

## P-Channel Enhancement Mode Field Effect Transistor

### Product Summary

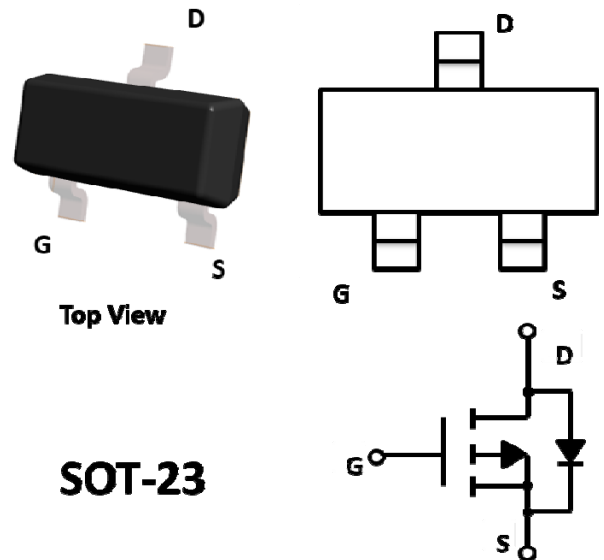
- $V_{DS}$  -20V
- $I_D$  -3.4A
- $R_{DS(ON)}$ ( at  $V_{GS}=-4.5V$ ) <64 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-2.5V$ ) <80 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-1.8V$ ) <95 mohm

### General Description

- Trench Power LV MOSFET technology
- High Power and Current handling capability
- Low Gate Charge
- Marking :  $\Delta$ 1SHB

### Applications

- PWM applications
- Power management
- Load switch



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

Parameter		Symbol	Maximum	Unit
Drain-source Voltage		$V_{DS}$	-20	V
Gate-source Voltage		$V_{GS}$	$\pm 10$	V
Drain Current	$T_A=25^\circ\text{C}$	$I_D$	-3.4	A
	$T_A=70^\circ\text{C}$		-2.7	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	-14	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$		$P_D$	1	W
Thermal Resistance Junction-to-Ambient <sup>B</sup>		$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 ~ +150	$^\circ\text{C}$

## Electrical Characteristics ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V, T_C=25^\circ\text{C}$			-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-3.4A$		49	64	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3A$		59	80	
		$V_{GS}=-1.8V, I_D=-2.5A$		79	95	
Diode Forward Voltage	$V_{SD}$	$I_S=-3.4A, V_{GS}=0V$		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	$I_S$				-3.4	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1\text{MHz}$		550		pF
Output Capacitance	$C_{oss}$			89		
Reverse Transfer Capacitance	$C_{rss}$			65		
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=-4.5V, V_{DS}=-10V, I_D=-3.4A$		4.3		nC
Gate Source Charge	$Q_{gs}$			0.8		
Gate Drain Charge	$Q_{gd}$			1.1		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=-4.5V, V_{DD}=-10V, I_D=-1A, R_{GEN}=2.5\Omega$		12		ns
Turn-on Rise Time	$t_r$			54		
Turn-off Delay Time	$t_{D(off)}$			15		
Turn-off Fall Time	$t_f$			9		

A. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

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

## Typical Performance Characteristics

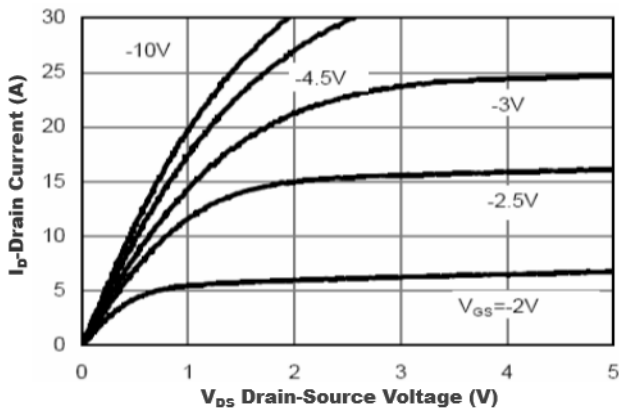


Figure1. Output Characteristics

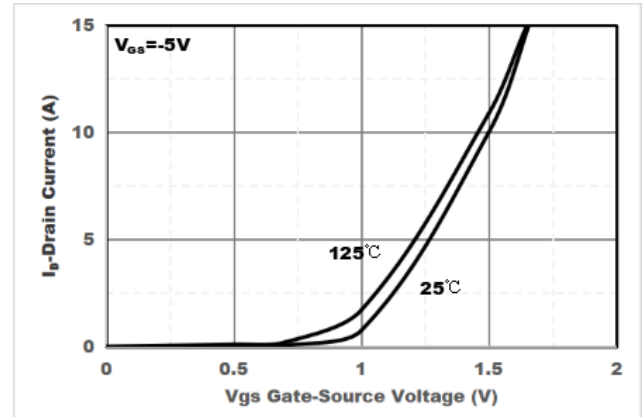


Figure2. Transfer Characteristics

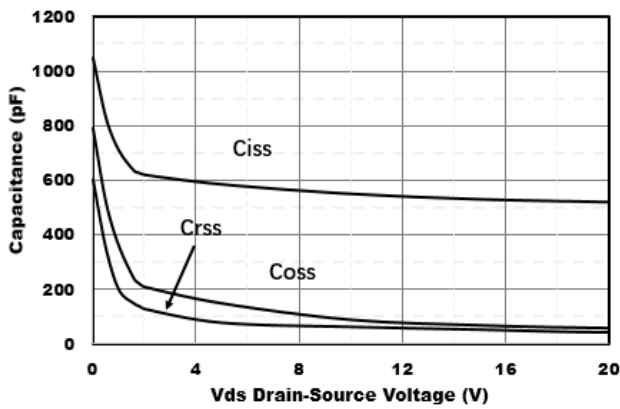


Figure3. Capacitance Characteristics

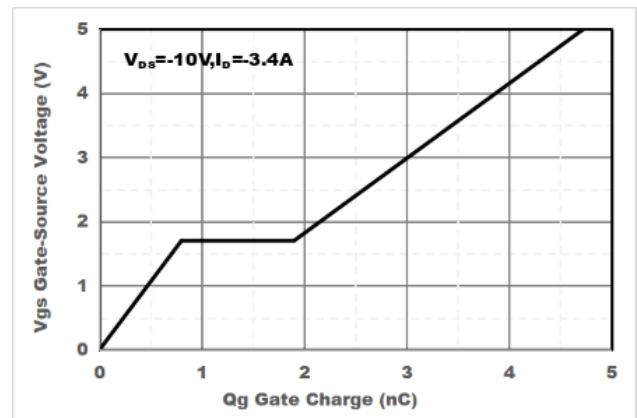


Figure4. Gate Charge

