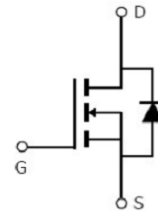


Main Product Characteristics

V_{DSS}	100V
$R_{DS(on)}$	3.5m Ω (typ.)
I_D	150A ①


TO-220

Schematic diagram
Features and Benefits

- Advanced Process Technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


Description

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute max Rating

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	150	A
I_{DM}	Pulsed Drain Current ②	600	
P_D @TC = 25°C	Power Dissipation ③	208	W
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy	609	mJ
I_{AS}	Single Pulse Avalanche Current	28	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

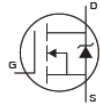
Thermal Resistance

Symbol	Characterizes	Value	Units
R _{θJC}	Junction-to-case ③	0.6	°C/W
R _{θJA}	Junction-to-ambient ④	60	°C/W

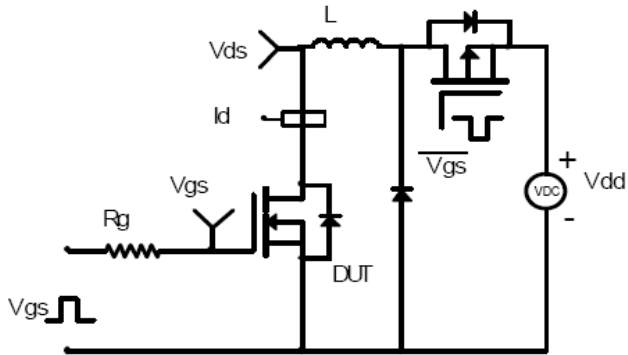
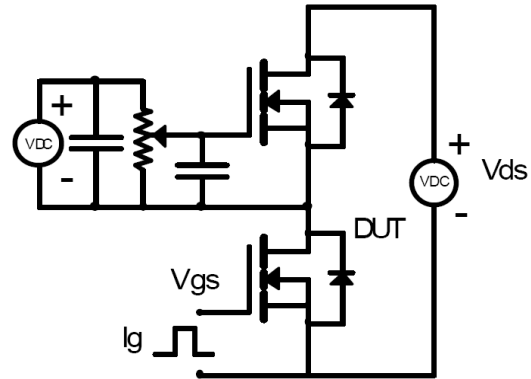
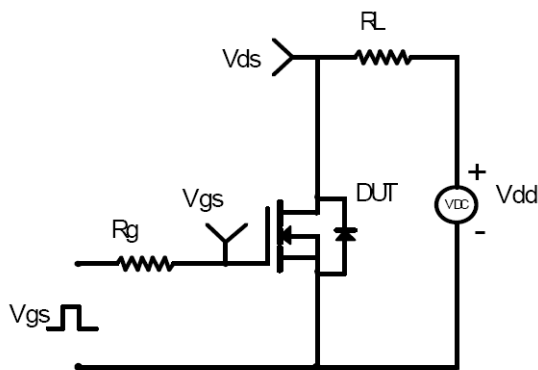
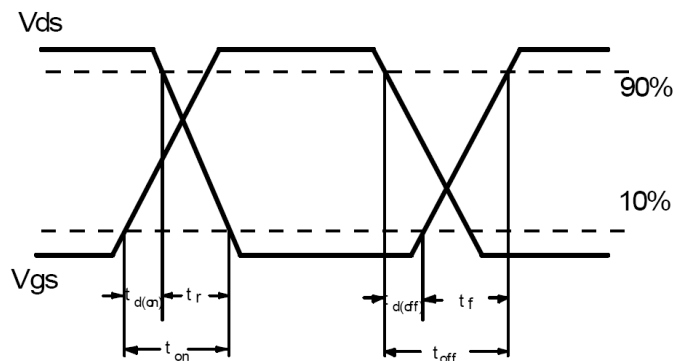
Electrical Characterizes @T_A=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source breakdown voltage	100	—	—	V	V _{GS} = 0V, I _D = 250μA
R _{DS(on)}	Static Drain-to-Source on-resistance	—	3.5	4.2	mΩ	V _{GS} =10V, I _D =50A
V _{GS(th)}	Gate threshold voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D =250μA
I _{DSS}	Drain-to-Source leakage current	—	—	1	μA	V _{DS} =100V, V _{GS} = 0V
I _{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V _{GS} =20V
		—	—	-100		V _{GS} = -20V
Q _g	Total gate charge	—	138	—	nC	I _D = 50A, V _{DS} =50V, V _{GS} = 10V
Q _{gs}	Gate-to-Source charge	—	37	—		
Q _{gd}	Gate-to-Drain("Miller") charge	—	35.5	—		
t _{d(on)}	Turn-on delay time	—	35	—	ns	V _{GS} =10V, V _{DD} =50V, R _{GEN} =25Ω I _D =50A
t _r	Rise time	—	22	—		
t _{d(off)}	Turn-Off delay time	—	105	—		
t _f	Fall time	—	45	—		
C _{iss}	Input capacitance	—	7700	—	pF	V _{GS} = 0V V _{DS} = 50V f = 1MHz
C _{oss}	Output capacitance	—	470	—		
C _{rss}	Reverse transfer capacitance	—	28	—		

