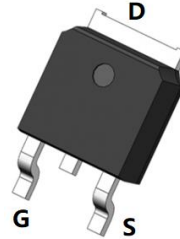


Application

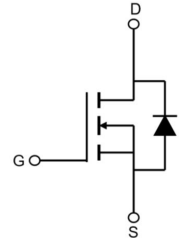
- Load Switch
- PWM Application
- Power management

Features

- 60V, 20A
 $R_{DS(ON)} < 33m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 45m\Omega$ @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired



TO-252 top view



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
20N06	SWD20N06	TO-252	13inch	2500	25000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter		Max.	Units
V _{DSS}	Drain-Source Voltage		60	V
V _{GSS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current	T _C = 25°C	20	A
		T _C = 100°C	13	A
I _{DM}	Pulsed Drain Current ^{note1}		80	A
EAS	Single Pulsed Avalanche Energy ^{note2}		18	mJ
P _D	Power Dissipation	T _C = 25°C	27.7	W
R _{θJC}	Thermal Resistance, Junction to Case		5.4	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	°C

**SWD20N06****N-channel Power MOSFET****Electrical Characteristics** ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =10A	-	26	33	mΩ
		V _{GS} =4.5V, I _D =5A	-	33	45	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	1148	-	pF
C _{oss}	Output Capacitance		-	58.5	-	pF
C _{rss}	Reverse Transfer Capacitance		-	49.4	-	pF
Q _g	Total Gate Charge	V _{DS} =30V, I _D =10A, V _{GS} =10V	-	20.3	-	nC
Q _{gs}	Gate-Source Charge		-	3.7	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	5.3	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =30V, I _D =20A, R _G =1.8Ω, V _{GS} =10V	-	7.6	-	ns
t _r	Turn-on Rise Time		-	20	-	ns
t _{d(off)}	Turn-off Delay Time		-	15	-	ns
t _f	Turn-off Fall Time		-	24	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =20A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=100A/μs	-	29	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	43	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition : $T_J=25^{\circ}\text{C}$, $V_{DD}=30V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=8.5A$ 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

