

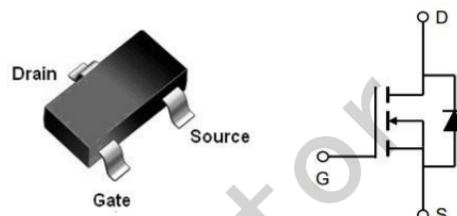
**Features**

- Low  $R_{DS(on)}$  @  $V_{GS}=10V$
- 5V Logic Level Control
- N Channel SOT23 Package
- Pb-Free, RoHS Compliant

$V_{(BR)DSS}$	$R_{DS(ON)}$ Typ	$I_D$ Max
60V	57mΩ @ 10V	3.5A
	66mΩ @ 4.5V	

**Applications**

- Load Switch
- Battery switch
- DC/DC Converter



**SOT23**

**Absolute Maximum Ratings**

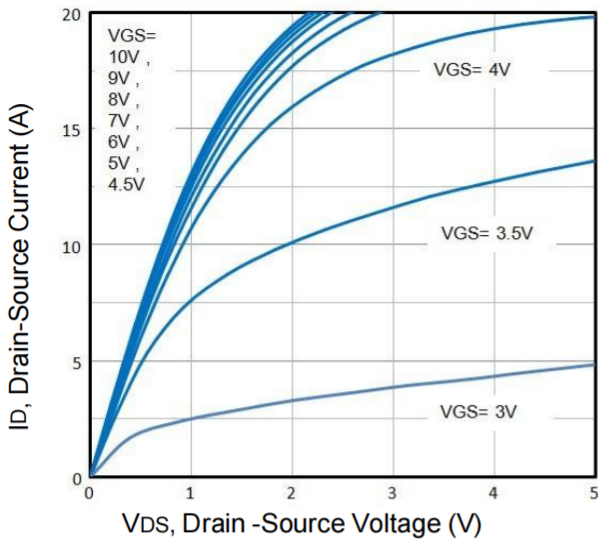
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (T<sub>A</sub>=25°C Unless Otherwise Noted)</b>				
$V_{GS}$	Gate-Source Voltage	±16	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	60	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-50 to 150	°C	
<b>Mounted on Large Heat Sink</b>				
$I_{DM}$	Pulse Drain Current Tested <sup>○</sup>	$T_A=25^\circ C$	15.2	A
$I_D$	Continuous Drain Current	$T_A=25^\circ C$	3.5	A
		$T_A=70^\circ C$	3	
$P_D$	Maximum Power Dissipation	$T_A=25^\circ C$	1.56	W
		$T_A=70^\circ C$	0.9	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	80	°C/W	

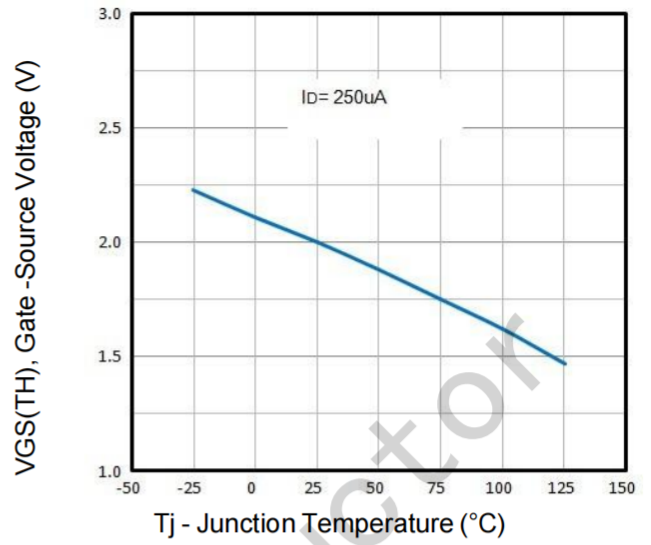
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(T <sub>A</sub> =25°C)	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T <sub>A</sub> =125°C)	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±16V, 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	1.0	2.0	3.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =10V, I <sub>D</sub> =3A	--	57	70	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A	--	66	90	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	--	362	--	pF
C <sub>oss</sub>	Output Capacitance		--	23	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	16	--	pF
R <sub>g</sub>	Gate Resistance	f=1MHz		9		Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V I <sub>D</sub> =4A, V <sub>GS</sub> =10V	--	6.9	--	nC
Q <sub>gs</sub>	Gate Source Charge		--	0.9	--	nC
Q <sub>gd</sub>	Gate Drain Charge		--	1.8	--	nC
<b>Switching Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
t <sub>d(on)</sub>	Turn on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =1A, R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =10V	--	3.4	--	ns
t <sub>r</sub>	Turn on Rise Time		--	5.8	--	ns
t <sub>d(off)</sub>	Turn Off Delay Time		--	21	--	ns
t <sub>f</sub>	Turn Off Fall Time		--	4.6	--	ns
<b>Source Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
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> =2A, V <sub>GS</sub> =0V	--	0.79	1.2	V

