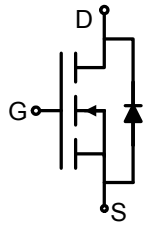
N-Channel Power MOSFET

General Features

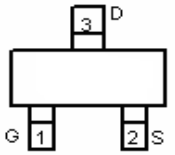
- V_{DS} = 30V,I_D = 4A
  $R_{DS(ON)}$ < 60mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$ < 50mΩ @ V_{GS}=10V

Application

- DC Fan
- *Charger, Fast switch*
- *Optimized for Power Management Applications for Portable Products, such as H-bridge, Inverters Car Charger and Others*



Schematic diagram



Pin Assignment

SOT-23 top view

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±20	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		30	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-50 to 150	°C
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested①	T_A=25°C	20.4	A
I_D	Continuous Drain Current(V_{GS}=4.5V)	T_A=25°C	4	A
		T_A=70°C	3.2	
P_D	Maximum Power Dissipation	T_A=25°C	1.5	W
		T_A=70°C	0.9	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		80－100	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(T_A=25℃)	V_{DS}=30V, V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_A=125℃)	V_{DS}=30V, V_{GS}=0V	--	--	100	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.5	0.9	1.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=10V, I_D=4A	--	29	50	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance②	V_{GS}=4.5V, I_D=3A	--	44	60	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=24V, V_{GS}=0V, f=1MHz	--	300	--	pF
C_{oss}	Output Capacitance		--	44	--	pF
C_{rss}	Reverse Transfer Capacitance		--	38	--	pF
Q_g	Total Gate Charge	V_{DS}=24V I_D=2A, V_{GS}=10V	--	3.5	--	nC
Q_{gs}	Gate Source Charge		--	0.4	--	nC
Q_{gd}	Gate Drain Charge		--	1.7	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn on Delay Time	V_{DD}=24V, I_D=5A, R_G=3.3Ω, V_{GS}=10V	--	2.2	--	ns
t_r	Turn on Rise Time		--	6.9	--	ns
$t_{d(off)}$	Turn Off Delay Time		-	15.5	--	ns
t_f	Turn Off Fall Time		--	4.5	--	ns
Source Drain Diode Characteristics						
I_{SD}	Source drain current(Body Diode)	T_A=25℃	--	--	1.8	A
V_{SD}	Forward on voltage②	T_j=25℃, I_{SD}=5A, V_{GS}=0V	--	--	1.2	V

Notes:

① Pulse width limited by maximum allowable junction temperature

②Pulse test ; Pulse width≤300μs, duty cycle≤2%.

