

Applications

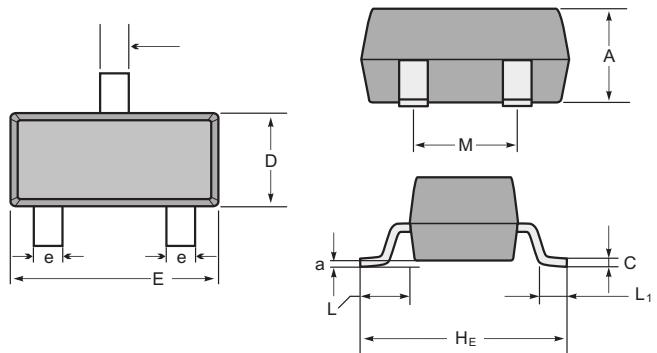
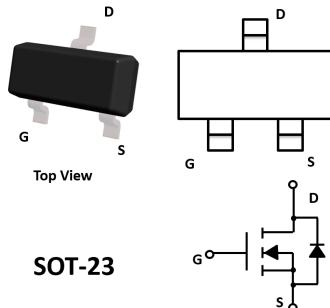
- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Isolated DC/DC convertor
- Invertors

General Description

- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery

Product Summary

- V_{DS} 100V
- I_D 5.0A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<140\text{ mohm}$



SOT-23 mechanical data

UNIT	A	C	D	E	H _E	e	M	L	L ₁	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7		
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)
	min	35	3	47	110	87	12	67		

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

Parameter	Symbol	Limit	Unit
Drain-source Voltage	V_{DS}	100	V
Gate-source Voltage	V_{GS}	± 20	V
Drain Current	I_D	5.0	A
		2.4	
Pulsed Drain Current ^A	I_{DM}	21	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	1.2	W
Thermal Resistance Junction-to-Ambient ^B	$R_{\theta JA}$	104	°C/W
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C

5N10

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}}=100\text{V}, V_{\text{GS}}=0\text{V}$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{\text{GS}}= \pm 20\text{V}, V_{\text{DS}}=0\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}= V_{\text{GS}}, I_{\text{D}}=250\mu\text{A}$	1.0	1.8	3.0	V
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}= 10\text{V}, I_{\text{D}}=3.0\text{A}$		110	140	$\text{m}\Omega$
		$V_{\text{GS}}= 4.5\text{V}, I_{\text{D}}=2.0\text{A}$		160	300	
Diode Forward Voltage	V_{SD}	$I_{\text{S}}=3.0\text{A}, V_{\text{GS}}=0\text{V}$		0.8	1.2	V
Maximum Body-Diode Continuous Current	I_{S}				3.0	A
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{\text{DS}}=50\text{V}, V_{\text{GS}}=0\text{V}, f=1\text{MHz}$		206		pF
Output Capacitance	C_{oss}			29		
Reverse Transfer Capacitance	C_{rss}			1.4		
Switching Parameters						
Total Gate Charge	Q_{g}	$V_{\text{GS}}=10\text{V}, V_{\text{DS}}=50\text{V}, I_{\text{D}}=3.0\text{A}$		4.3		nC
Gate-Source Charge	Q_{gs}			1.5		
Gate-Drain Charge	Q_{gd}			1.1		
Turn-on Delay Time	$t_{\text{D}(\text{on})}$	$V_{\text{GS}}=10\text{V}, V_{\text{DD}}=50\text{V}, I_{\text{D}}=3.0\text{A}, R_{\text{GEN}}=2\Omega$		14.7		ns
Turn-on Rise Time	t_{r}			3.5		
Turn-off Delay Time	$t_{\text{D}(\text{off})}$			20.9		
Turn-off fall Time	t_{f}			2.7		
Reverse recovery time	t_{rr}	$I_{\text{S}}=3\text{A}, dI/dt=100 \text{ A}/\mu\text{s}$		32		ns
Reverse recovery charge	Q_{rr}			39		
Peak reverse recovery current	I_{rrm}			2.1		A

