

## Features

- Low  $R_{DS(on)}$  @  $V_{GS}=4.5V$
- 3.3V Logic Level Control
- N-Channel SOT23 Package
- Pb-Free, RoHS Compliant



## Applications

- Load Switch
- DC/DC Converter
- Switching Circuits
- Power Management

$V_{(BR)DSS}$	$R_{DS(ON)}$ Typ	$I_D$ Max
20V	21m $\Omega$ @ 4.5V	6A
	28m $\Omega$ @ 3.3V	

## Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

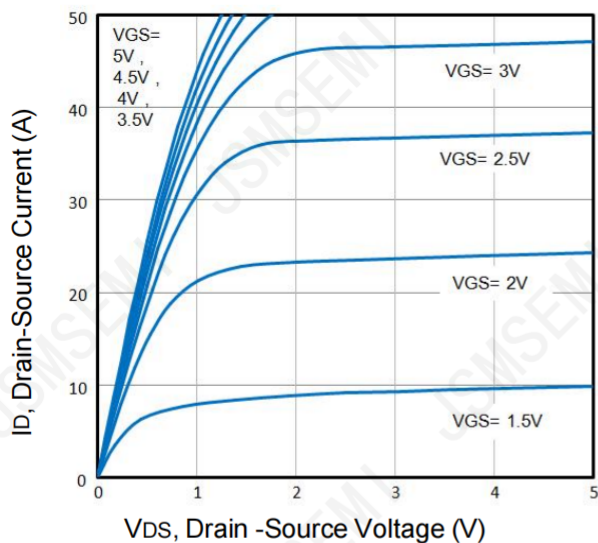
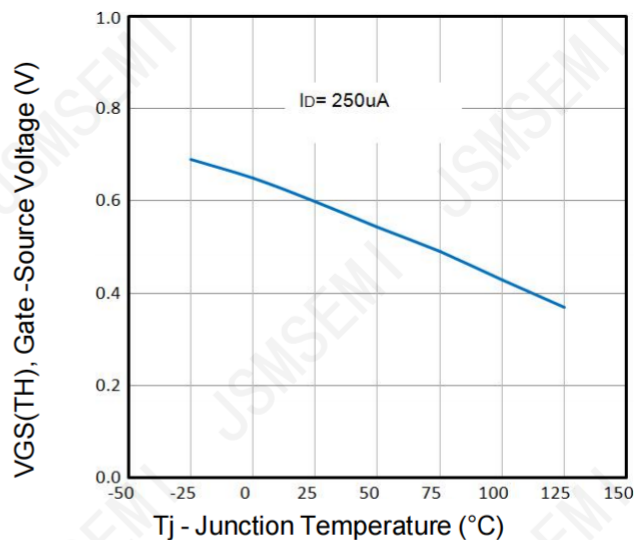
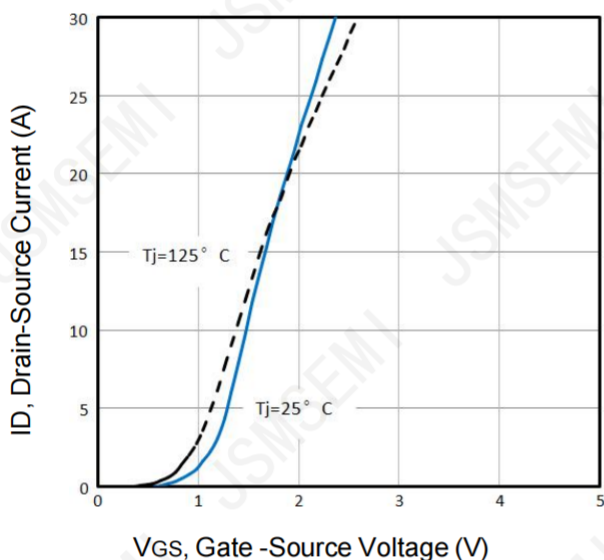
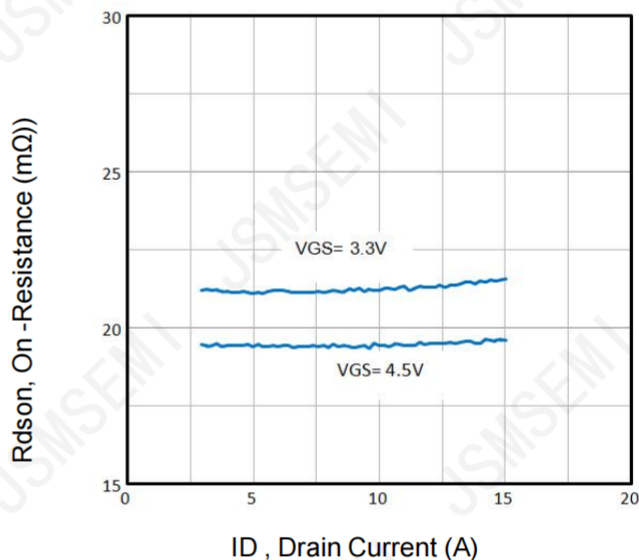
