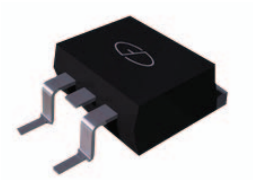
GOOD-ARK
SEMICONDUCTOR

SSS1004A

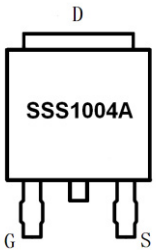
100V N-Channel MOSFET

Main Product Characteristics

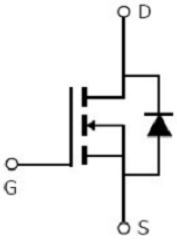
V_{DSS}	100V
$R_{DS(on)}$	3.7mΩ (typ.)
I_D	180A ①



TO-263



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced Process Technology
- Designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 175°C operating temperature

Description

The SSS1004A utilizes the latest processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable for use in power switching applications and a wide variety of other applications.

Absolute Max Ratings

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	180 ①	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	130 ①	
I_{DM}	Pulsed Drain Current ②	670	
P_D @T_C = 25°C	Power Dissipation ③	375	W
	Linear Derating Factor	2.5	W/°C
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.3mH	1045	mJ
I_{AS}	Avalanche Current @ L=0.3mH	83.5	A
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C

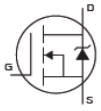
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ③	—	0.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient (t ≤ 10s) ④	—	62	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	°C/W

Electrical Characteristics (T_A=25°C unless otherwise specified)

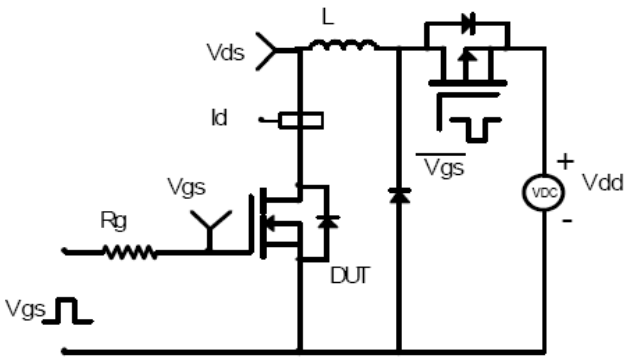
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	V_{GS} = 0V, I_D= 1mA
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	3.7	4.7	mΩ	V_{GS}=10V,I_D =106A
		—	8.4	—		T_J = 125°C
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D =250μA
		—	2.2	—		T_J = 125°C
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	V_{DS} =120V,V_{GS} = 0V
		—	—	50		T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} =20V
		—	—	-100		V_{GS} = -20V
Q_g	Total Gate Charge	—	224	—	nC	I_D = 50A,
Q_{gs}	Gate-to-Source Charge	—	80	—		V_{DS}=50V,
Q_{gd}	Gate-to-Drain("Miller") Charge	—	55	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on Delay Time	—	40	—	nS	V_{GS}=10V, V_{DD} =65V,
t_r	Rise Time	—	141	—		R_L=0.87Ω,
$t_{d(off)}$	Turn-Off Delay Time	—	95	—		R_{GEN}=2.6Ω
t_f	Fall Time	—	101	—		I_D =75A
C_{iss}	Input Capacitance	—	5634	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	657	—		V_{DS} = 50V
C_{rss}	Reverse Transfer Capacitance	—	12.6	—		f = 1MHz

Source-Drain Ratings and Characteristics

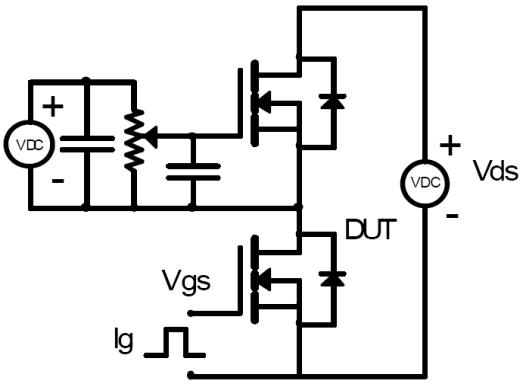
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	180 ①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	670	A	
V_{SD}	Diode Forward Voltage	—	0.9	1.3	V	I_S=75A, V_{GS}=0V, T_J = 25°C