A. Pulse Test: Pulse Width $\leqslant 300\text{us}$, Duty cycle $\leqslant 2\%$.

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

RATING AND CHARACTERISTIC CURVES (5N10)

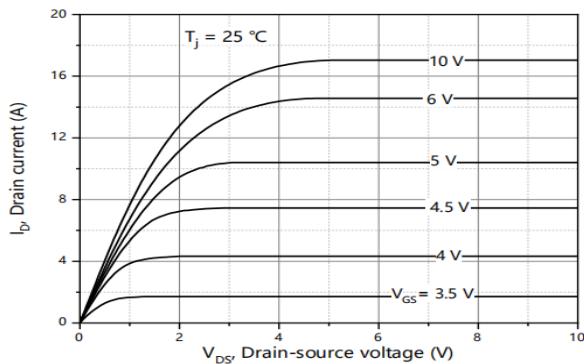


Figure1. Output Characteristics

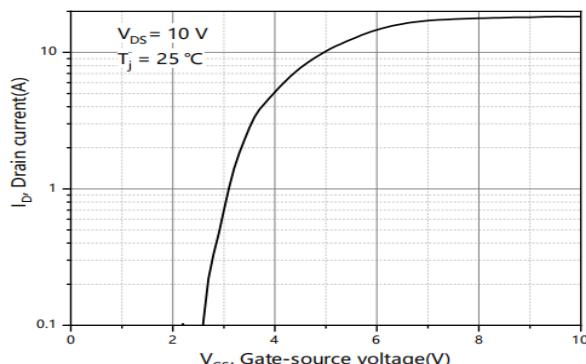


Figure2. Transfer Characteristics

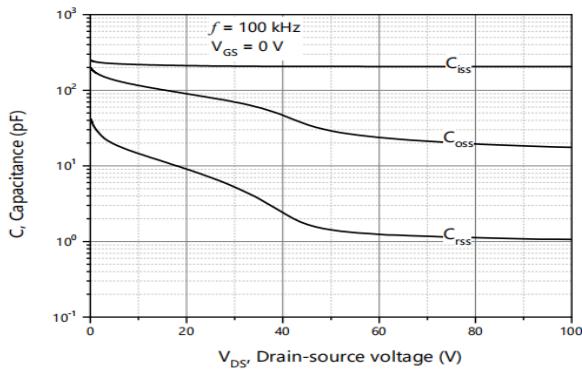


Figure3. Capacitance Characteristics

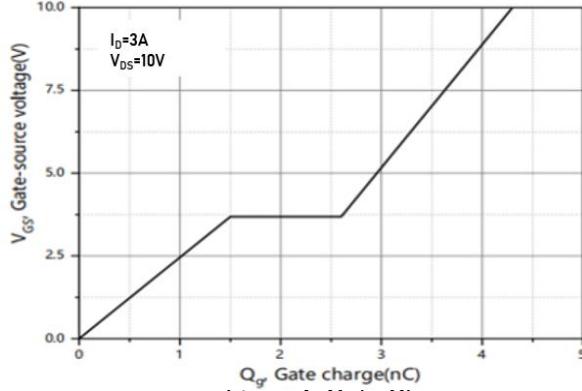


Figure4. Gate Charge

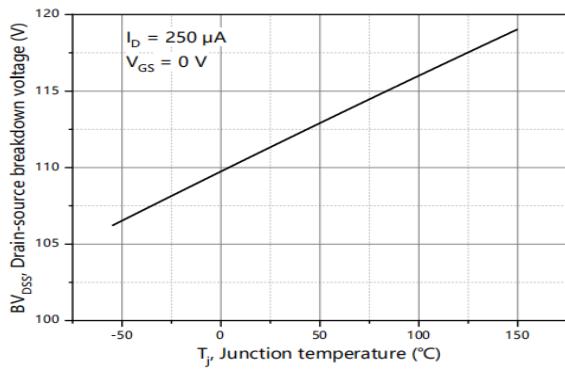