Source-Drain Ratings and Characteristics

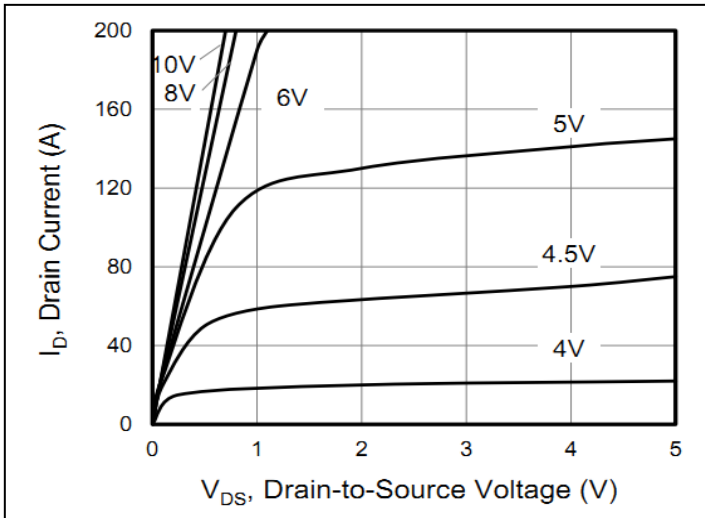
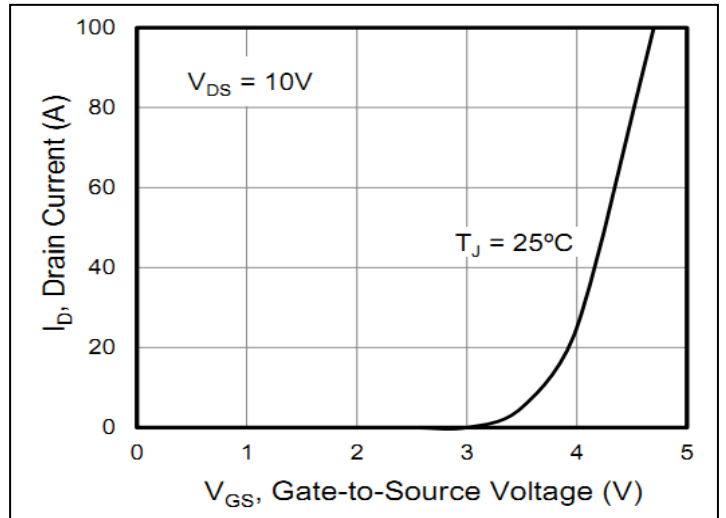
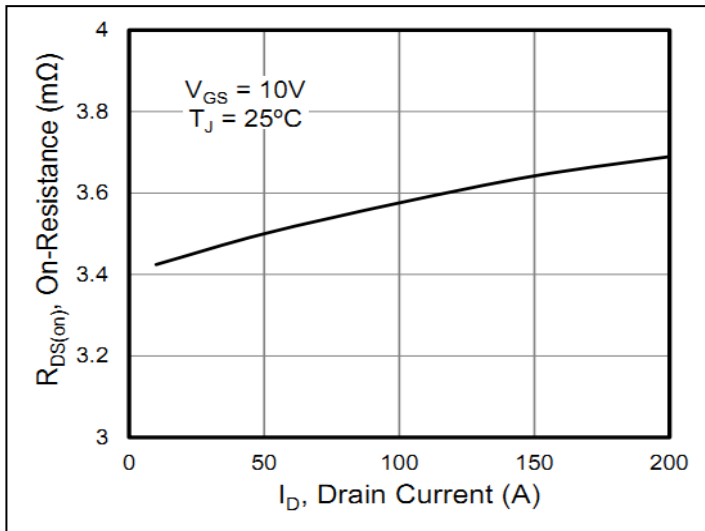
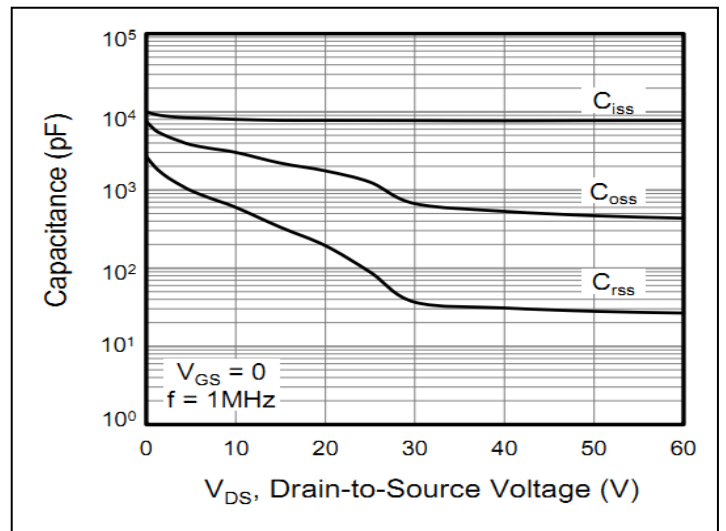
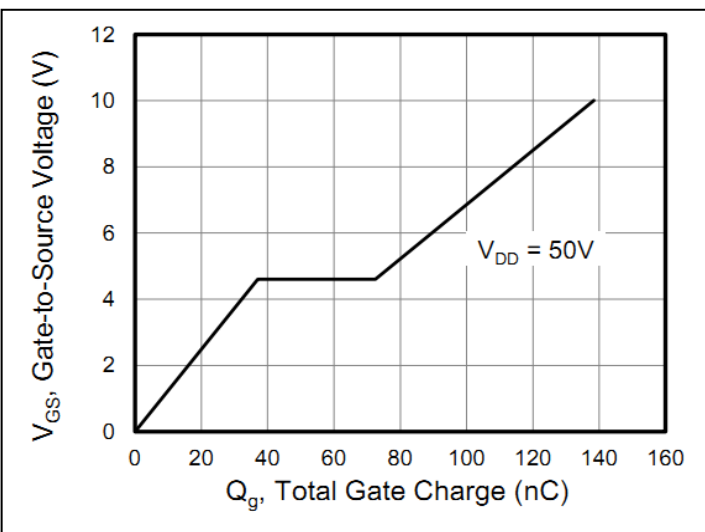
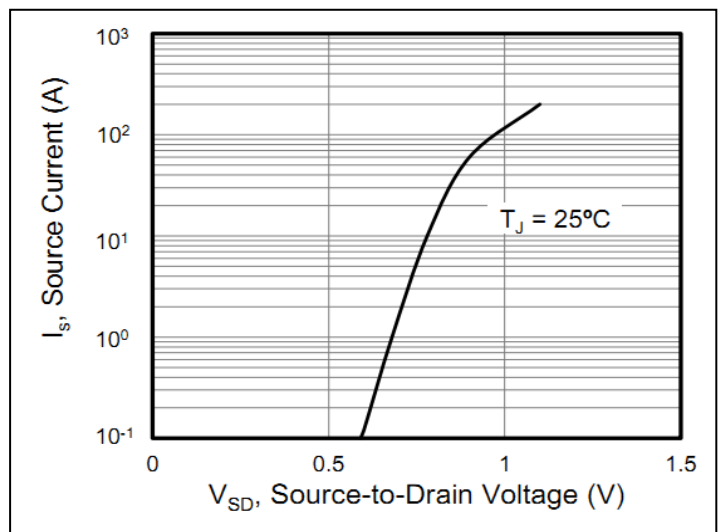
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode) ①	—	—	50	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode)	—	—	150	A	
V _{SD}	Diode Forward Voltage	—	0.9	1.2	V	I _S =50A, V _{GS} =0V, T _J = 25°C
t _{rr}	Reverse Recovery Time	—	50	—	ns	I _S =50A, di/dt=500A/us
Q _{rr}	Reverse Recovery Charge	—	110	—	nC	