Test Circuits and Waveforms

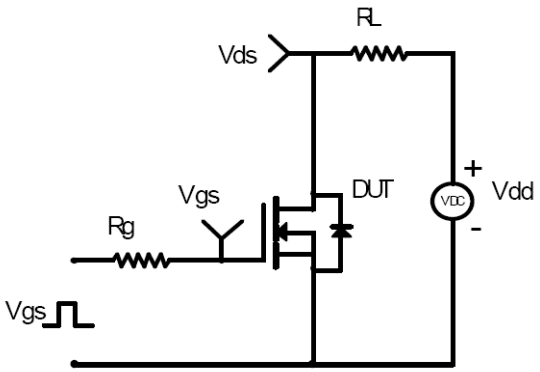
E_{AS} Test Circuit



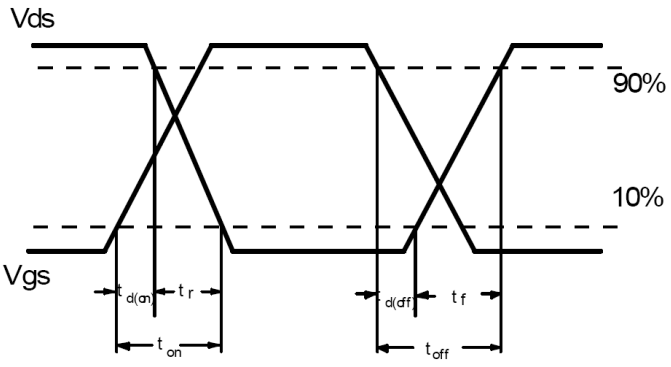
Gate Charge Test Circuit



Switching Time Test Circuit



Switching Waveforms



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation P_D is based on max. junction temperature, using junction-to-case thermal resistance.

