

## N-Channel Enhancement Mode Field Effect Transistor

### Product Summary

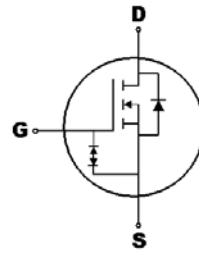
- $V_{DS}$  20V
- $I_D$  6.8A
- $R_{DS(ON)}$ ( at  $V_{GS}=4.5V$ ) < 18 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=2.5V$ ) < 22 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=1.8V$ ) < 39 mohm

### General Description

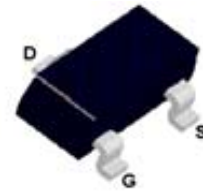
- Trench Power LV MOSFET technology
- High Power and current handing capability
- ESD protect:  $\pm 2700V$
- Marking:K12

### Applications

- PWM application
- Load switch



Symbol



SOT-23

### ■ Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	20	V
Gate-source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current	$I_D$	$T_A=25^\circ C$ @ Steady State	6.8
		$T_A=70^\circ C$ @ Steady State	5.4
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	17	A
Total Power Dissipation @ $T_A=25^\circ C$	$P_D$	1.2	W
Thermal Resistance Junction-to-Ambient @ Steady State <sup>B</sup>	$R_{\theta JA}$	104	$^\circ C/W$
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature Range	$T_{STG}$	-55~+150	$^\circ C$

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C			1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V, V <sub>DS</sub> =0V			±10	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	0.45	0.62	1.0	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> =6.8A		13.5	18	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> =3.0A		17	22	
		V <sub>GS</sub> = 1.8V, I <sub>D</sub> =2.5A		22	39	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =6.8A, V <sub>GS</sub> =0V			1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				6.8	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHZ		900		pF
Output Capacitance	C <sub>oss</sub>			165		
Reverse Transfer Capacitance	C <sub>rss</sub>			75		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, I <sub>D</sub> =6.8A		9.2		nC
Gate Source Charge	Q <sub>gs</sub>			1.7		
Gate Drain Charge	Q <sub>gd</sub>			2.9		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =4.5V, V <sub>DD</sub> =10V, R <sub>L</sub> =1.5Ω, R <sub>GEN</sub> =3Ω		12		ns
Turn-on Rise Time	t <sub>r</sub>			52		
Turn-off Delay Time	t <sub>D(off)</sub>			17		
Turn-off Fall Time	t <sub>f</sub>			10		

A. Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Performance Characteristics