## Notes:

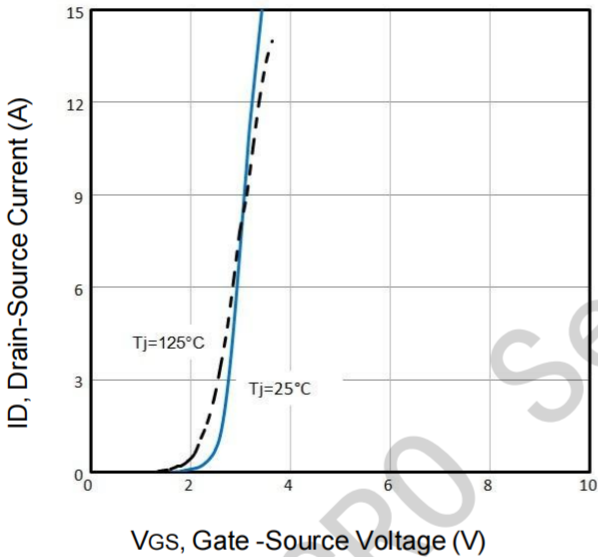
- ① Pulse width limited by maximum allowable junction temperature
- ② Pulse test ; Pulse width 300μs, duty cycle 2%.



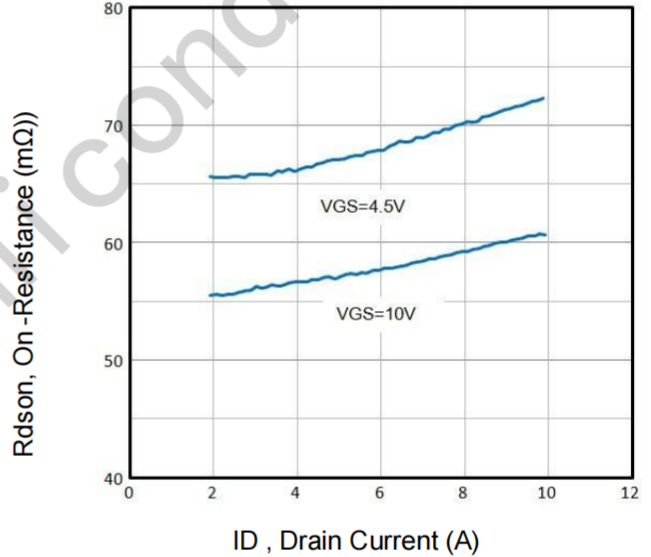
**Fig1.** Typical Output Characteristics



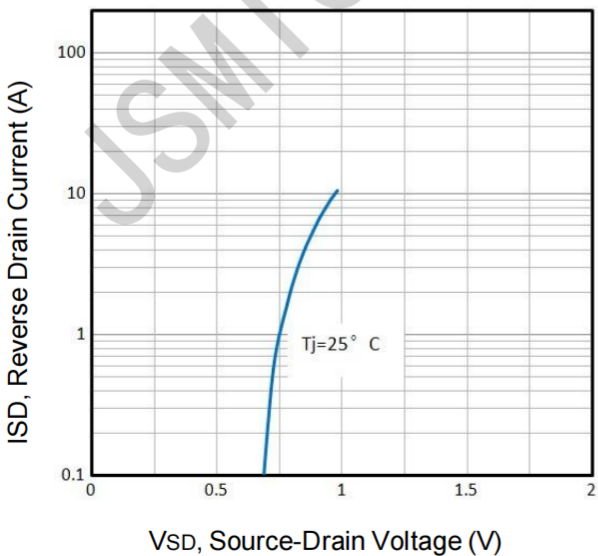
**Fig2.** VGS(TH) Voltage Vs. Temperature