Test circuits and Waveforms

EAS Test Circuit:

Gate charge test circuit:

Switching Time Test Circuit:

Switching Waveforms:


Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical electrical and thermal characteristics

Figure 1. Typical Output Characteristics

Figure 2. Typ. Transfer Characteristics

Figure 3. On-Resistance vs. Drain Current

Figure 4. Capacitance

Figure 5. Gate Charge

Figure 6. Body Diode Forward Voltage

Typical electrical and thermal characteristics

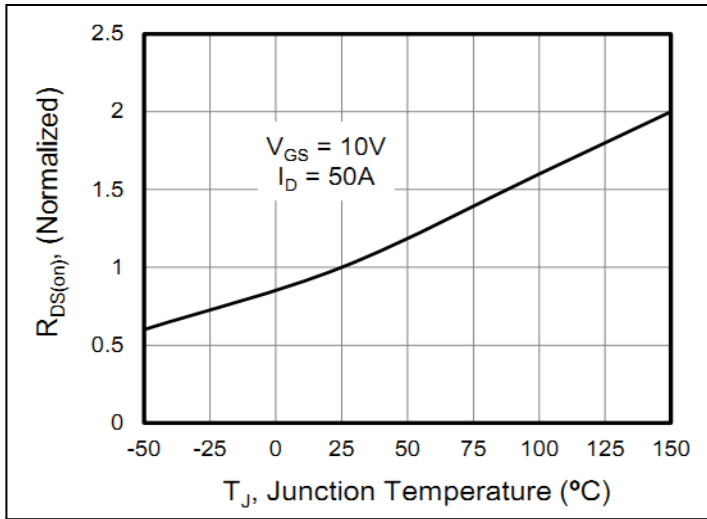


Figure 7. On-Resistance vs. Junction Temperature

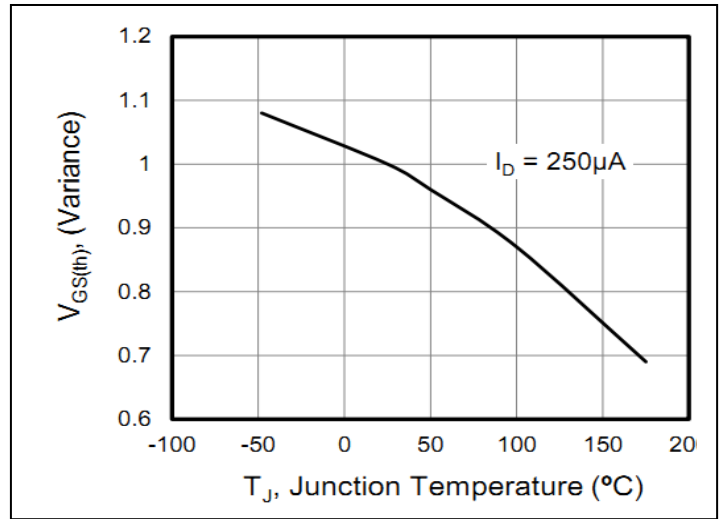


Figure 8. Threshold Voltage vs. Junction Temperature

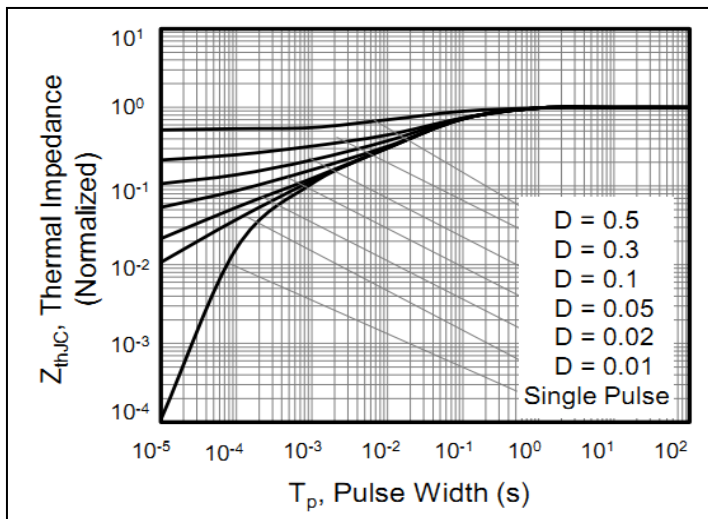
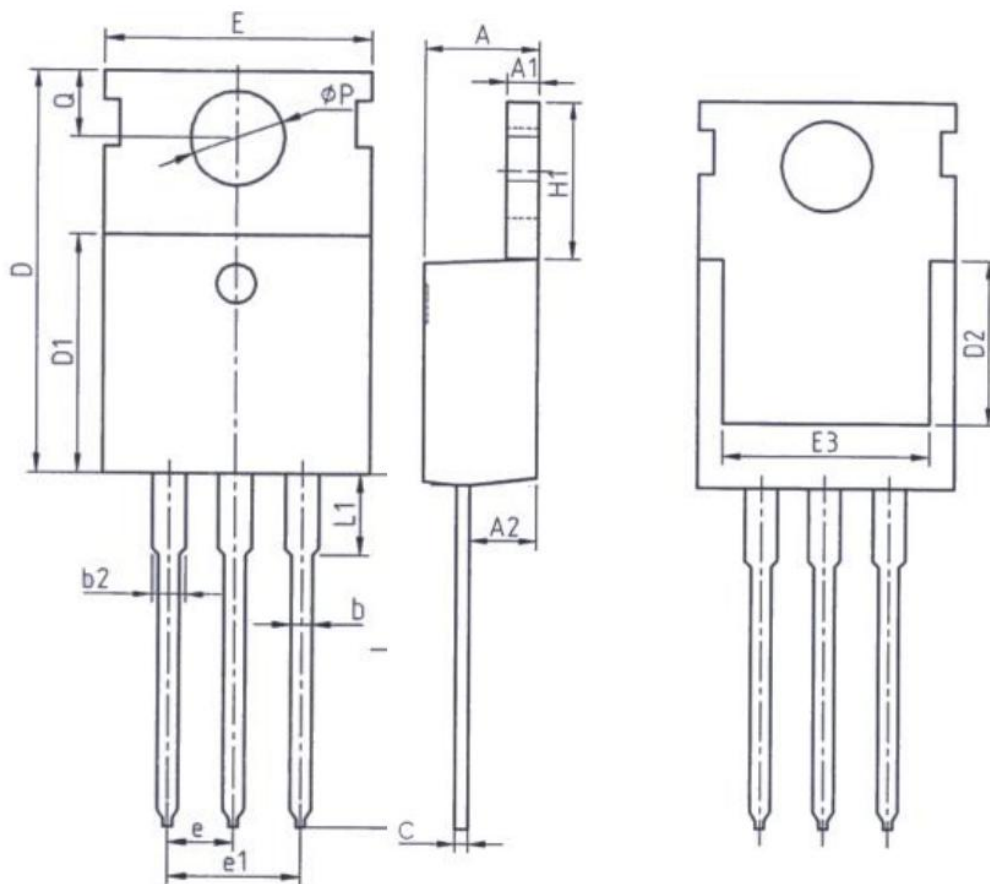


Figure 9. Transient Thermal Impedance

Mechanical Data:
Package Outline Dimension


Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	-

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	-
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	-	3.40
P	3.40	3.80
Q	2.60	3.00

Ordering and Marking Information
Device Marking: SSS1004W

Package (Available)
TO-220
Operating Temperature Range
C : -55 to 150 °C

Devices per Unit

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-220	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to 175°C @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=125^{\circ}\text{C}$ or 175°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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