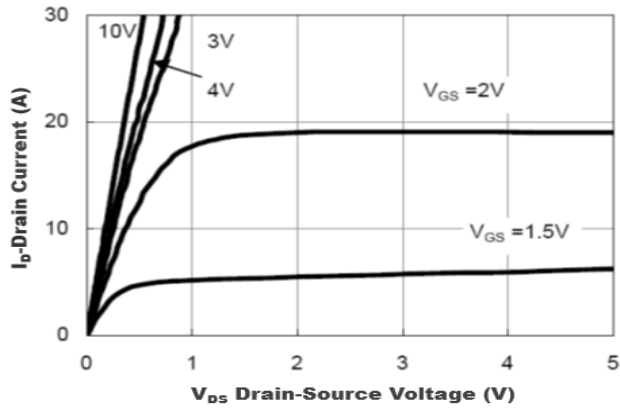


Figure1. Output Characteristics

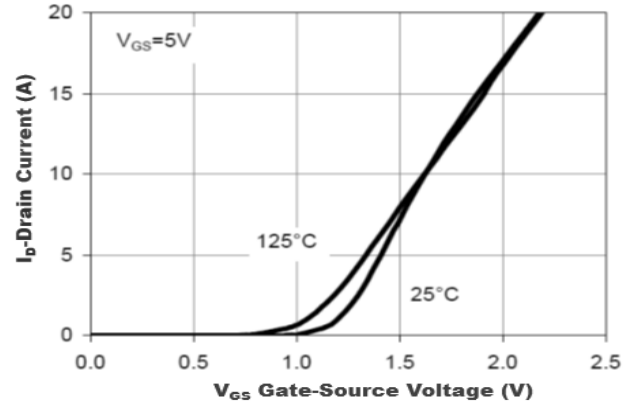


Figure2. Transfer Characteristics

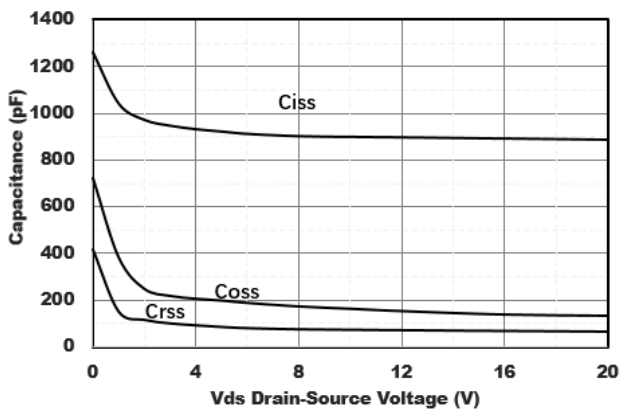


Figure3. Capacitance Characteristics

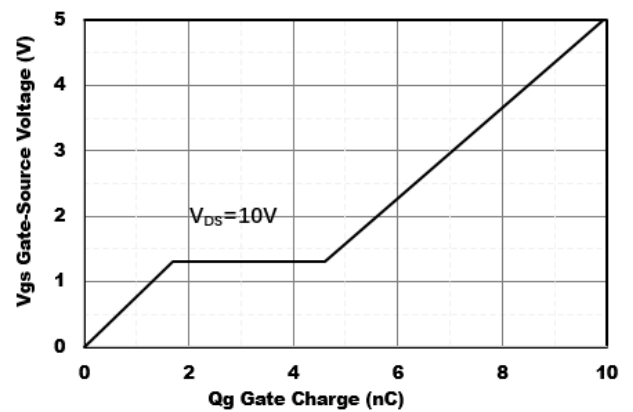


Figure4. Gate Charge

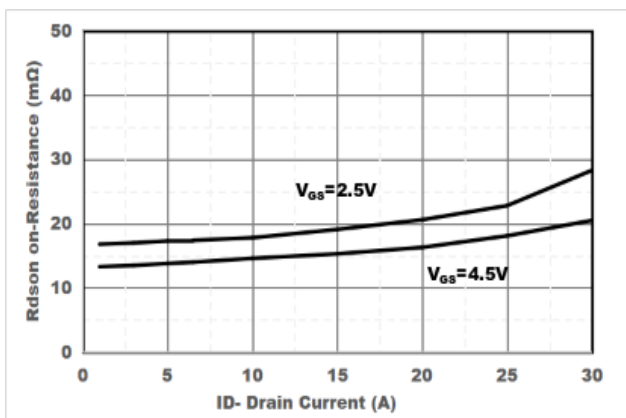


Figure5. Drain-Source on Resistance

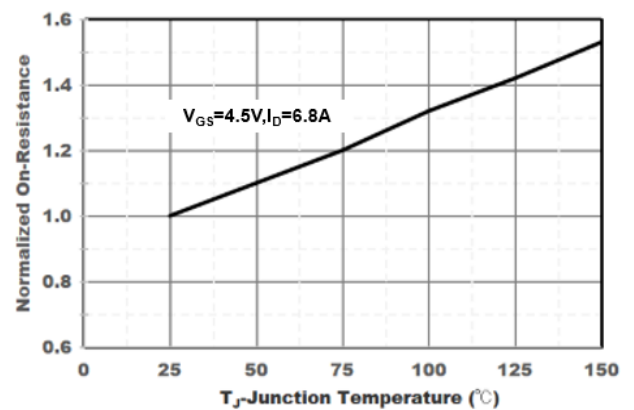


Figure6. Drain-Source on Resistance

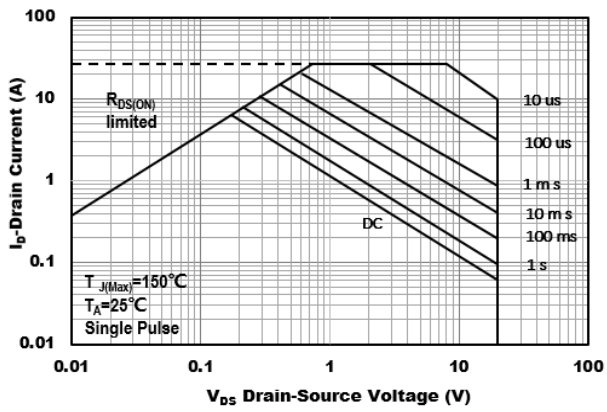


Figure7. Safe Operation Area

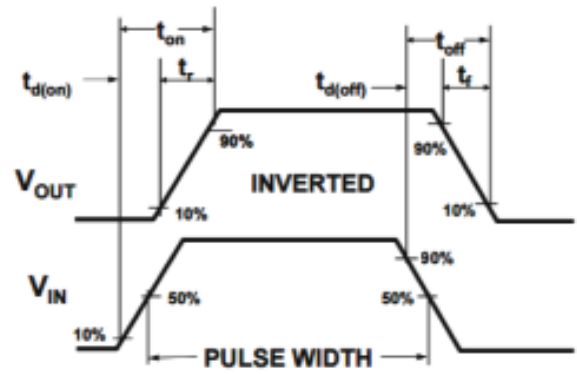
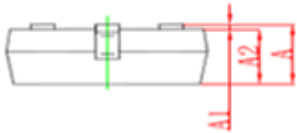
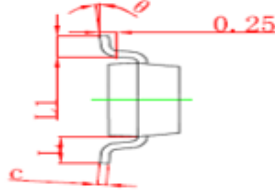
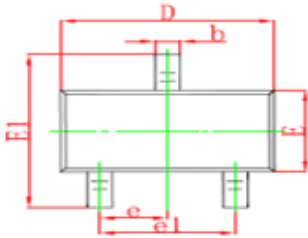


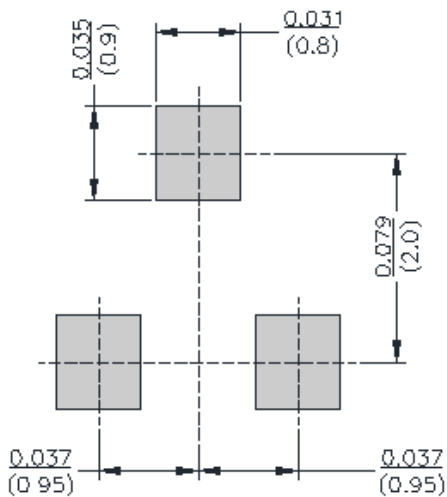
Figure8. Switching wave

## ■SOT-23 Package information



Symbol	Dimensions in Millimeter		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950Type		0.037Type	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.220REF	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

## ■SOT-23 Suggested Pad Layout



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