Typical Characteristics

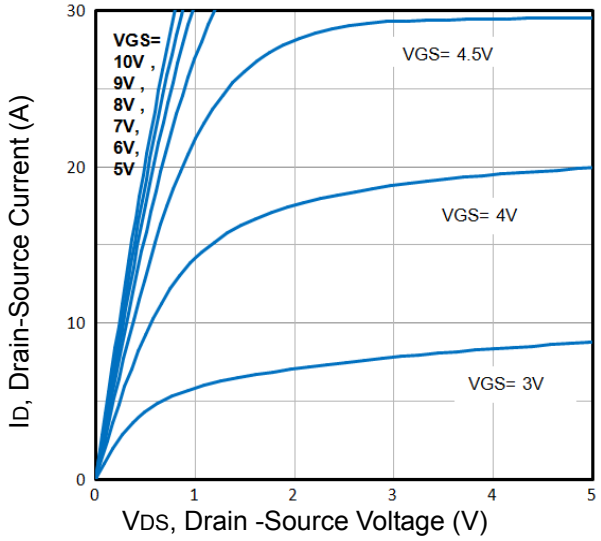


Fig1. Typical Output Characteristics

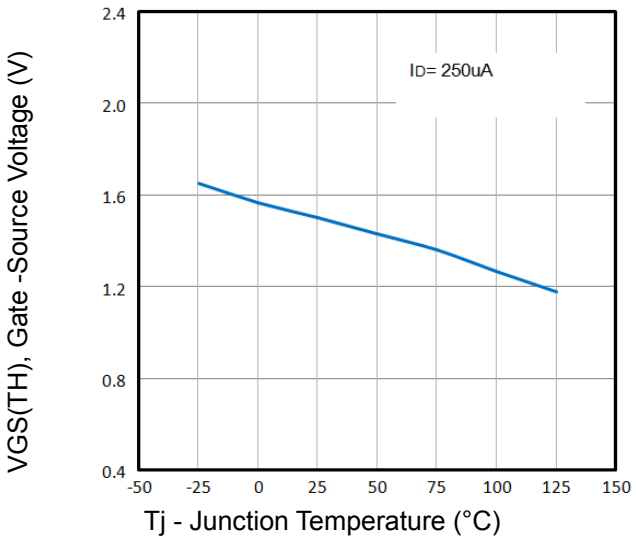


Fig2. Normalized Threshold Voltage Vs. Temperature

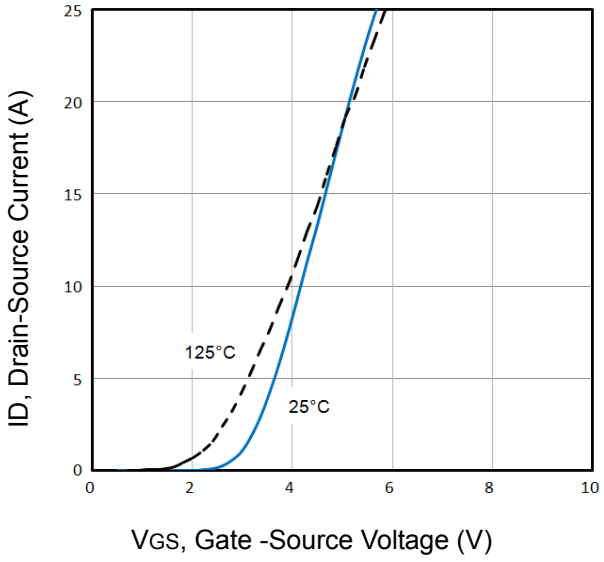


Fig3. Typical Transfer Characteristics

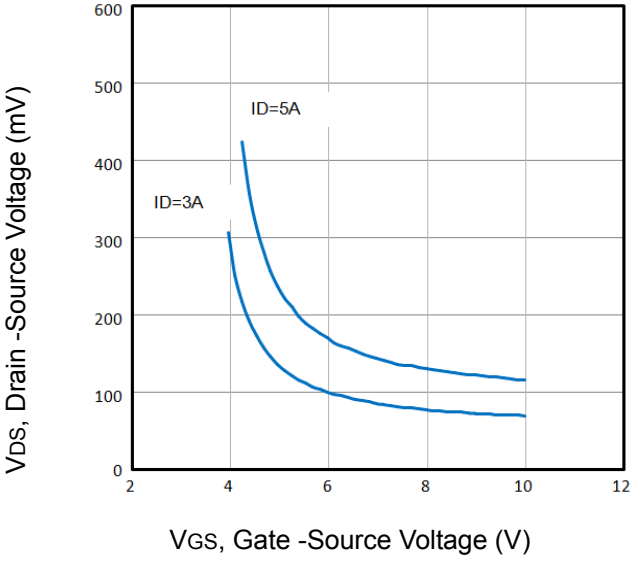


Fig4. Drain -Source Voltage vs Gate -Source Voltage