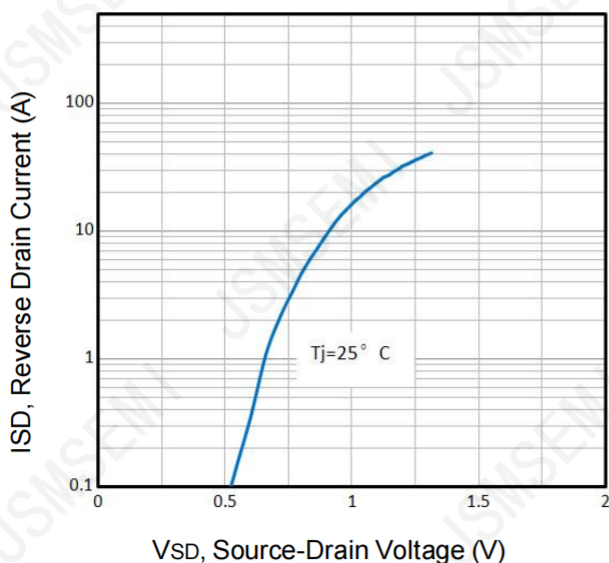
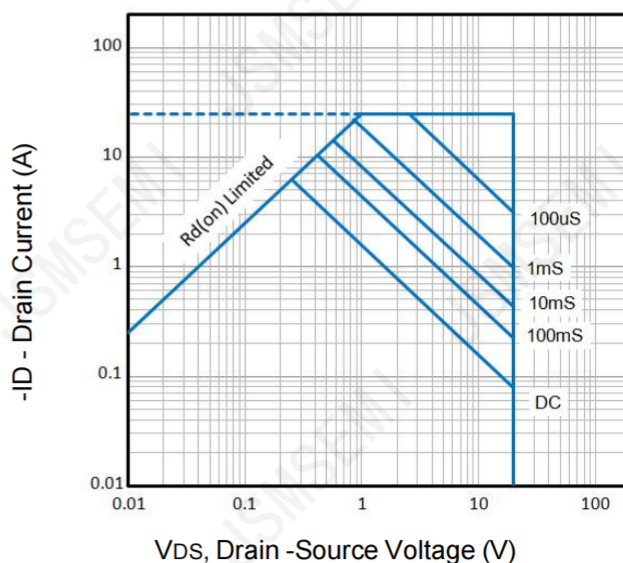
Symbol	Parameter	Rating	Unit	
Common Ratings (TA=25°C Unless Otherwise Noted)				
VGS	Gate-Source Voltage	±10	V	
V(BR)DSS	Drain-Source Breakdown Voltage	20	V	
TJ	Maximum Junction Temperature	150	°C	
TSTG	Storage Temperature Range	-50 to 150	°C	
Mounted on Large Heat Sink				
IDM	Pulse Drain Current Tested①	TA=25°C	24.8	A
ID	Continuous Drain Current	TA=25°C	6	A
		TA=70°C	4.2	
PD	Maximum Power Dissipation	TA=25°C	1.56	W
		TA=70°C	0.9	
RθJA	Thermal Resistance Junction-Ambient	80	°C/W	

