

20V N-Channel Enhancement-Mode MOSFET

DESCRIPTION

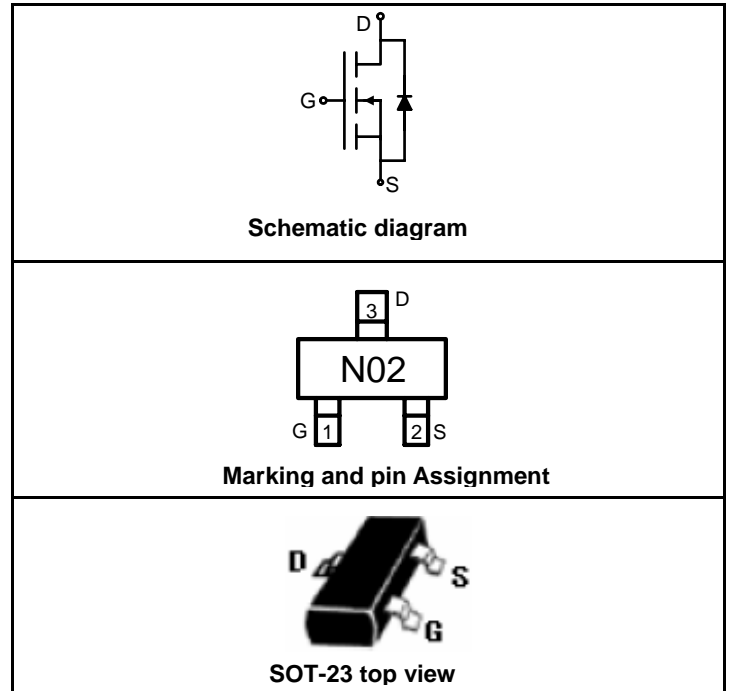
The FTK2302 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

GENERAL FEATURES

- $V_{DS} = 20V, I_D = 2.4A$
 $R_{DS(ON)} < 115m\Omega @ V_{GS}=2.5V$
 $R_{DS(ON)} < 60m\Omega @ V_{GS}=4.5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- Battery protection
- Load switch
- Power management



- We declare that the material of product are Halogen Free and compliance with RoHS requirements.

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
N02	FTK2302	SOT-23	Ø180mm	8 mm	3000 units

ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±8	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D (25^\circ C)$	2.4	A
	$I_D (70^\circ C)$	1.7	A
	I_{DM}	10	A
Maximum Power Dissipation	P_D	0.9	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	140	°C/W
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ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 8V, V_{DS}=0V$			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.65	0.95	1.2	V

Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V, I_D=3.1A$	70	115	m Ω
		$V_{GS}=4.5V, I_D=3.6A$	45	60	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=3.6A$	8		S
DYNAMIC CHARACTERISTICS (Note4)					
Input Capacitance	C_{ISS}	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	300		PF
Output Capacitance	C_{OSS}		120		PF
Reverse Transfer Capacitance	C_{RSS}		80		PF
SWITCHING CHARACTERISTICS (Note 4)					
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L = 2.8 \Omega$ $V_{GS}=4.5V, R_{GEN}=6\Omega,$ $I_D=3.6A,$	7	15	nS
Turn-on Rise Time	t_r		55	80	nS
Turn-Off Delay Time	$t_{d(off)}$		16	60	nS
Turn-Off Fall Time	t_f		10	25	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=3.6A, V_{GS}=4.5V$	4.0	10	nC
Gate-Source Charge	Q_{gs}		0.65		nC
Gate-Drain Charge	Q_{gd}		1.5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS					
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=0.94A$	0.76	1.2	V
Diode Forward Current (Note 2)	I_S		0.94		A

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in² FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