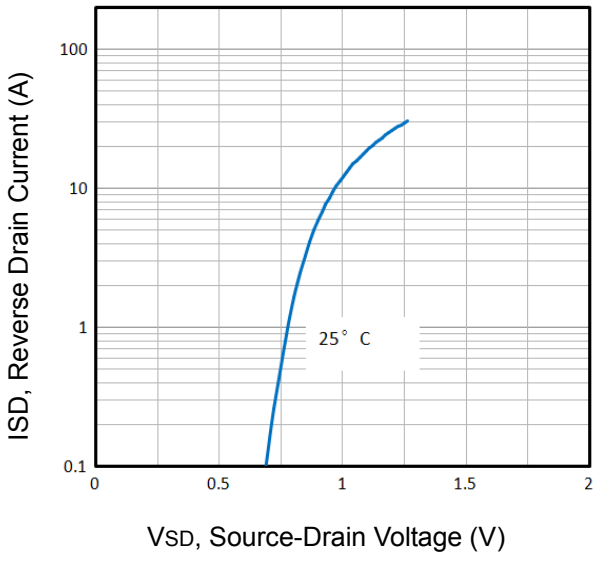


Fig5. Typical Source-Drain Diode Forward Voltage

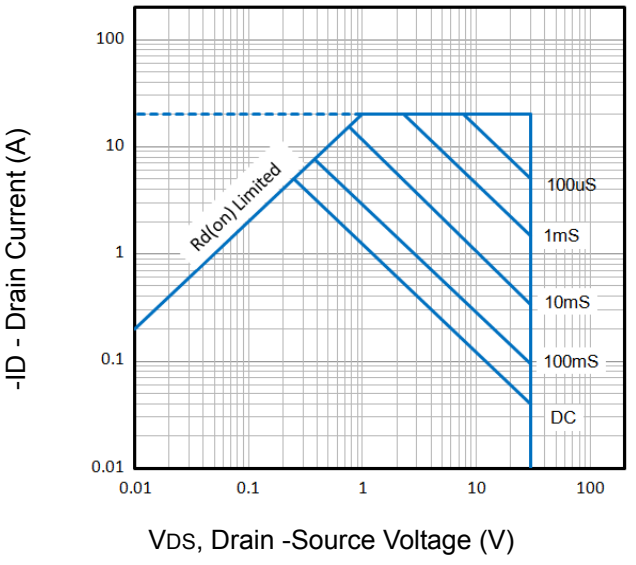


Fig6. Maximum Safe Operating Area

Typical Characteristics

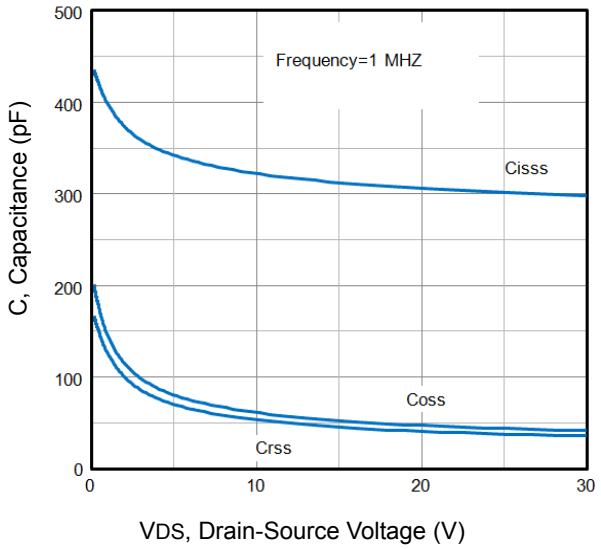


Fig7. Typical Capacitance Vs. Drain-Source Voltage

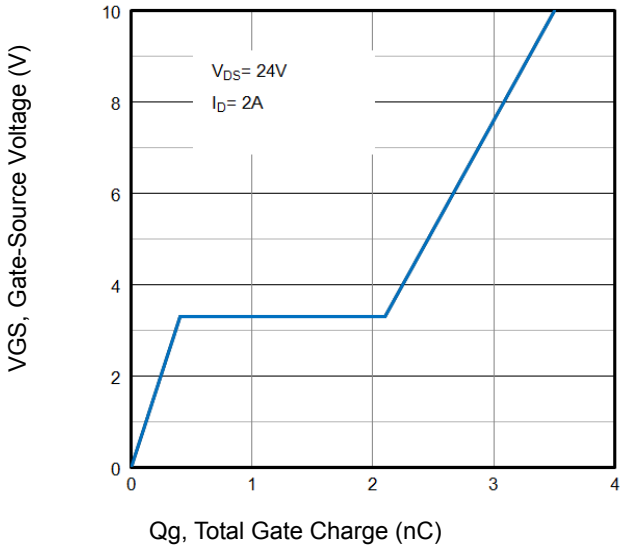