Figure 1: Output Characteristics

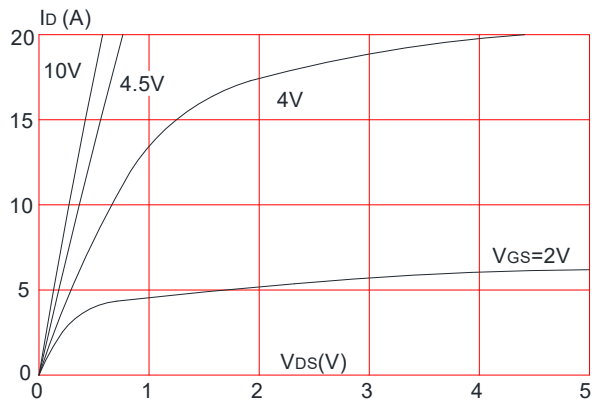


Figure 2: Typical Transfer Characteristics

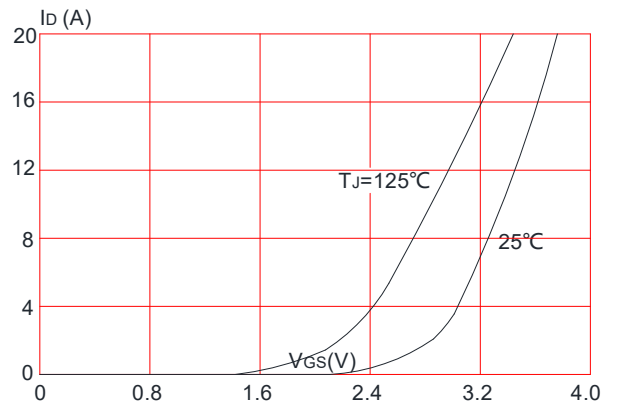


Figure 3: On-resistance vs. Drain Current

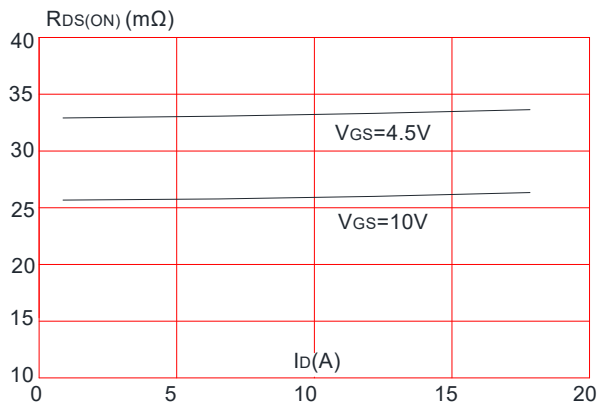


Figure 4: Body Diode Characteristics

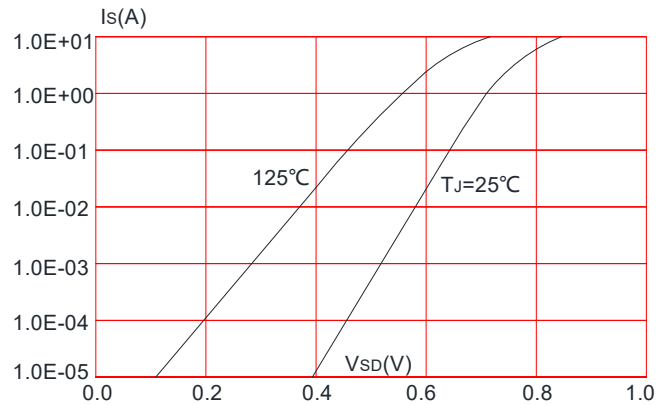


Figure 5: Gate Charge Characteristics

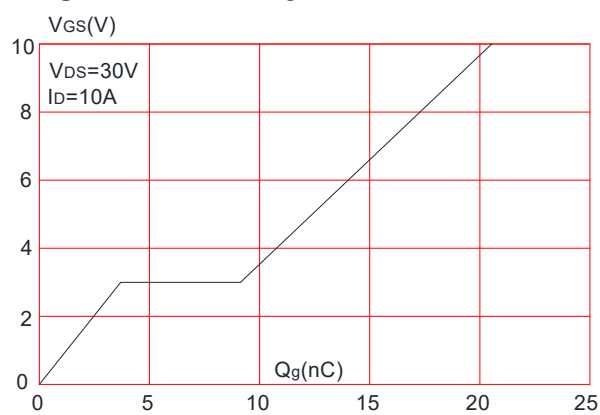
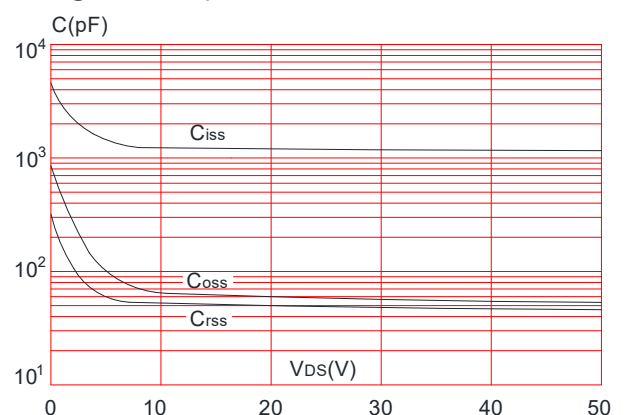