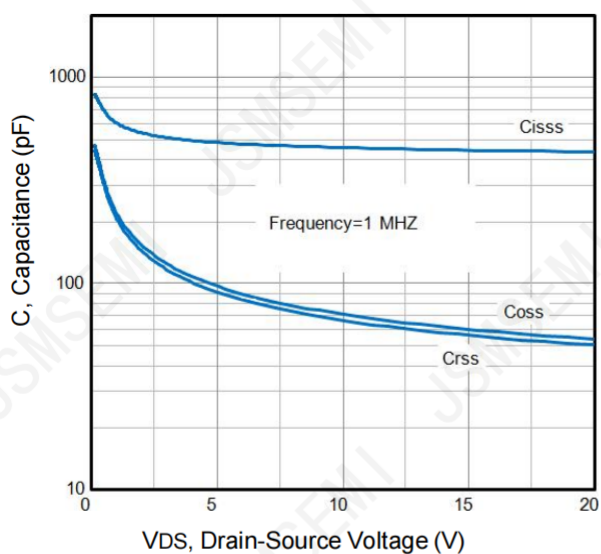
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T <sub>J</sub> = 25°C (unless otherwise stated)						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	20	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(T <sub>A</sub> =25°C)	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T <sub>A</sub> =125°C)	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V	--	--	100	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.45	0.6	1.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	--	21		mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =3.3V, I <sub>D</sub> =3A	--	28		mΩ
Dynamic Electrical Characteristics @ T <sub>J</sub> = 25°C (unless otherwise stated)						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	--	457	--	pF
C <sub>oss</sub>	Output Capacitance		--	71	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	66	--	pF
R <sub>g</sub>	Gate Resistance	f=1MHz		7.8		Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V I <sub>D</sub> =4A, V <sub>GS</sub> =4.5V	--	6.6	--	nC
Q <sub>gs</sub>	Gate Source Charge		--	0.4	--	nC
Q <sub>gd</sub>	Gate Drain Charge		--	2	--	nC
Switching Characteristics @ T <sub>J</sub> = 25°C (unless otherwise stated)						
t <sub>d(on)</sub>	Turn on Delay Time	V <sub>DD</sub> =10V, I <sub>D</sub> =1A, R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =4.5V	--	4.1	--	ns
t <sub>r</sub>	Turn on Rise Time		--	11.6	--	ns
t <sub>d(off)</sub>	Turn Off Delay Time		-	24	--	ns
t <sub>f</sub>	Turn Off Fall Time		--	7.6	--	ns
Source Drain Diode Characteristics @ T <sub>J</sub> = 25°C (unless otherwise stated)						
I <sub>SD</sub>	Source drain current(Body Diode)	T <sub>A</sub> =25°C	--	--	2	A
V <sub>SD</sub>	Forward on voltage②	T <sub>J</sub> =25°C, I <sub>SD</sub> =4A, V <sub>GS</sub> =0V	--	0.79	1.2	V

Notes:

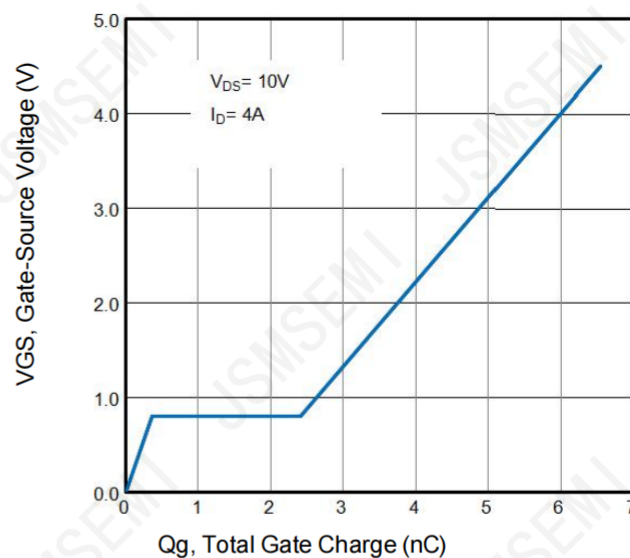
① Pulse width limited by maximum allowable junction temperature