④The 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°C

Typical Electrical and Thermal Characteristics

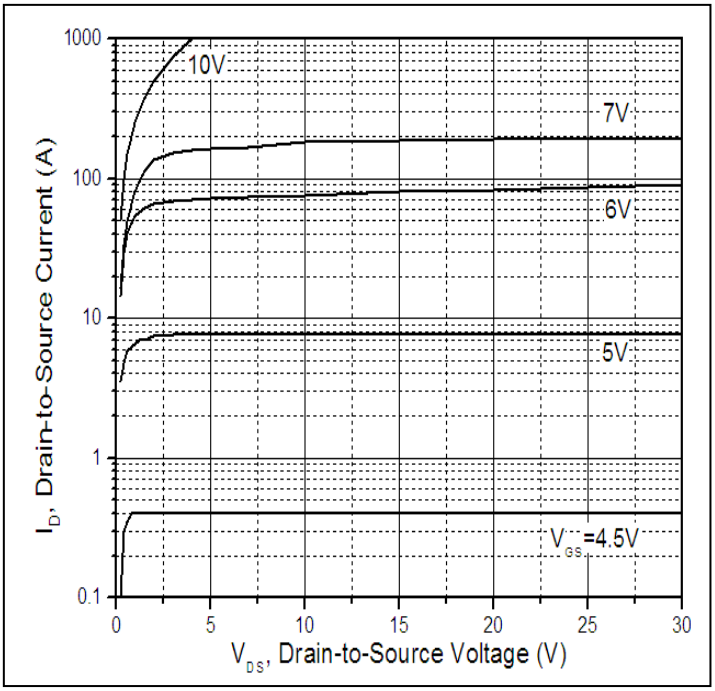


Figure 1. Typical Output Characteristics

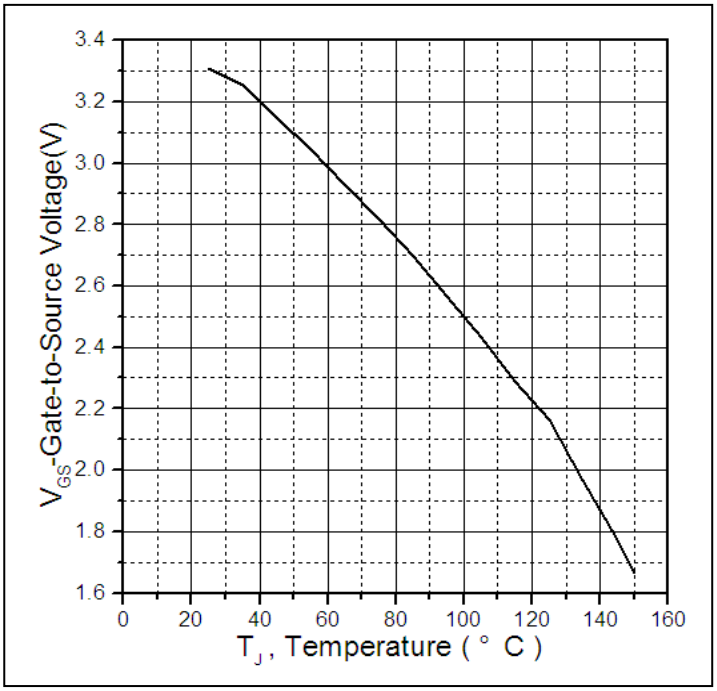


Figure 2. Gate to Source Cut-off Voltage

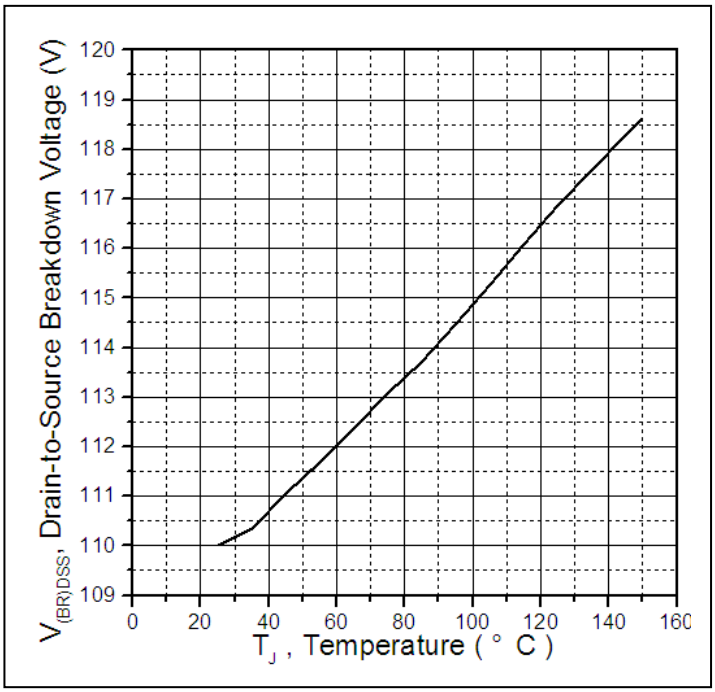


Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature

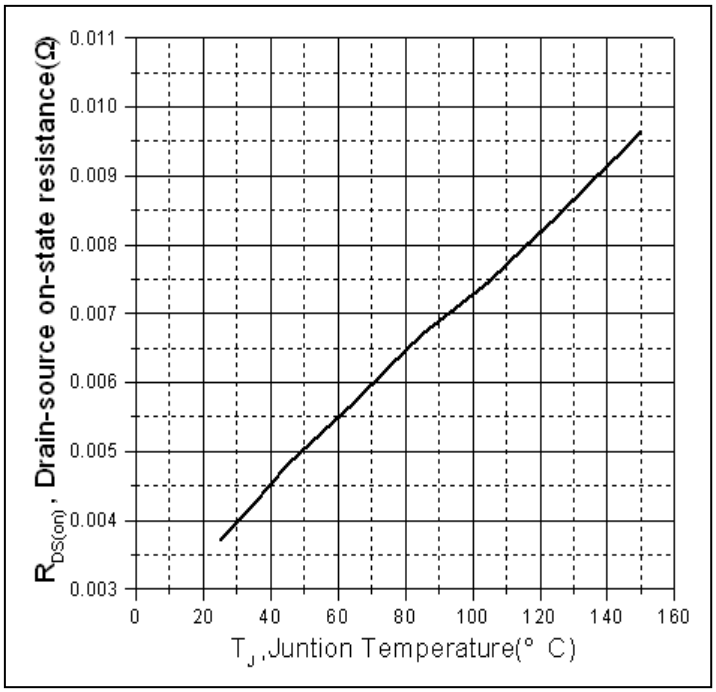


Figure 4. Normalized On-Resistance Vs. Case Temperature

Typical Electrical and Thermal Characteristics

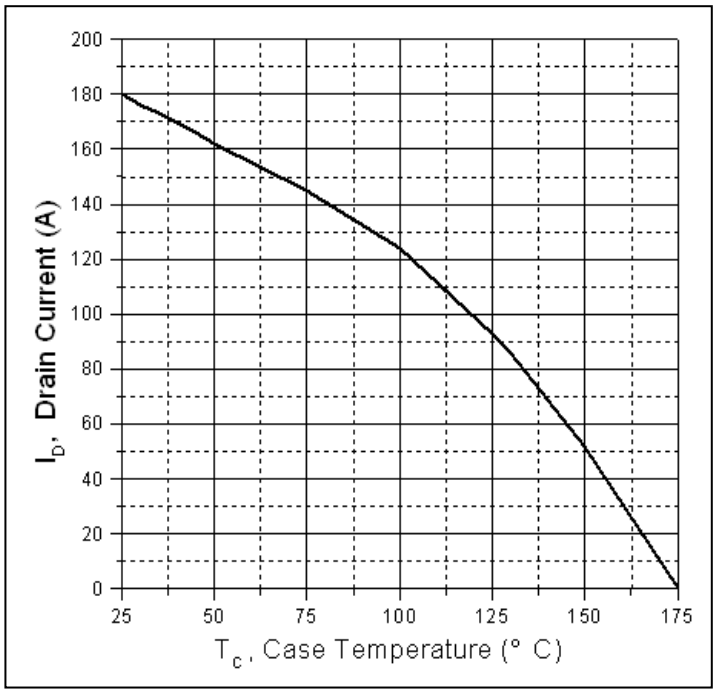


Figure 5. Maximum Drain Current Vs. Case Temperature