Figure5. Drain-Source breakdown voltage

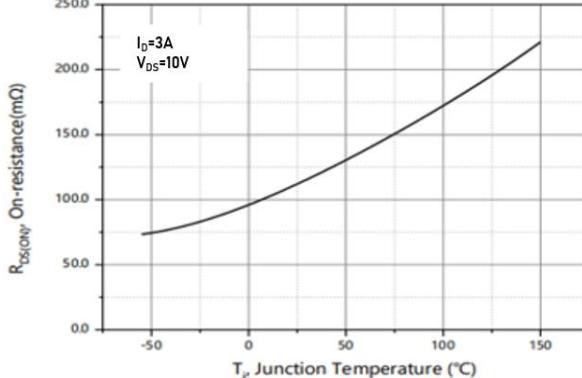


Figure6. Drain-Source on Resistance

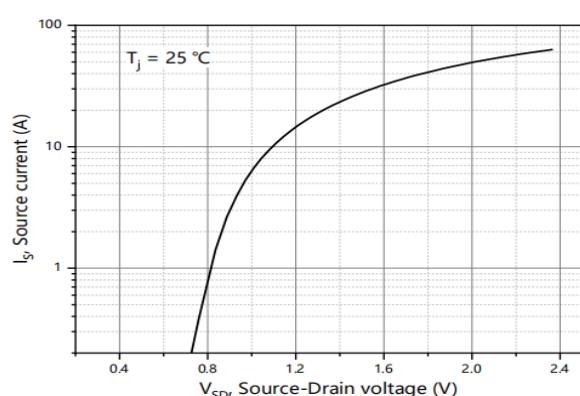


Figure7. Forward characteristic of body diode

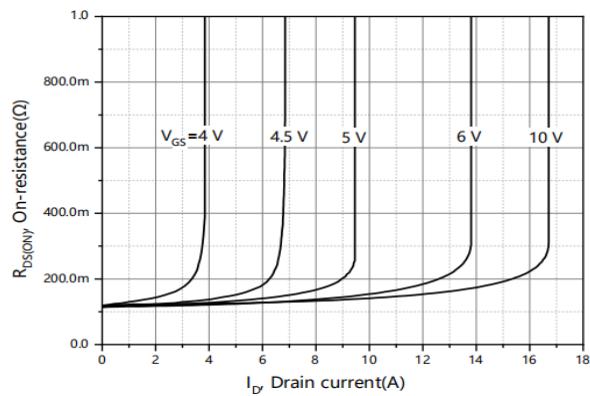


Figure8. Drain-source on-state resistance

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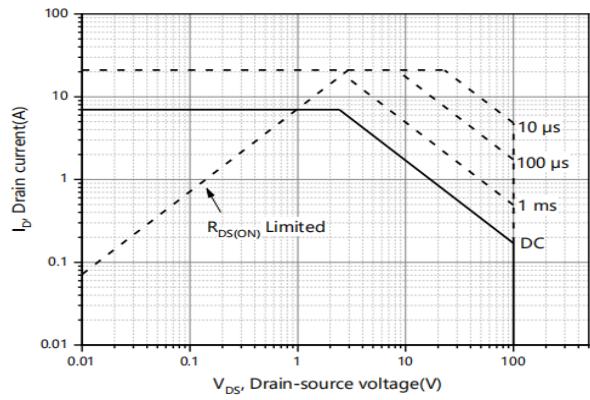


Figure9. Safe Operation Area $T_A=25\text{ }^\circ\text{C}$

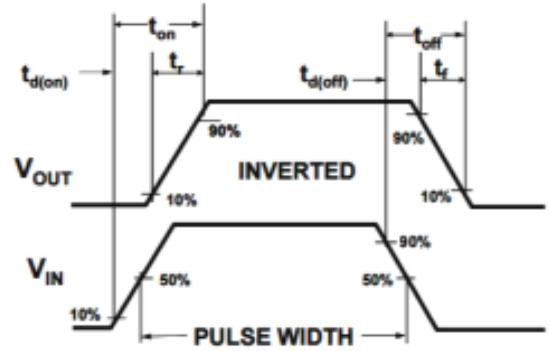


Figure10. Switching wave