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

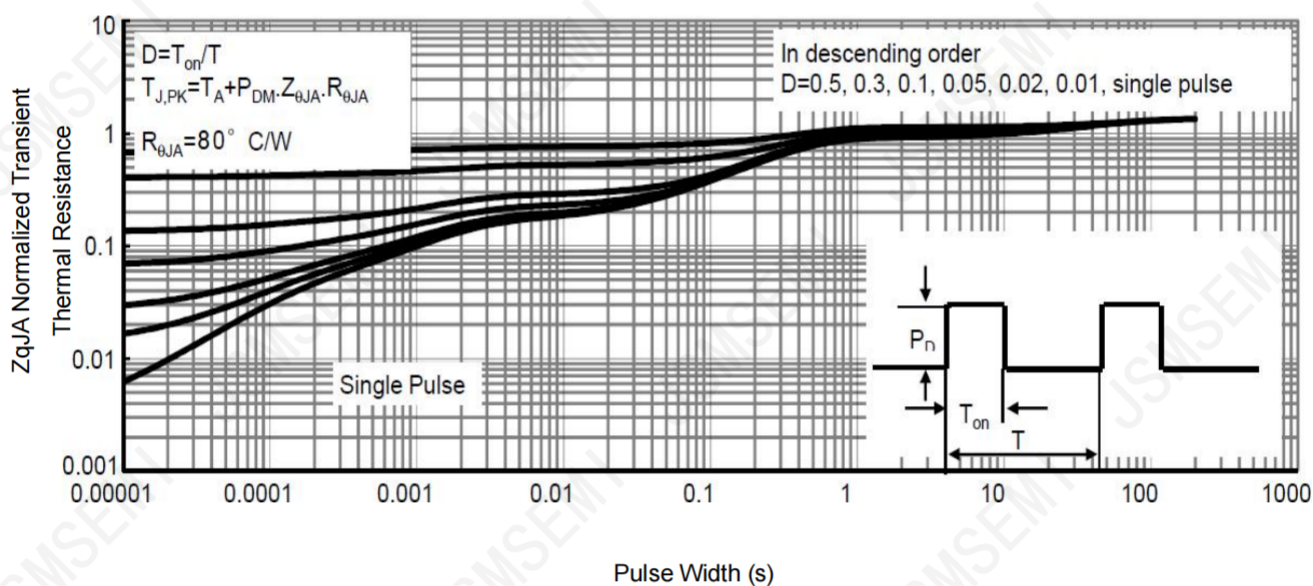

**Fig1. Typical Output Characteristics**

**Fig2. VGS(TH) Voltage Vs. Temperature**

**Fig3. Typical Transfer Characteristics**

**Fig4. On-Resistance vs. Drain Current and Gate**

**Fig5. Typical Source-Drain Diode Forward Voltage**

**Fig6. Maximum Safe Operating Area**



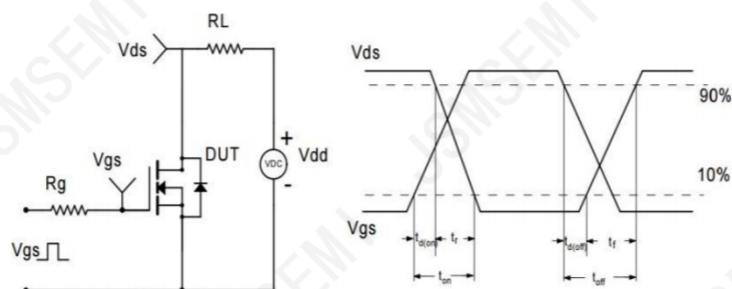
**Fig7.** Typical Capacitance Vs. Drain-Source Voltage



