Main Product Characteristics:

V_{DSS}	30V
$R_{DS}(on)$	2.6mΩ (typ.)
I_D	120A

TO-263
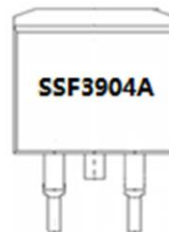
Marking and Pin Assignments
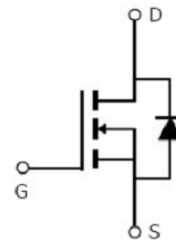
Schematic Diagram

Features and Benefits:

- Advanced MOSFET 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℃ 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} @ 10V①	120	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V①	90	
I_{DM}	Pulsed Drain Current②	480	
P_D @TC = 25°C	Power Dissipation③	100	W
	Linear Derating Factor	0.55	W/°C
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.1mH	320	mJ
I_{AS}	Avalanche Current @ L=0.1mH	80	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
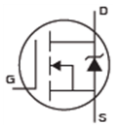
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case③	—	0.9	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	℃/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	℃/W

## Electrical Characterizes @T_A=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	30	—	—	V	V_{GS} = 0V, I_D = 250µA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	2.6	3.6	mΩ	V_{GS}=10V,I_D = 30A
		—	3.8	—		T_J = 125℃
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	3.2	5	mΩ	V_{GS}=4.5V,I_D = 16A
		—	4.8	—		T_J = 125℃
$V_{GS(th)}$	Gate threshold voltage	1	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
		—	1.3	—		T_J = 125℃
I_{DSS}	Drain-to-Source leakage current	—	—	1	µA	V_{DS} = 30V,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	—	68	—		V_{DS}=15V,
Q_{gs}	Gate-to-Source charge	—	19	—	nC	I_D=16A,
Q_{gd}	Gate-to-Drain("Miller") charge	—	25	—		V_{GS}=5V
$t_{d(on)}$	Turn-on delay time	—	19	—		
t_r	Rise time	—	18	—		V_{GS}=10V, V_{DS}=15V,
$t_{d(off)}$	Turn-Off delay time	—	145	—	ns	R_{GEN}=6Ω, I_D=1A
t_f	Fall time	—	63	—		
C_{iss}	Input capacitance	—	9291	—		V_{GS} = 0V
C_{oss}	Output capacitance	—	748	—	pF	V_{DS} = 15V
C_{rss}	Reverse transfer capacitance	—	702	—		ƒ = 1MHz

Source-Drain Ratings and Characteristics

| Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	110	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	440	A	
V_{SD}	Diode Forward Voltage	—	0.85	1.3	V	I_S=50A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	20	—	ns	T_J = 25°C, I_F =32A,
Q_{rr}	Reverse Recovery Charge	—	7.8	—	nC	di/dt = 100A/µs