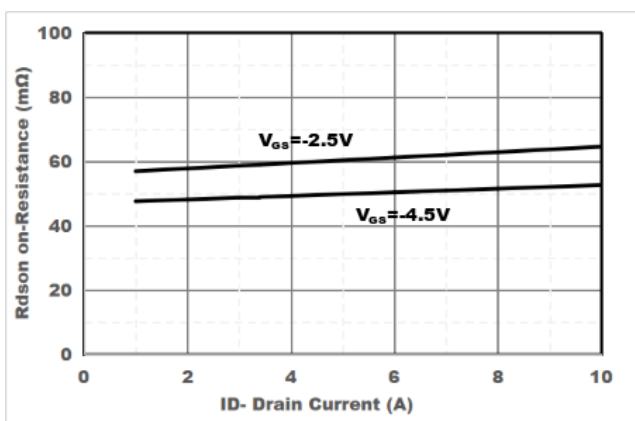


Figure5. Drain-Source on Resistance

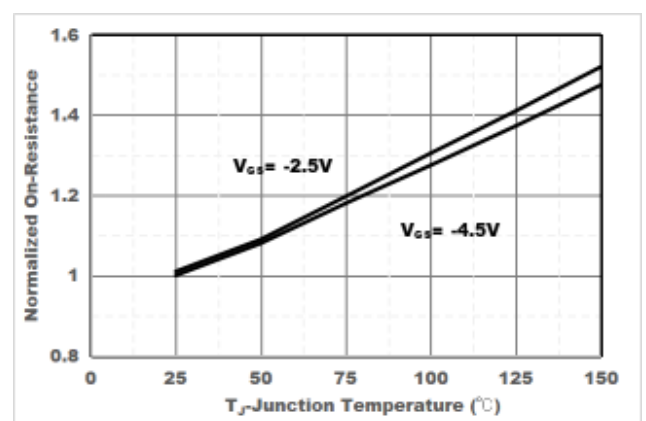


Figure6. Drain-Source on Resistance

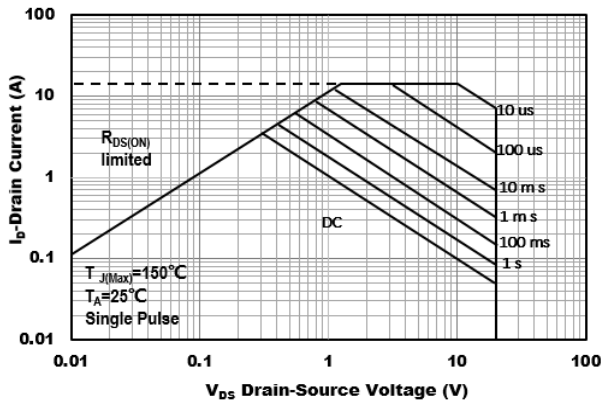


Figure7. Safe Operation Area

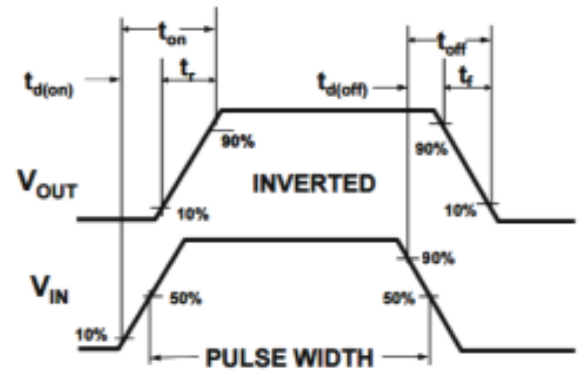
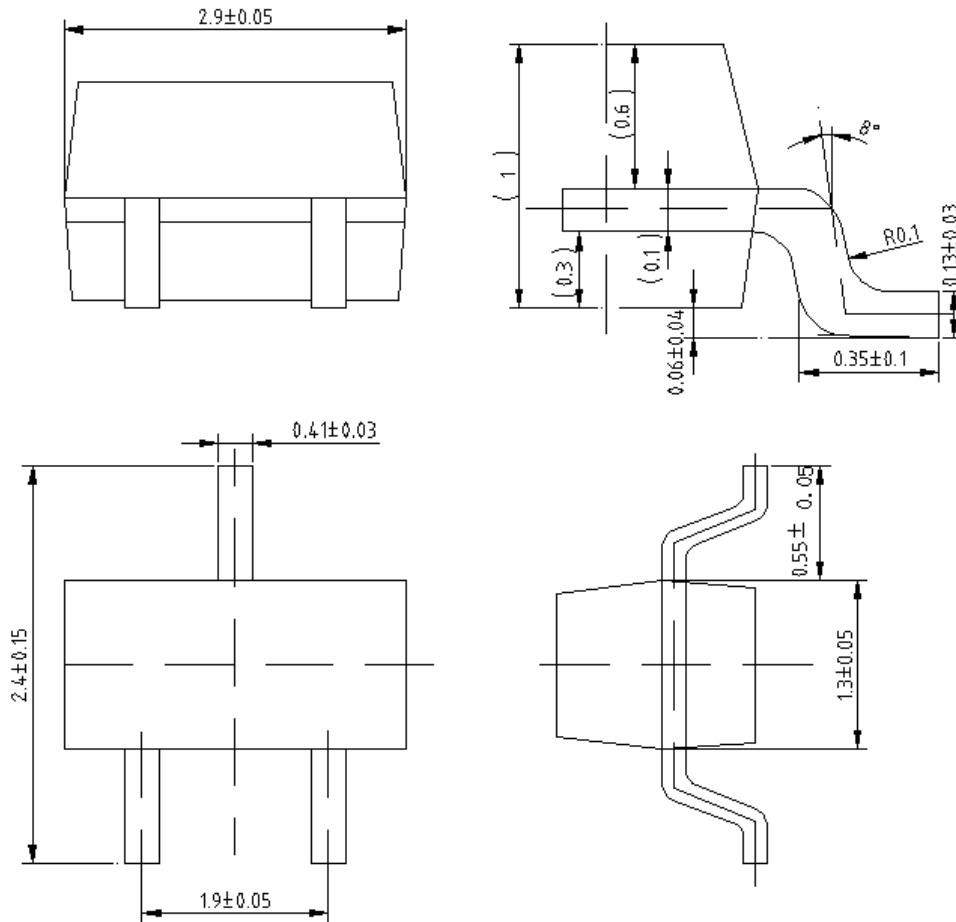


Figure8. Switching wave

## Package Outline Dimensions (UNIT: mm)

SOT-23



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