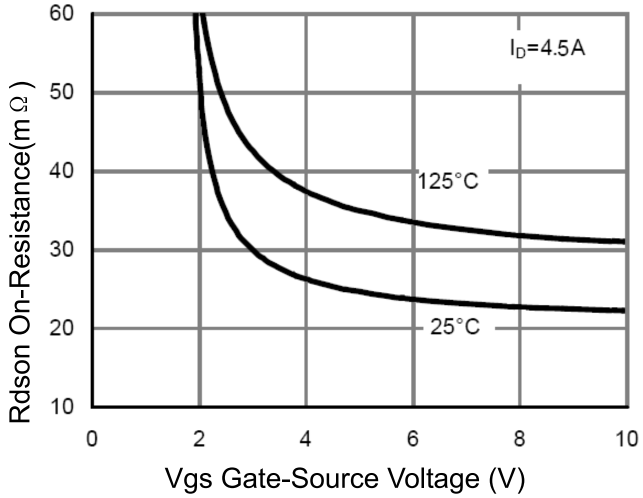


Figure 9 Rdson vs Vgs

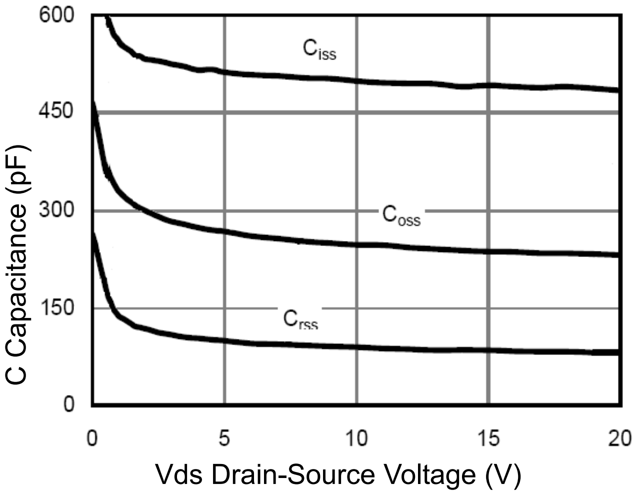


Figure 10 Capacitance vs Vds

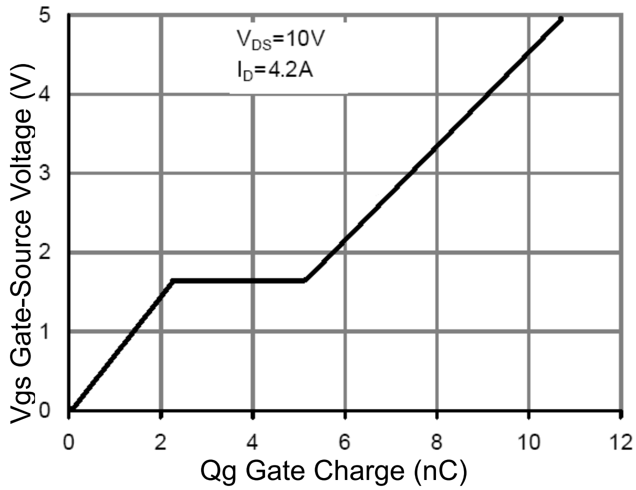


Figure 11 Gate Charge

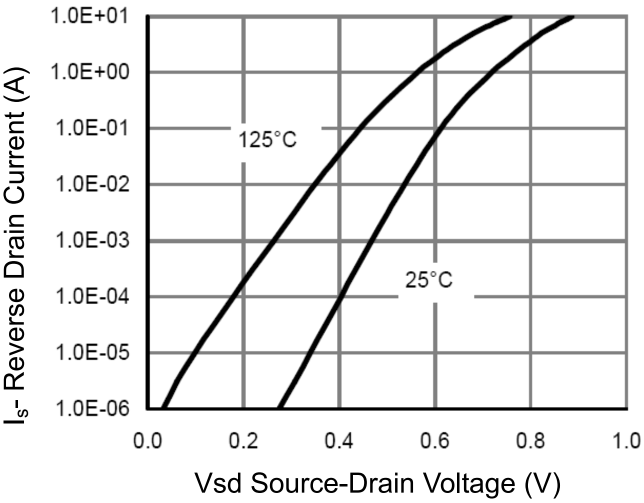


Figure 12 Source- Drain Diode Forward

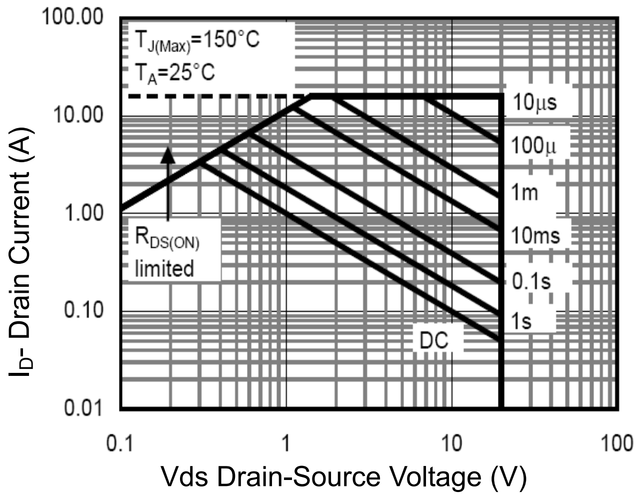


Figure 13 Safe Operation Area