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

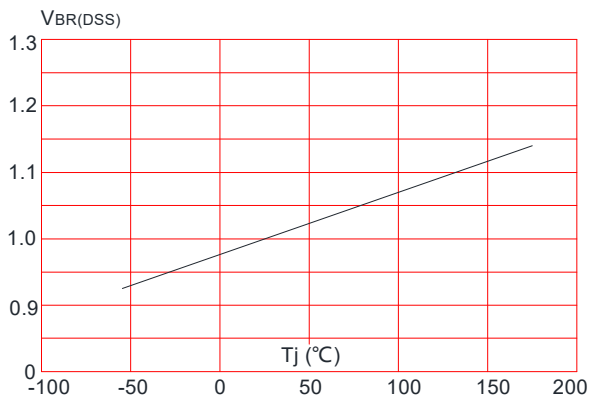


Figure 8: Normalized on Resistance vs. Junction Temperature

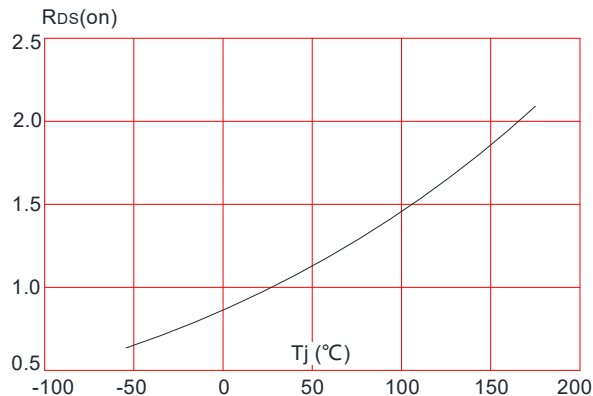


Figure 9: Maximum Safe Operating Area

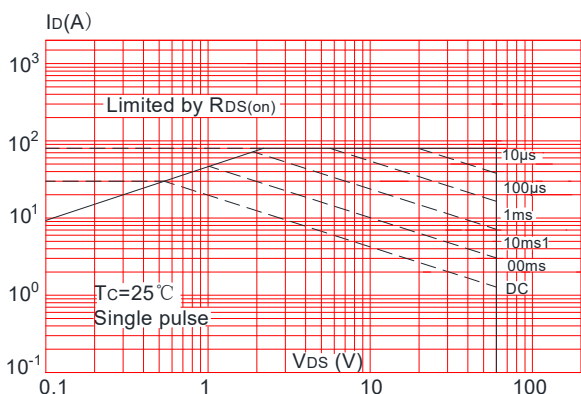


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

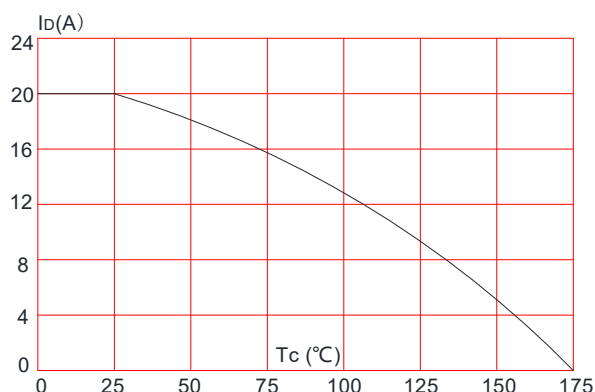
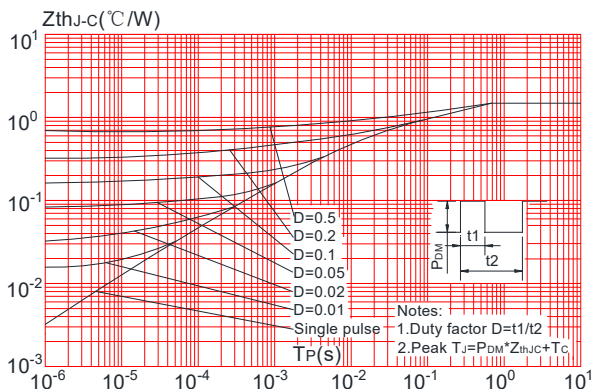