Test circuits and Waveforms

EAS Test Circuit:
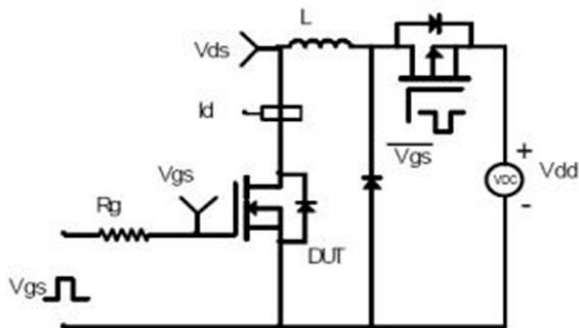
Gate Charge Test Circuit:
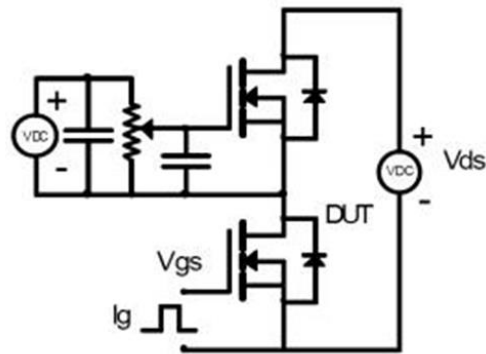
Switching Time Test Circuit:
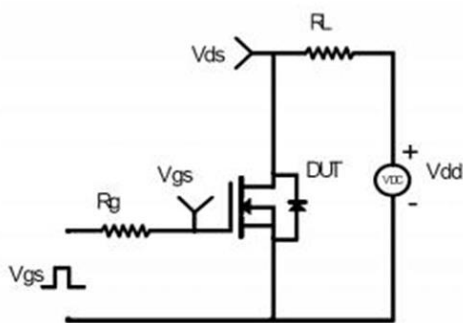
Switching Waveforms:
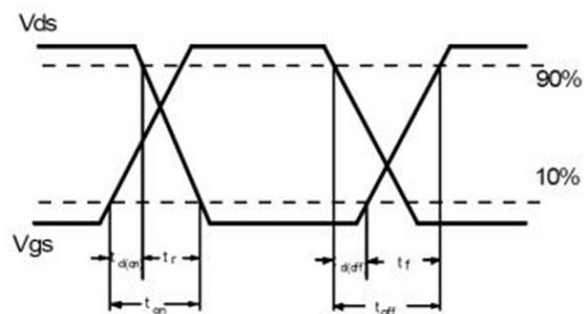
Notes:

①Calculated continuous current based on maximum allowable junction temperature.