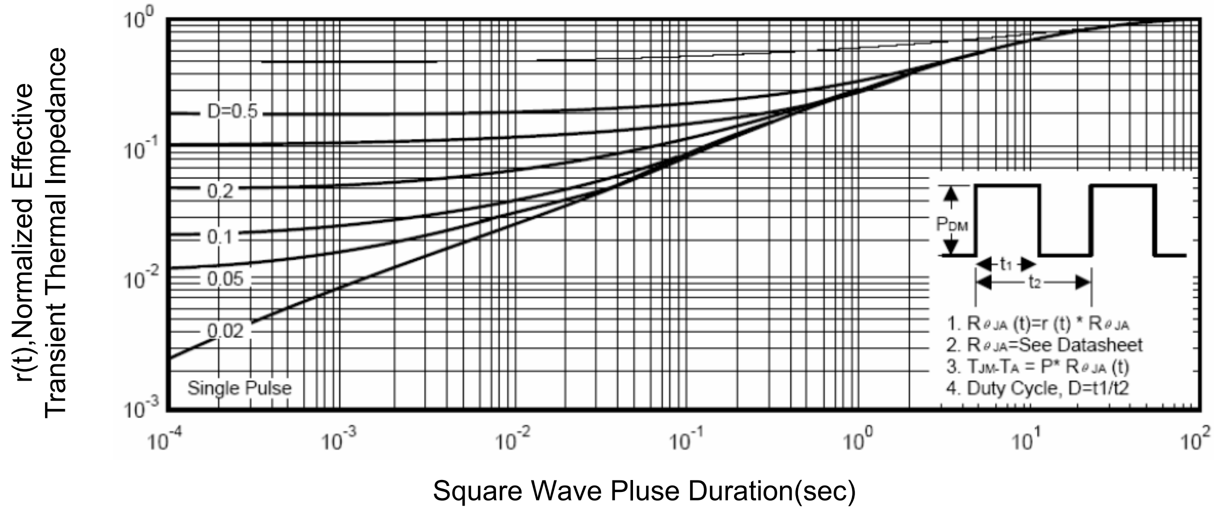
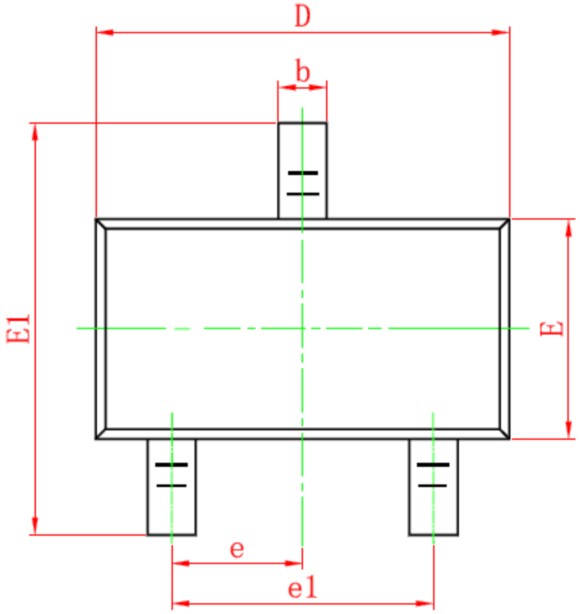
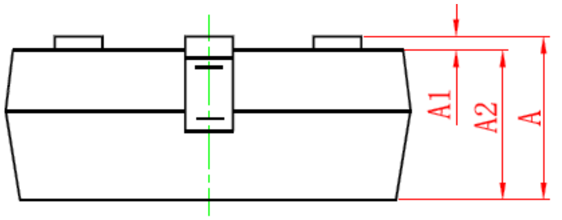


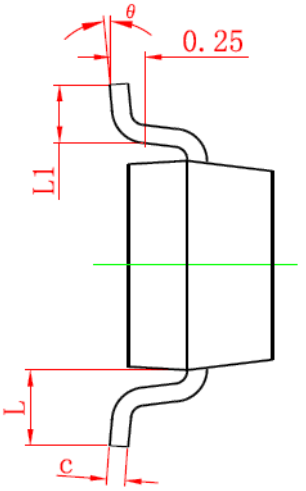
Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)







Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

NOTES

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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