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

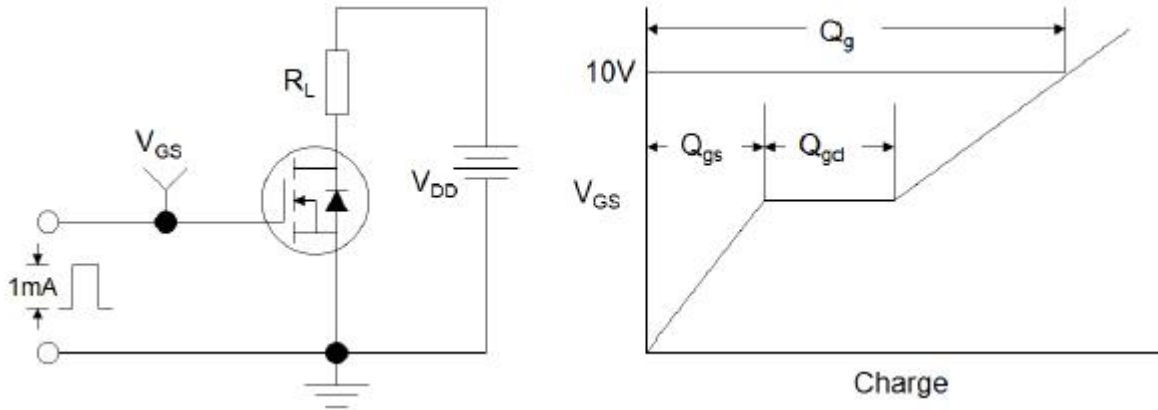


Figure1:Gate Charge Test Circuit & Waveform

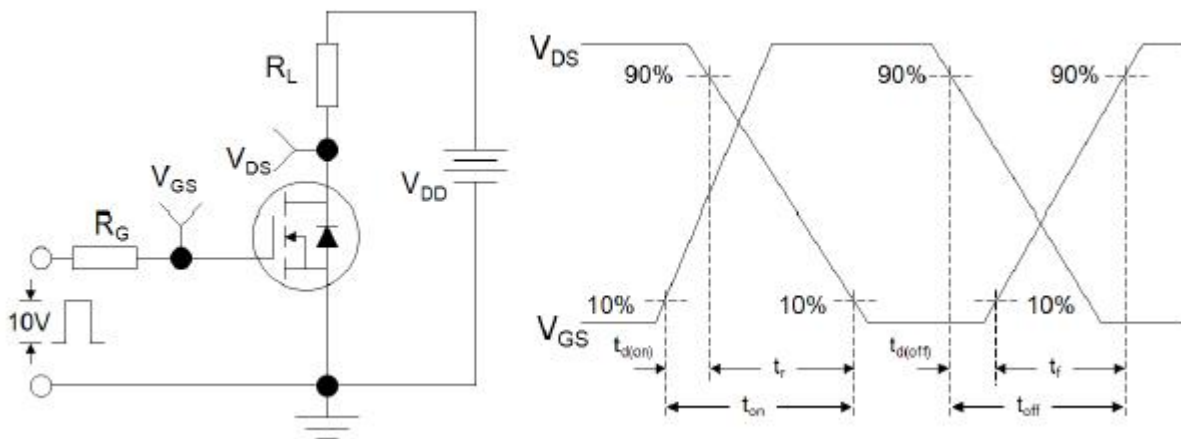


Figure 2: Resistive Switching Test Circuit & Waveforms

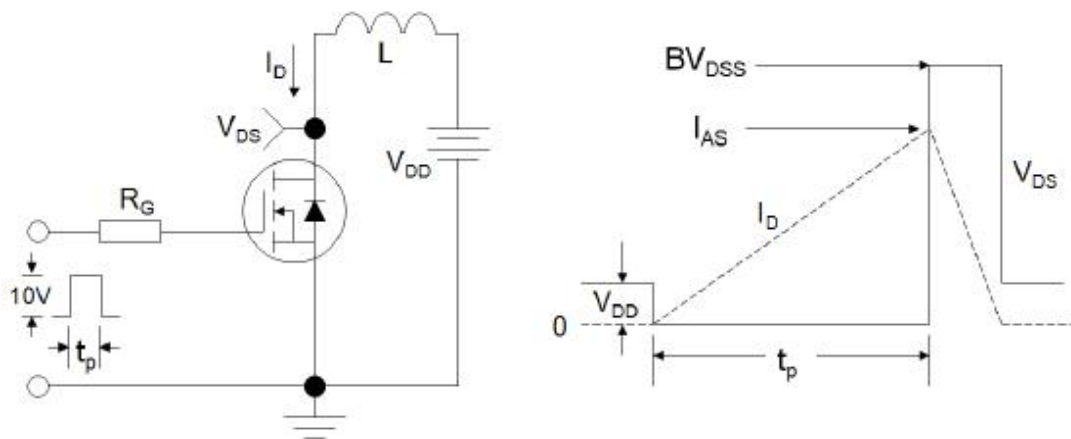
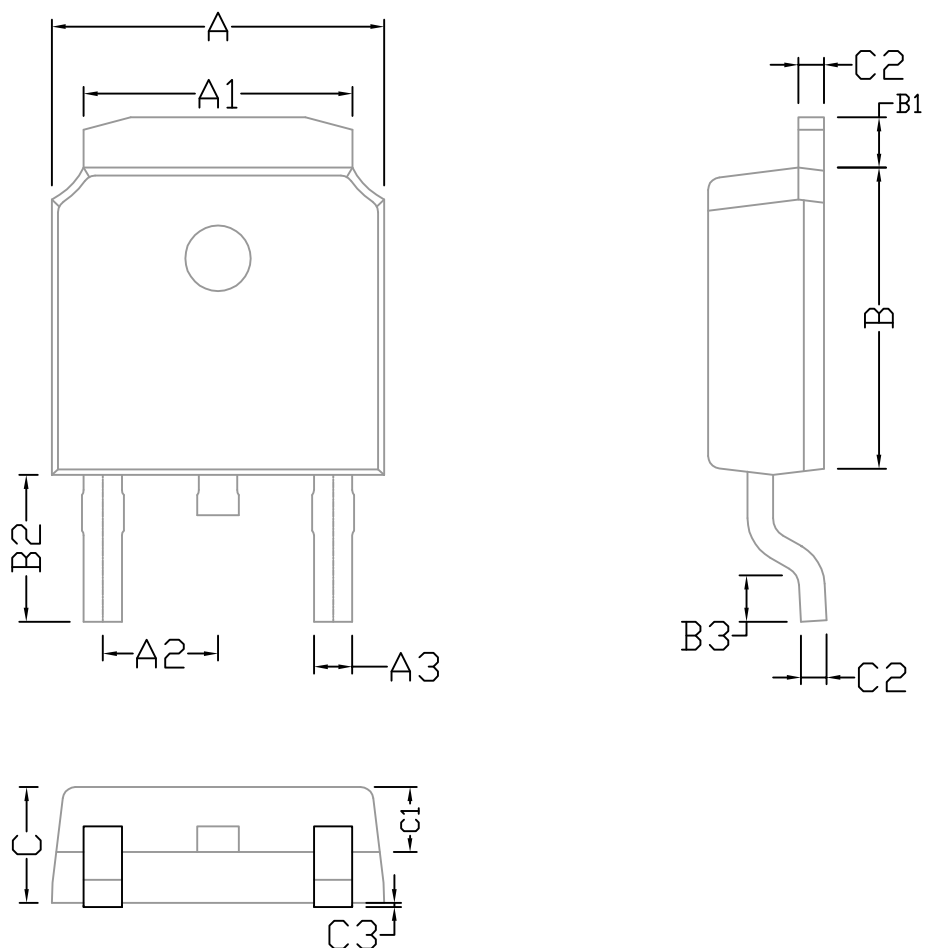


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Mechanical Data-TO-252



标注	最小	标准	最大	标注	最小	标准	最大	标注	最小	标准	最大
A	6.50	6.60	6.70	B	6.05	6.10	6.15	C	2.25	2.30	2.35
A1	5.28	5.33	5.38	B1	0.95	1.00	1.05	C1	0.76	0.81	0.86
A2	2.23	2.28	2.33	B2	2.85	2.9	2.95	C2	0.45	0.50	0.55
A3	0.70	0.75	0.80	B3	1.45	1.50	1.55	C3	0.01	0.05	0.10