**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage



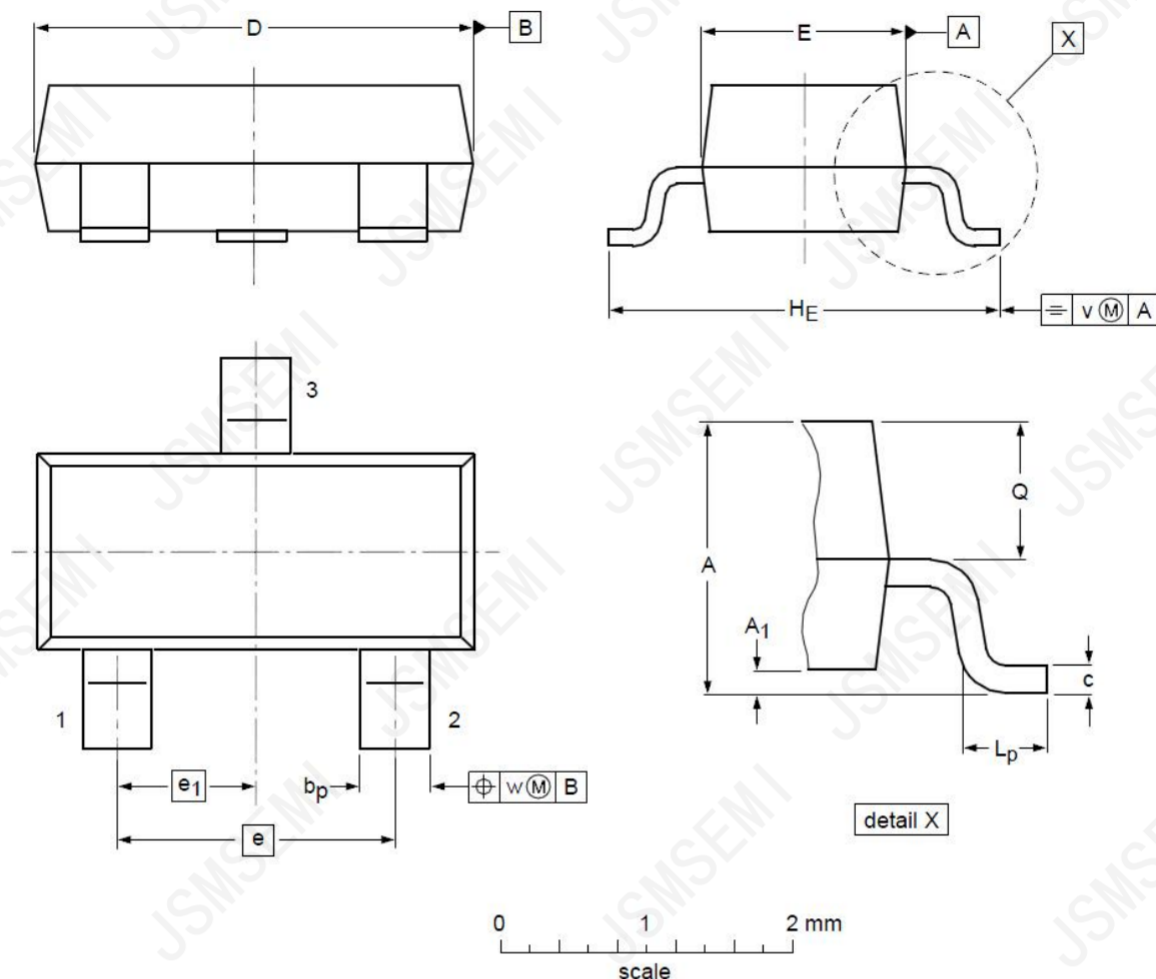
**Fig9.** Normalized Maximum Transient Thermal Impedance



**Fig10.** Switching Time Test Circuit and waveforms



### SOT23-3 Mechanical Data



### DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A <sub>1</sub>	0.01	0.05	0.10
b <sub>p</sub>	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e <sub>1</sub>	--	0.95	--
H <sub>E</sub>	2.25	2.40	2.55	L <sub>p</sub>	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				

## Revision History

Rev.	Change	Date
V1.0	Initial version	2/23/2024

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