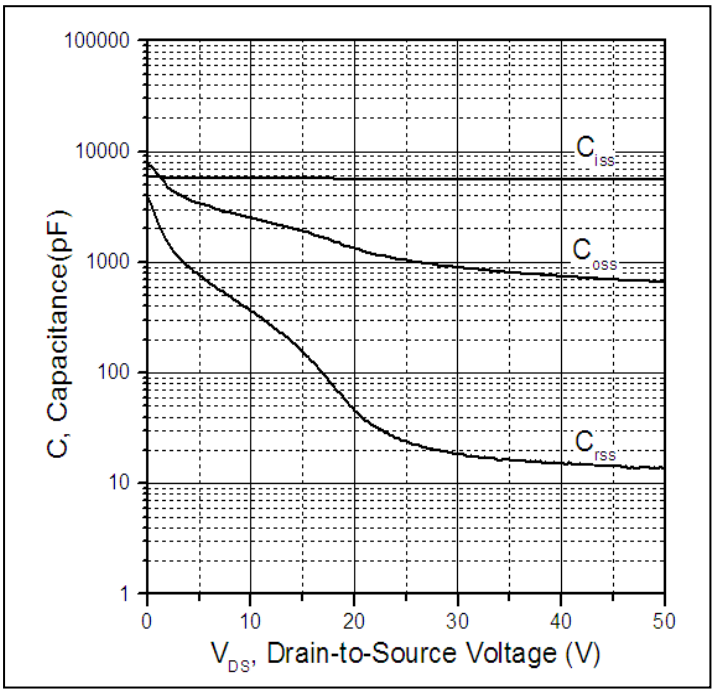


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

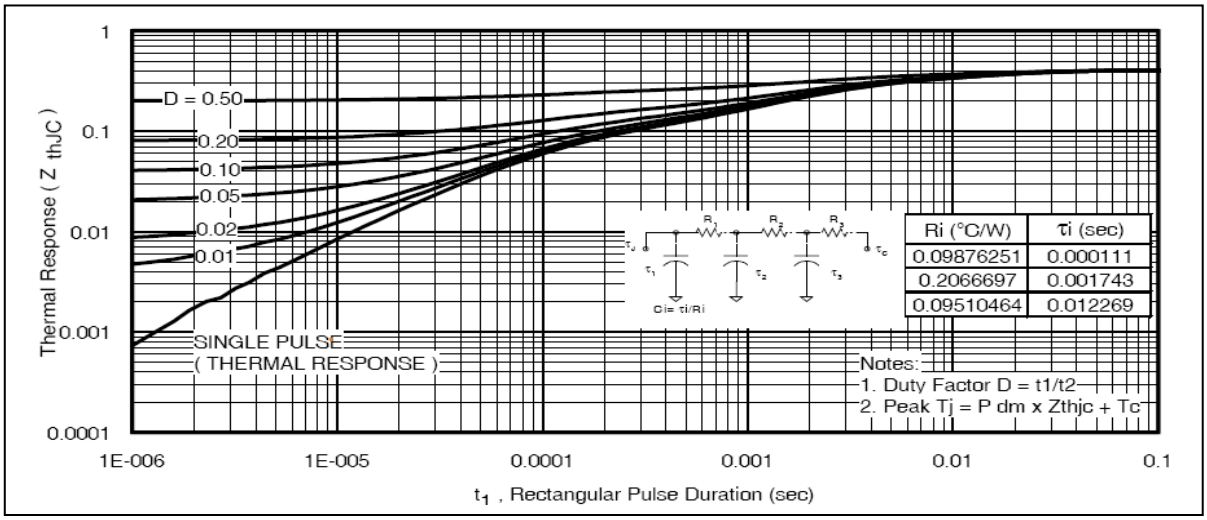
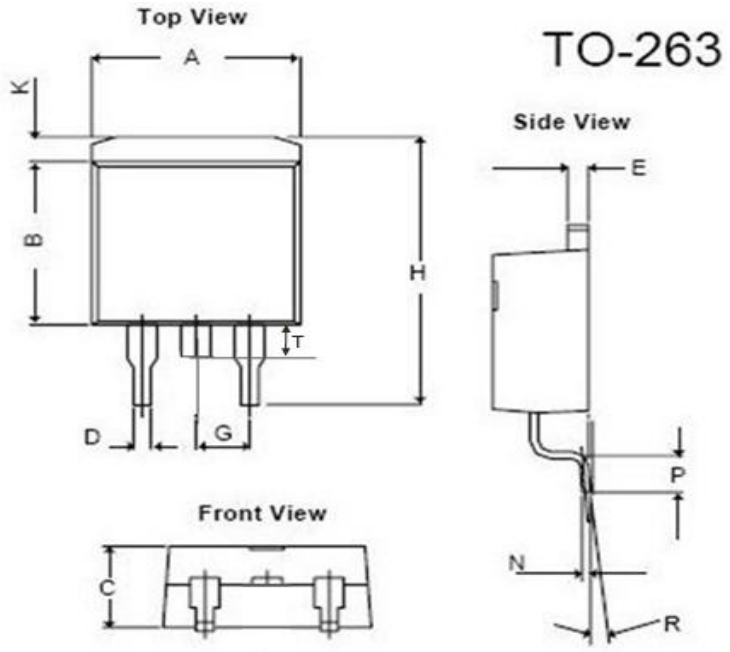


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data

TO-263 Package Outline Dimension：



SYMBOLS	MILLIMETERS			INCHES		
	MIN	TYPE	MAX	MIN	TYPE	MAX
A	9.650	10.140	10.668	0.3799	0.3992	0.4200
B	8.280	8.740	9.660	0.3260	0.3441	0.3803
C	4.060	4.580	4.830	0.1598	0.1803	0.1902
D	0.500	0.800	1.360	0.0197	0.0315	0.0535
E	1.270	1.380	1.450	0.0500	0.0543	0.0571
G		2.540			0.1000	
H	14.600	14.900	15.875	0.5748	0.5866	0.6250
K	0.990	1.250	2.930	0.0390	0.0492	0.1154
N		0.381			0.0150	
P	2.280	2.680	2.800	0.0898	0.1055	0.1102
R	0°	5°	8°	0°	5°	8°
T	1.360	1.400	1.440	0.0535	0.0551	0.0567

Ordering and Marking Information

Device Marking: SSS1004A

Package (Available)

TO-263

Operating Temperature Range

C : -55 to 175 ºC

Devices per Unit

Package Type	Units/ Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-263	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125°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°C or 175°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices