20V/17mΩ@10V N-Channel MOSFET

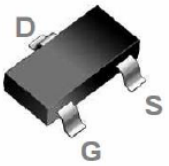
Features

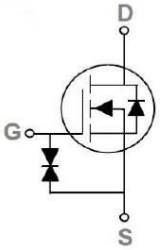
- 20V, 5A
  $R_{DS(ON)}$< 22mΩ @ V_{GS} =4.5V
  $R_{DS(ON)}$< 36mΩ @ V_{GS} =2.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- ESD Rating: HBM 2KV

Applications

- Load Switch
- PWM Application
- Power management

SOT23 Pin Configuration





Maximum Ratings (Tc = 25℃, Unless Otherwise Noted)

Parameters	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current - Continuous(TC=25℃)	I_D	5	A
Drain Current - Continuous(TC=100℃)		3.3	A
Drain Current - Pulsed	I_{DM}[1]	20	A
Power Dissipation(TC=25℃)	P_D	0.9	W
Power Dissipation - Derate above 25℃		0.007	W/℃
Storage Temperature Range	T_{STG}	-55~ 150	℃
Operating Junction Temperature Range	Tj	-55~ 150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Typ.	Unit
Thermal Resistance Junction to ambient	$R_{\theta JA}$	139	---	℃/W

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦0.5%.
3. Essentially independent of operating temperature.

Electrical Characteristics(Tj = 25℃, Unless Otherwise Noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain to Source Breakdown Volage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20	---	---	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V, T_J=25℃	---	---	1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±10V	---	---	±10	uA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=5A	---	17	22	mΩ
		V_{GS}=2.5V, I_D=3A	---	26	36	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.4	0.7	1	V
Dynamic And Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=10V, V_{GS}=4.5V, I_D=5A	---	8	---	nC
Gate-Source Charge[2,3]	Q_{gs}		---	2.5	---	
Gate-Drain Charge[2,3]	Q_{gd}		---	3	---	
Turn-on Delay Time[2,3]	$T_{d(on)}$	V_{DD}=10V, R_L=1.5Ω, V_{GS}=5V, R_{GEN}=3Ω	---	0.5	---	nS
Turn-on Rise Time[2,3]	T_r		---	1	---	
Turn-off Delay Time[2,3]	$T_{d(off)}$		---	12	---	
Turn-off Fall Time[2,3]	T_f		---	4	---	
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, F=1.0MHz	---	545	---	pF
Output Capacitance	C_{oss}		---	103	---	
Reverse Transfer Capacitance	C_{rss}		---	90	---	

Drain-Source Diode Characteristics And Maximum Ratings

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	---	---	5	A
Pulsed Source Current	I_{SM}		---	---	20	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=5A，T_J=25℃	---	---	1.2	V

Typical Performance Characteristics

Figure1: Output Characteristics

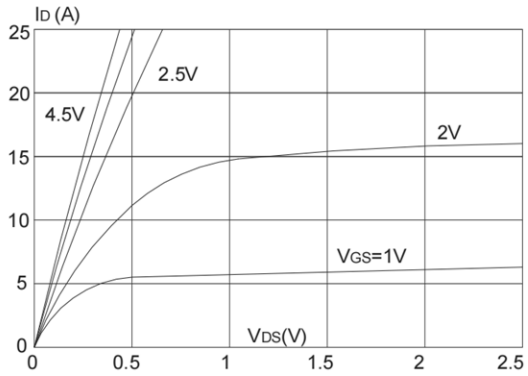


Figure 2: Typical Transfer Characteristics

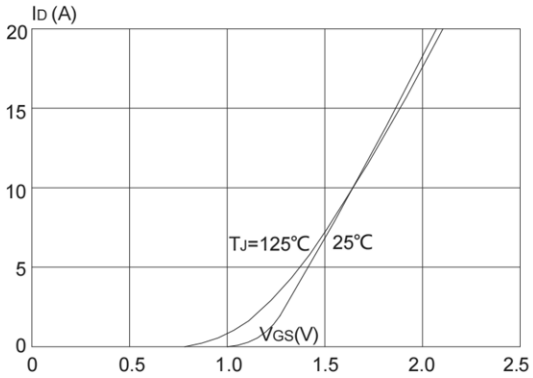


Figure 3: On-resistance vs. Drain Current

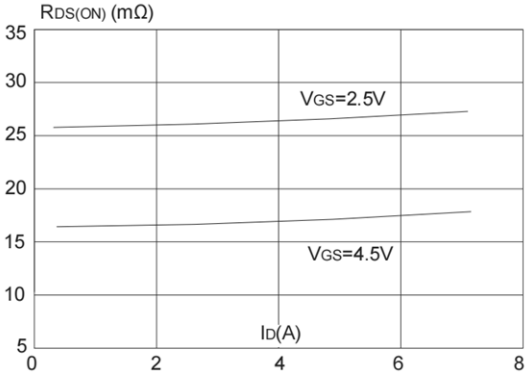


Figure 4: Body Diode Characteristics

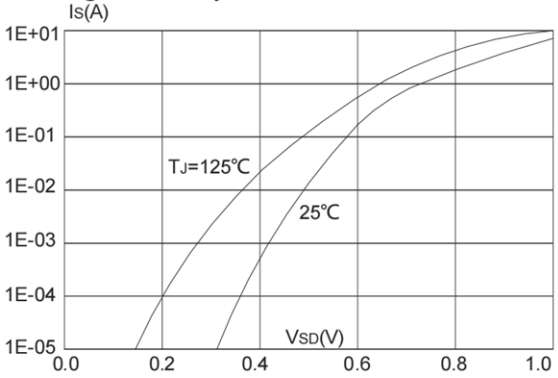


Figure 5: Gate Charge Characteristics

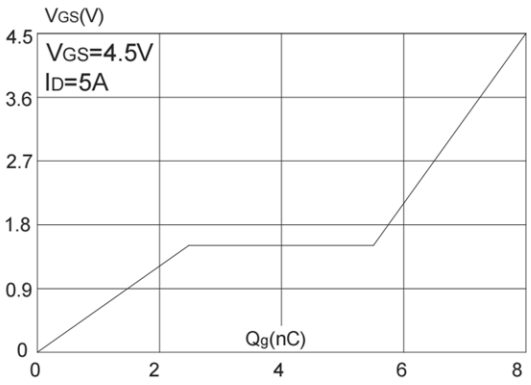


Figure 6: Capacitance Characteristics

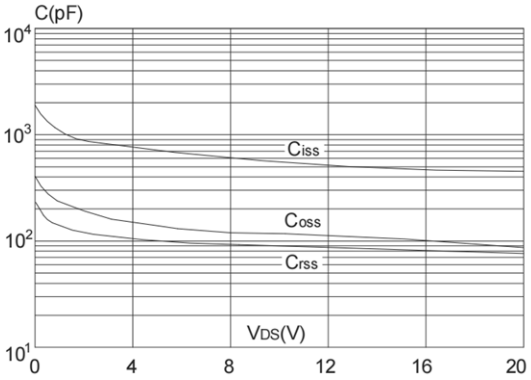


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

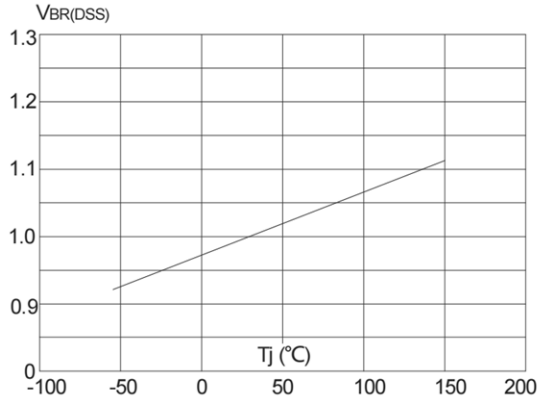


Figure 8: Normalized on Resistance vs. Junction Temperature

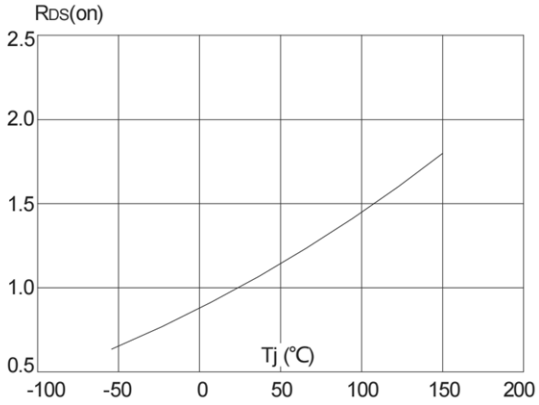


Figure 9: Maximum Safe Operating Area

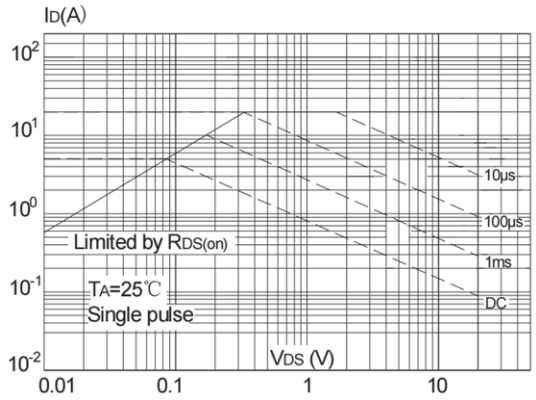


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

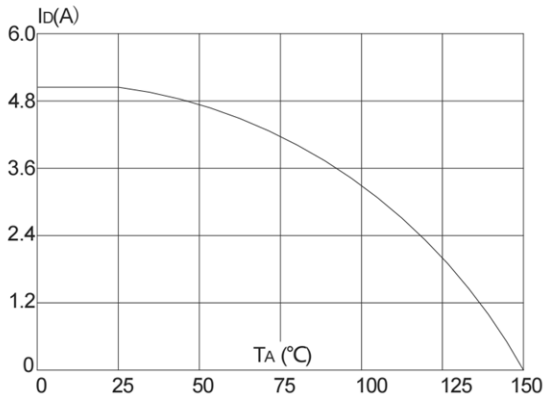
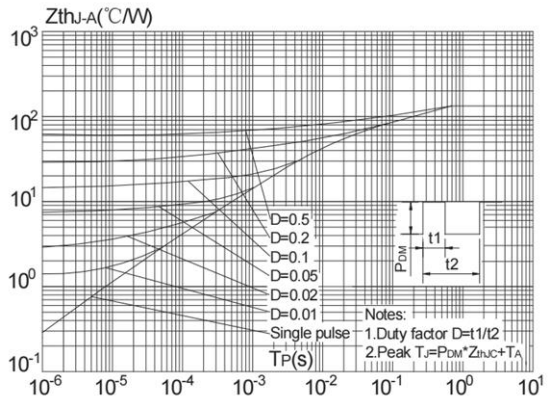


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

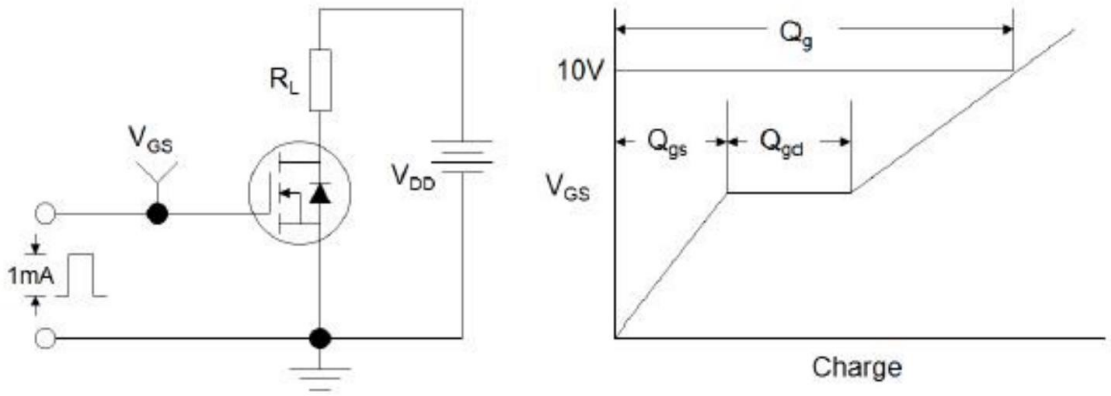


Figure1:Gate Charge Test Circuit & Waveform

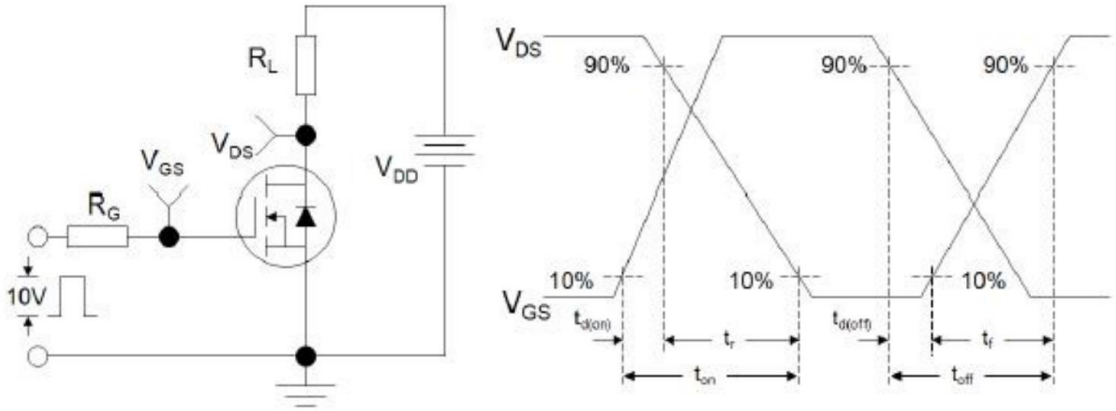


Figure 2: Resistive Switching Test Circuit & Waveforms

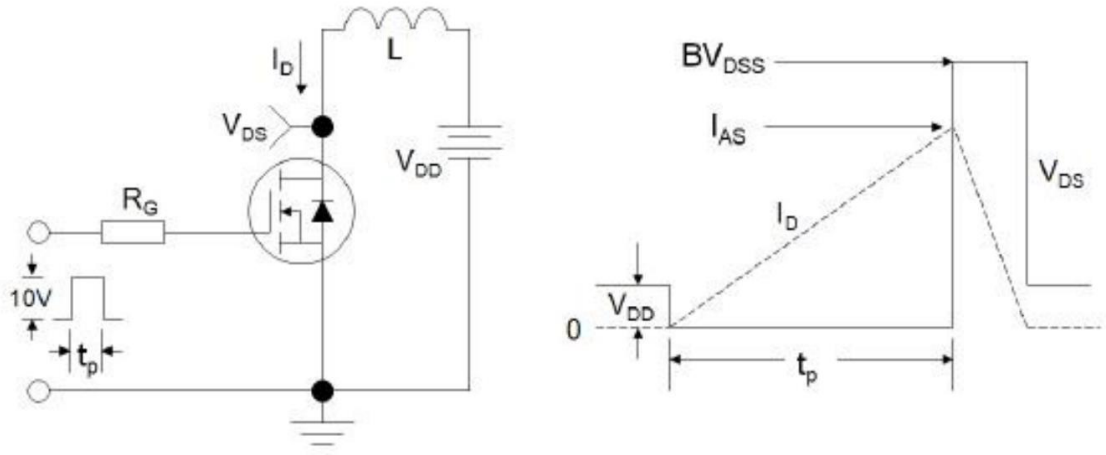
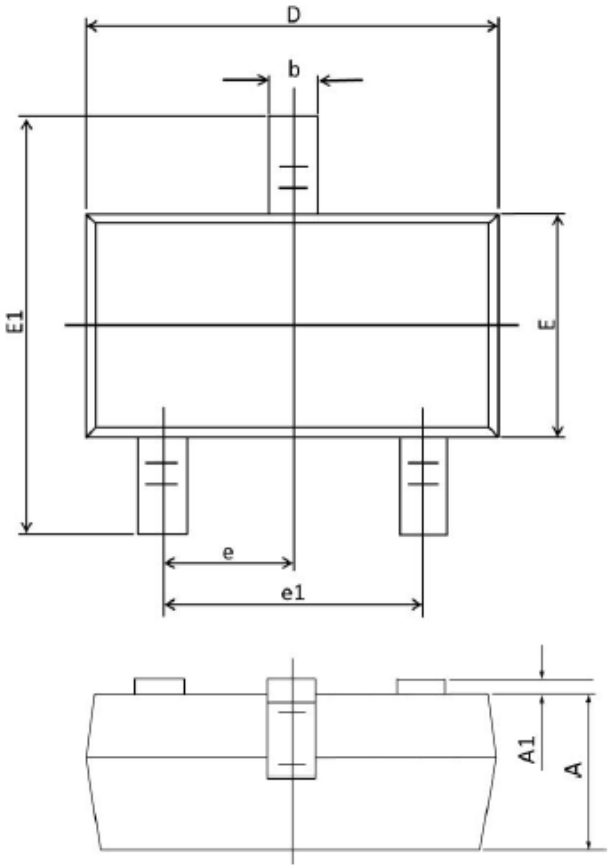


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

SOT 23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
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	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°