

5N10 N-Channel Enhancement Mode Field Effect Transistor

Applications

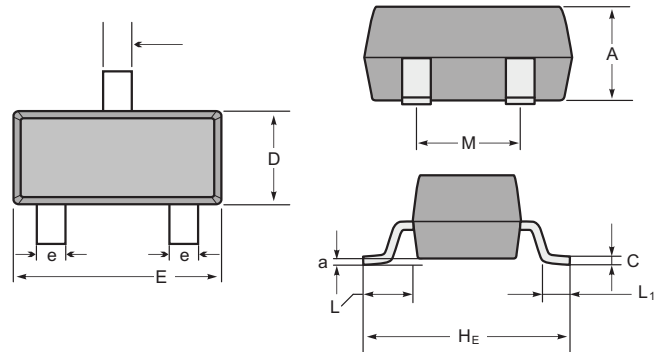
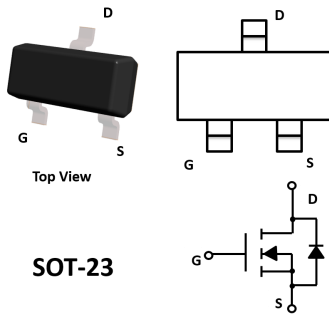
- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Isolated DC/DC convertor
- Invertors

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 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)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

■ 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	$T_A=25^\circ\text{C}$	5.0
		$T_A=70^\circ\text{C}$	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	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$

5N10

■ Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	100			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.8	3.0	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D =3.0A		110	140	mΩ
		V _{GS} = 4.5V, I _D =2.0A		160	300	
Diode Forward Voltage	V _{SD}	I _S =3.0A, V _{GS} =0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	I _S				3.0	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1MHZ		206		pF
Output Capacitance	C _{oss}			29		
Reverse Transfer Capacitance	C _{rss}			1.4		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =50V, I _D =3.0A		4.3		nC
Gate-Source Charge	Q _{gs}			1.5		
Gate-Drain Charge	Q _{gd}			1.1		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =50V, I _D =3.0A, R _{GEN} =2Ω		14.7		ns
Turn-on Rise Time	t _r			3.5		
Turn-off Delay Time	t _{D(off)}			20.9		
Turn-off fall Time	t _f			2.7		
Reverse recovery time	t _{rr}	I _S =3A, di/dt=100 A/ μ s		32		ns
Reverse recovery charge	Q _{rr}			39		nC
Peak reverse recovery current	I _{rrm}			2.1		A

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.

RATING AND CHARACTERISTIC CURVES (5N10)

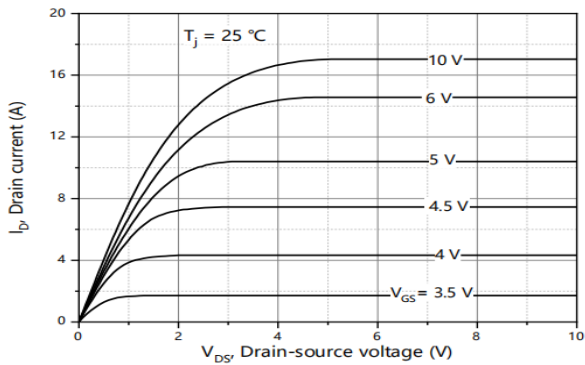


Figure1. Output Characteristics

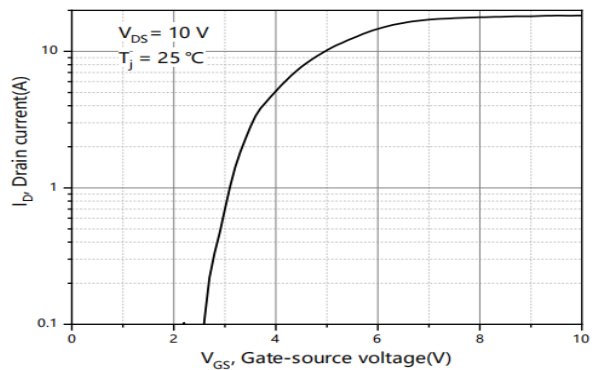


Figure2. Transfer Characteristics

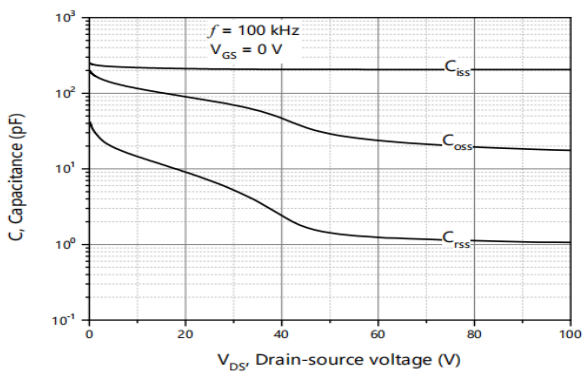


Figure3. Capacitance Characteristics

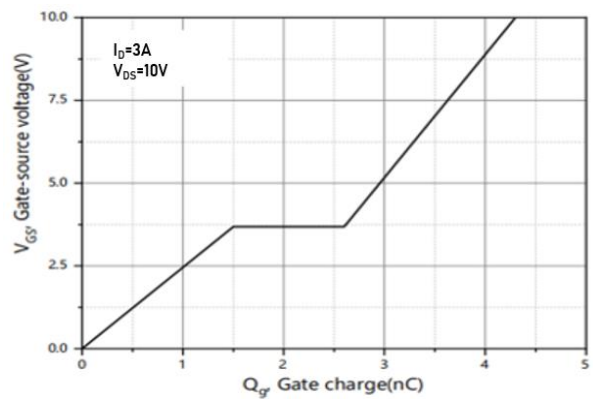


Figure4. Gate Charge

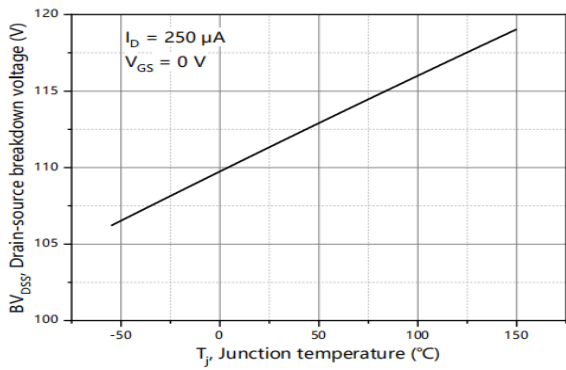


Figure5. Drain-Source breakdown voltage

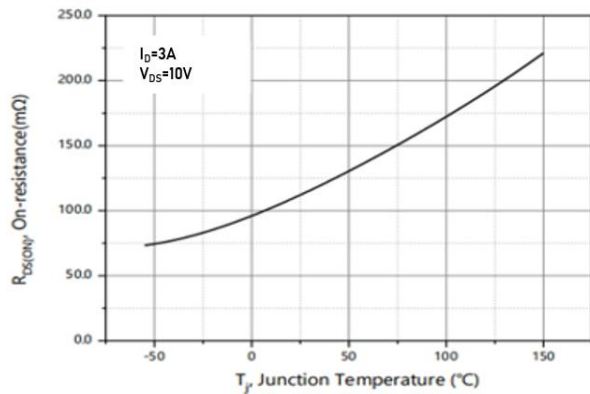


Figure6. Drain-Source on Resistance

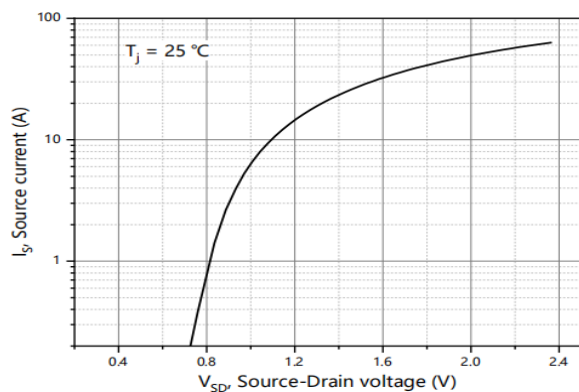


Figure7. Forward characteristic of body diode

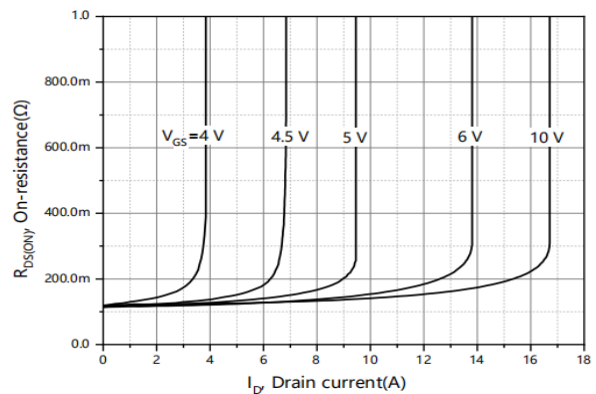


Figure8. Drain-source on-state resistance

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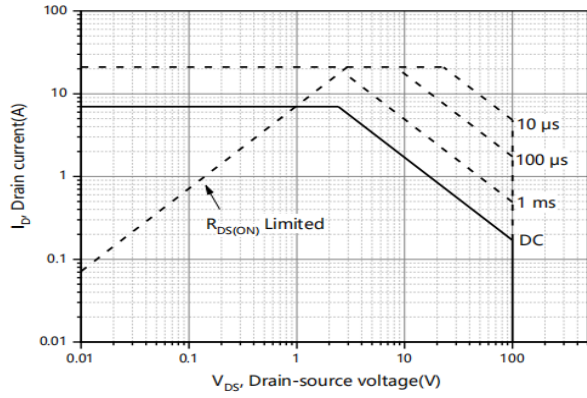


Figure9. Safe Operation Area $T_A=25\text{ }^\circ\text{C}$

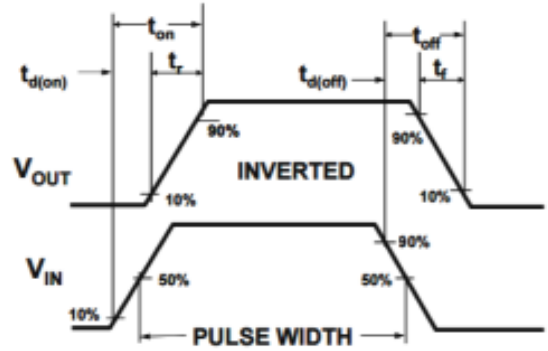


Figure10. Switching wave

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