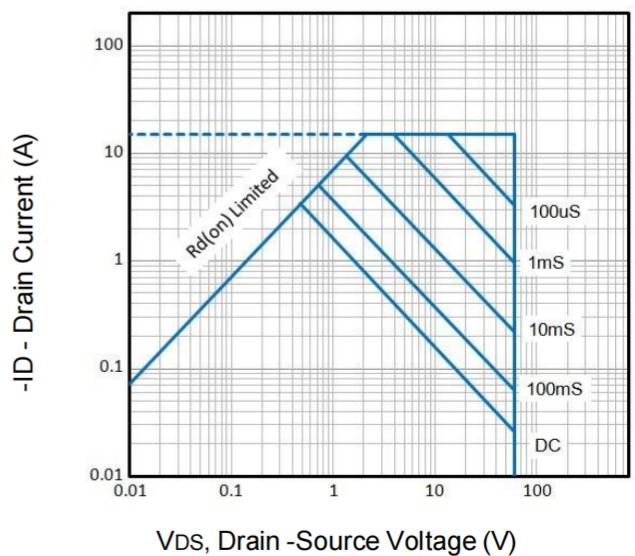
**Fig3.** Typical Transfer Characteristics



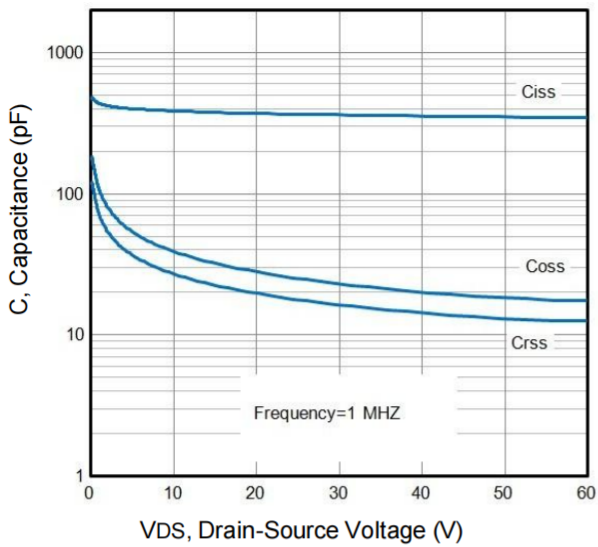
**Fig4.** On-Resistance vs. Drain Current and Gate



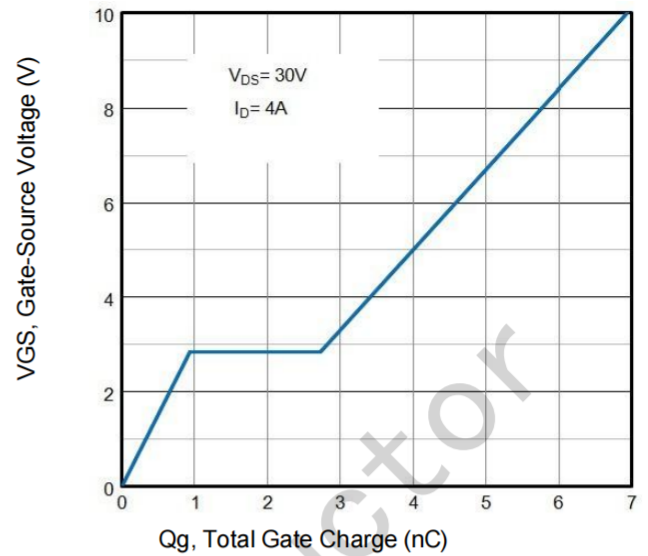
**Fig5.** Typical Source-Drain Diode Forward Voltage