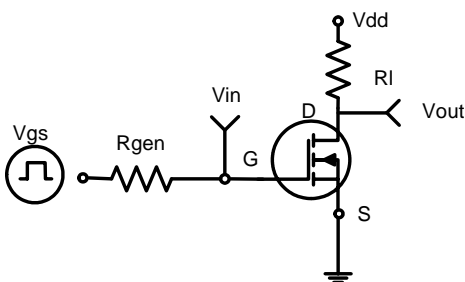


Figure 1: Switching Test Circuit

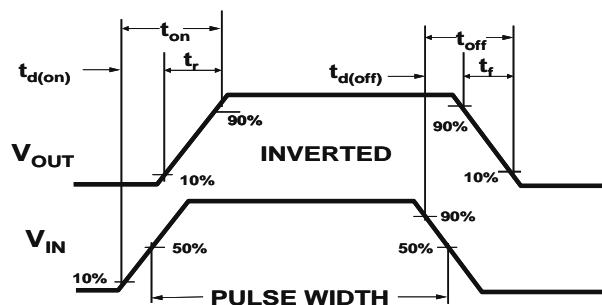
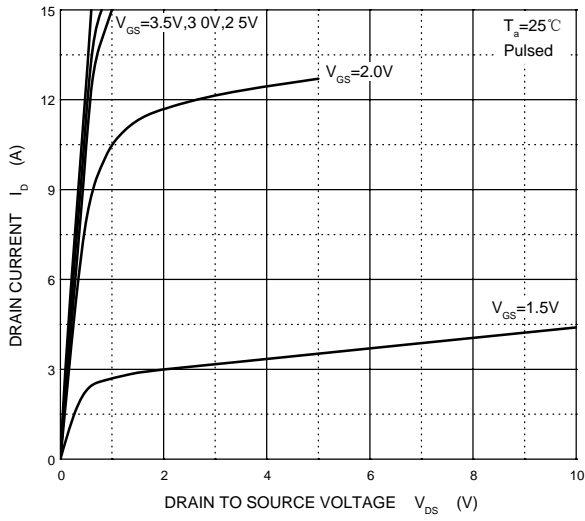
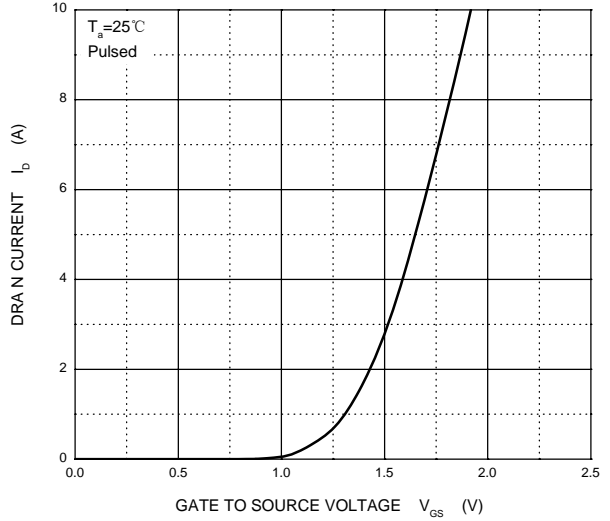


Figure 2: Switching Waveforms

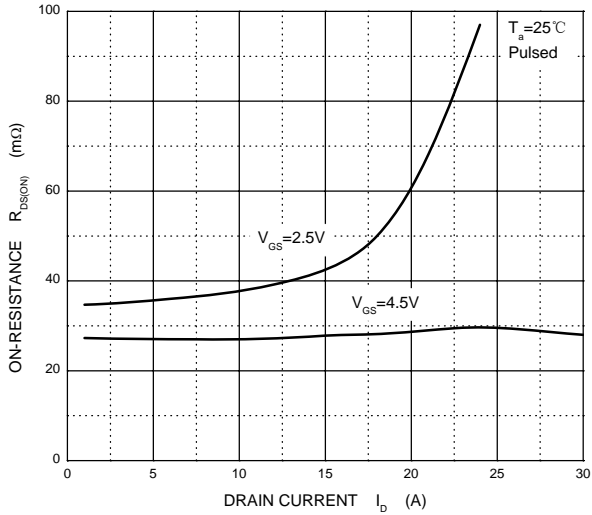
Output Characteristics



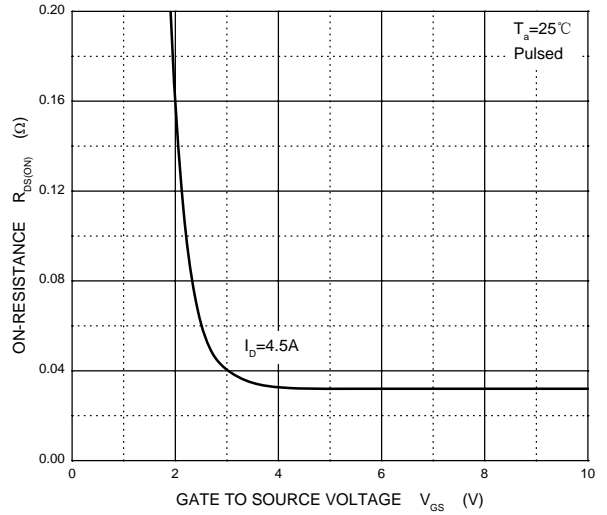
Transfer Characteristics



$R_{DS(ON)}$ — I_D



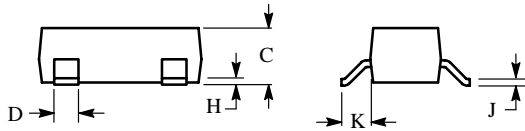
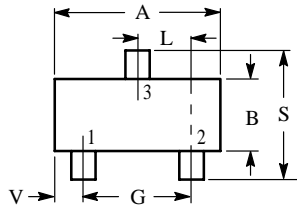
$R_{DS(ON)}$ — V_{GS}



SOT -23

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M,1982
2. CONTROLLING DIMENSION: INCH.



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