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

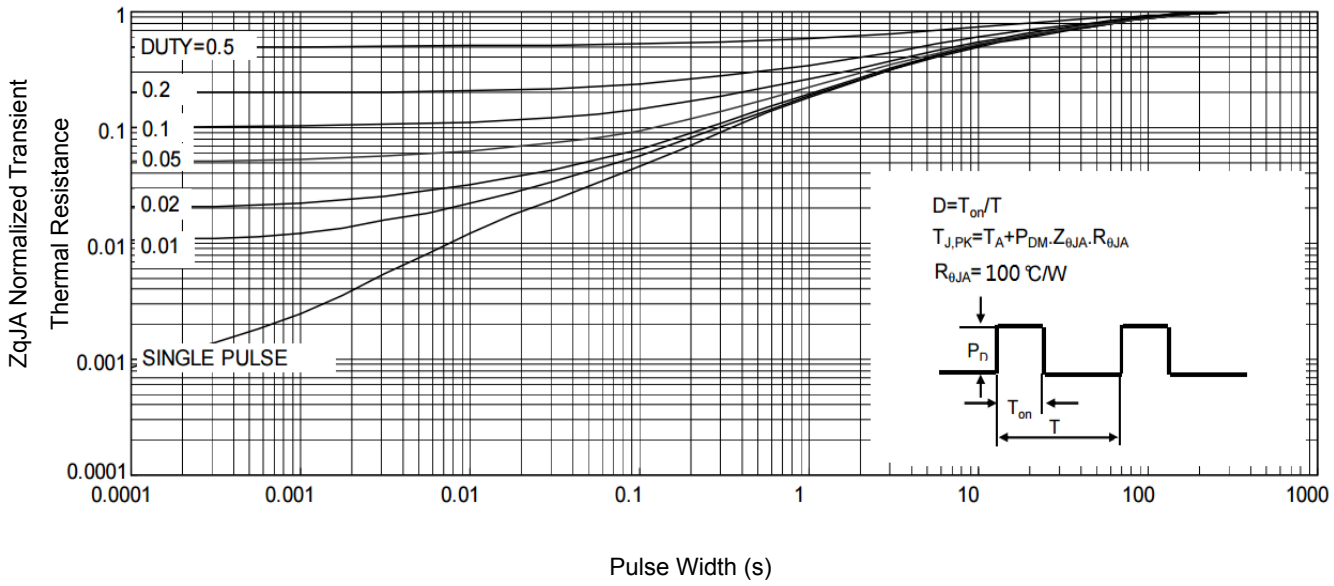


Fig9. Normalized Maximum Transient Thermal Impedance

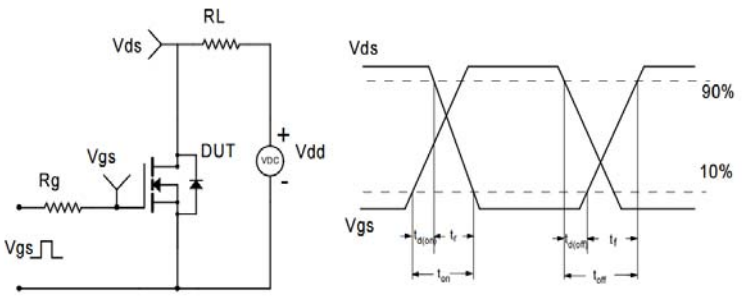
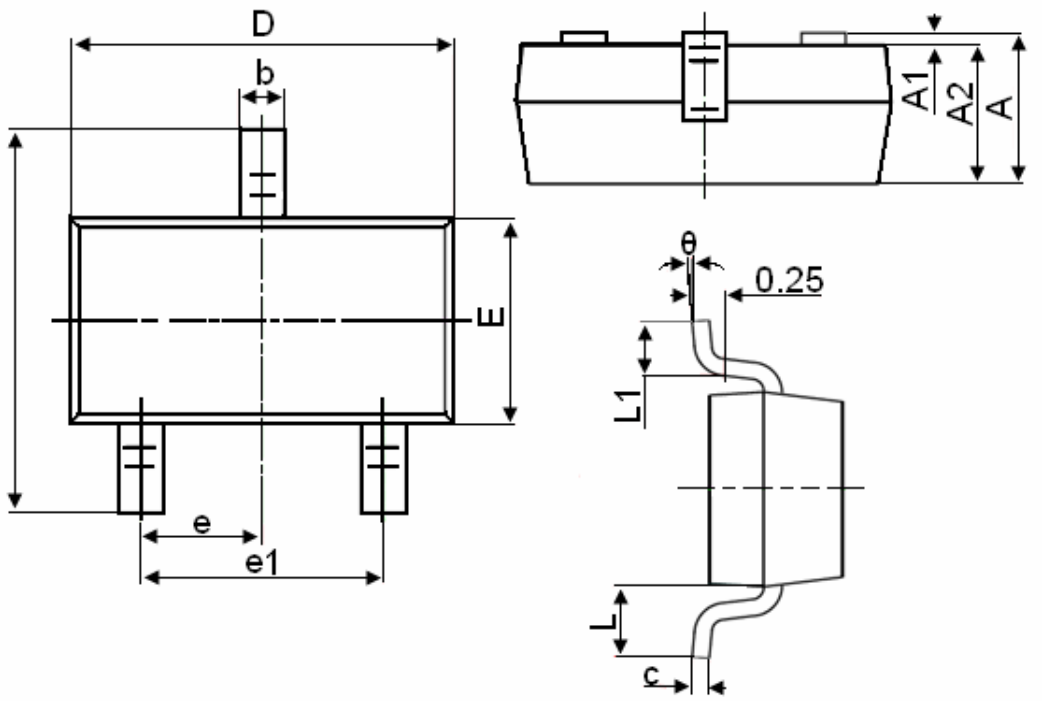


Fig10. Switching Time Test Circuit and waveforms

SOT-23 Package Information



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°