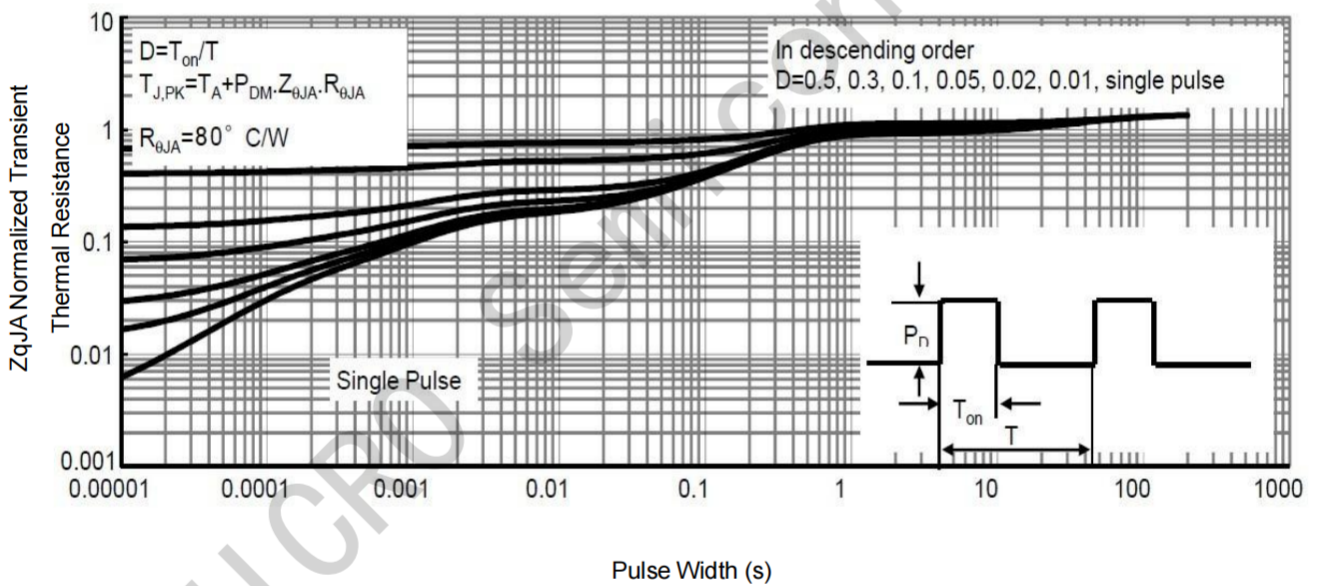
**Fig6.** Maximum Safe Operating Area



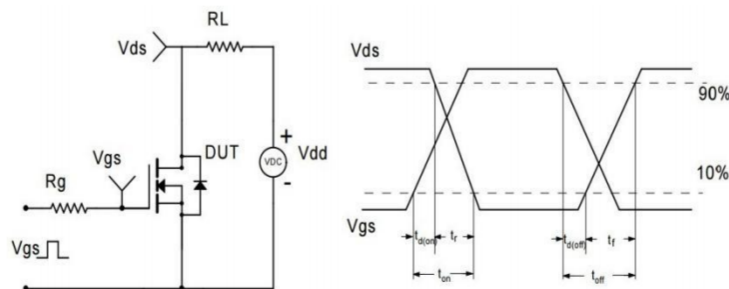
**Fig7.** Typical Capacitance Vs. Drain-Source Voltage



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



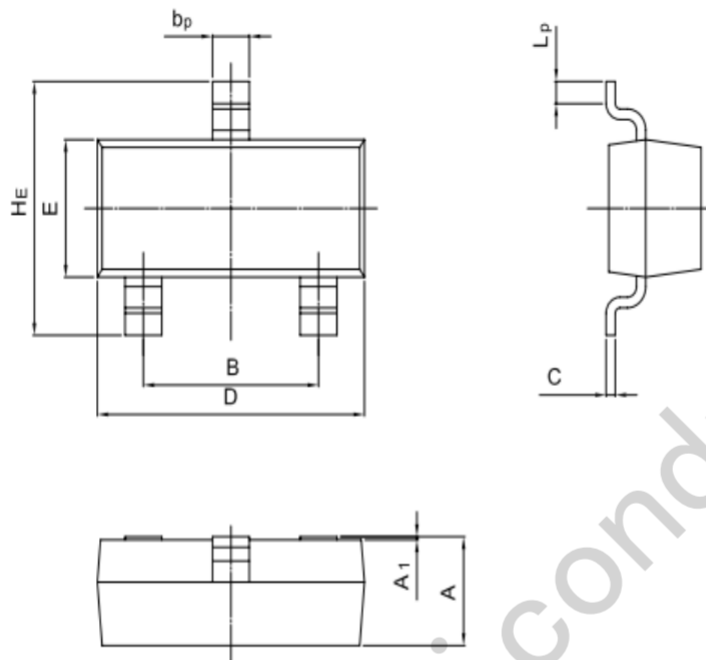
**Fig9.** Normalized Maximum Transient Thermal Impedance



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

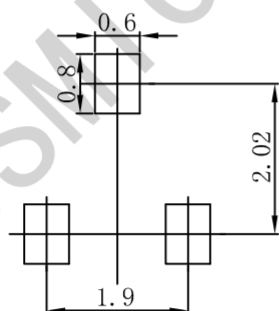
## Package Information

### SOT-23



UNIT	A	B	$b_p$	C	D	E	$H_E$	$A_1$	$L_p$
mm	1.40 0.95	2.04 1.78	0.50 0.35	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20

### SOT-23 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05$  mm.
3. The pad layout is for reference purposes only.

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