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

③ The power dissipation PD 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 Characteristics
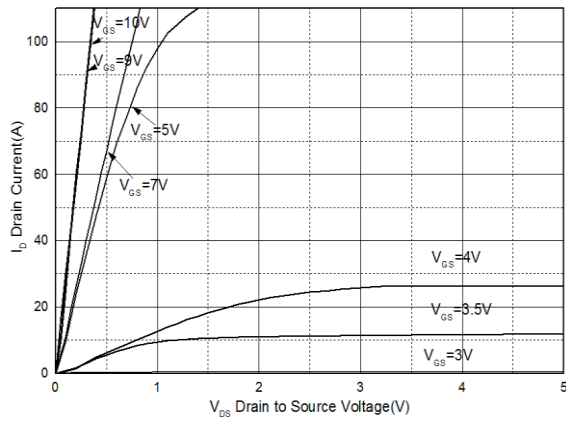
Figure 1. Typical Output Characteristics
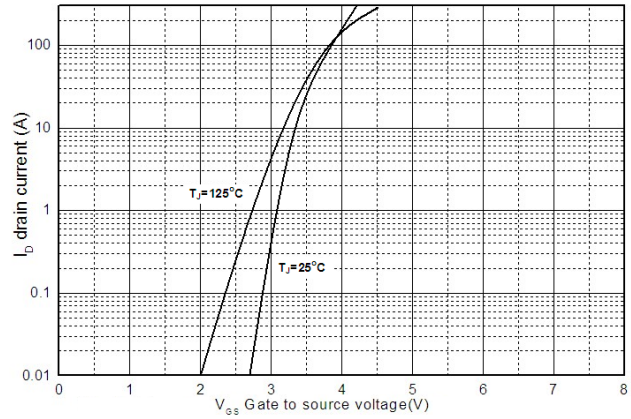
Figure 2. Typical Transfer Characteristics
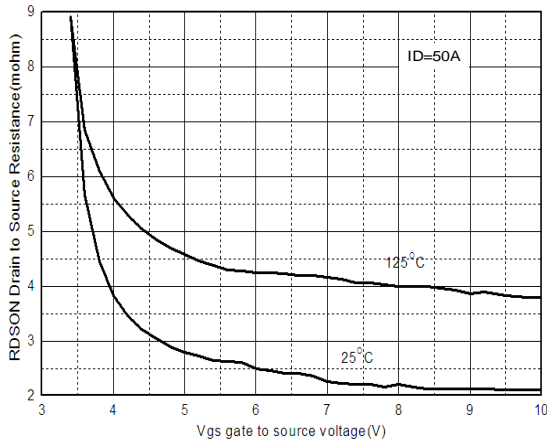
Figure 3. On-Resistance vs. Gate-Source Voltage
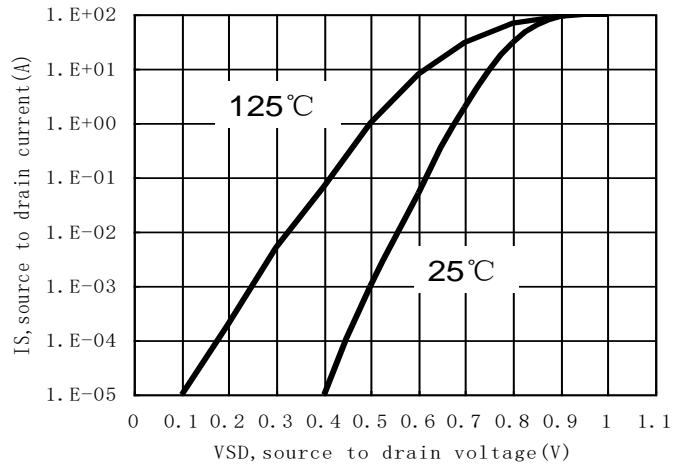
Figure 4. Body-Diode Characteristics
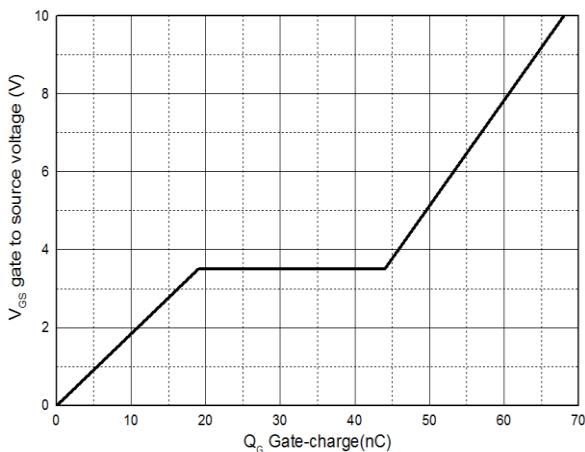
Figure 5. Gate-Charge Characteristics
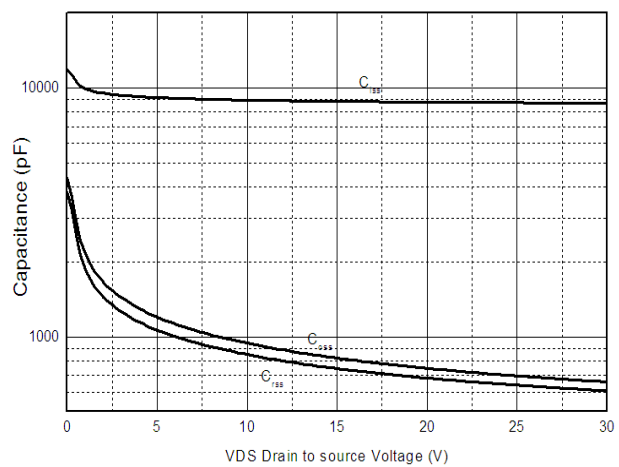
Figure 6. Capacitance Characteristics

Typical thermal characteristics

The graph shows the Normalized Effective Transient Thermal Impedance curves.

Y-axis: r(t), Normalized Effective Transient Thermal Impedance, ranging from 10^{-2} to 10^0

X-axis: Square Wave Pulse Duration (sec), ranging from 10^{-5} to 10^1

Curves labeled: D=0.5, 0.2, 0.1, 0.05, 0.02, 0.01, Single Pulse

1. $R_{\theta JC}(t) = r(t) * R_{\theta JC}$
2. $R_{\theta JC}$ = See Datasheet
3. $T_{JM} - T_C = P * R_{\theta JC}(t)$
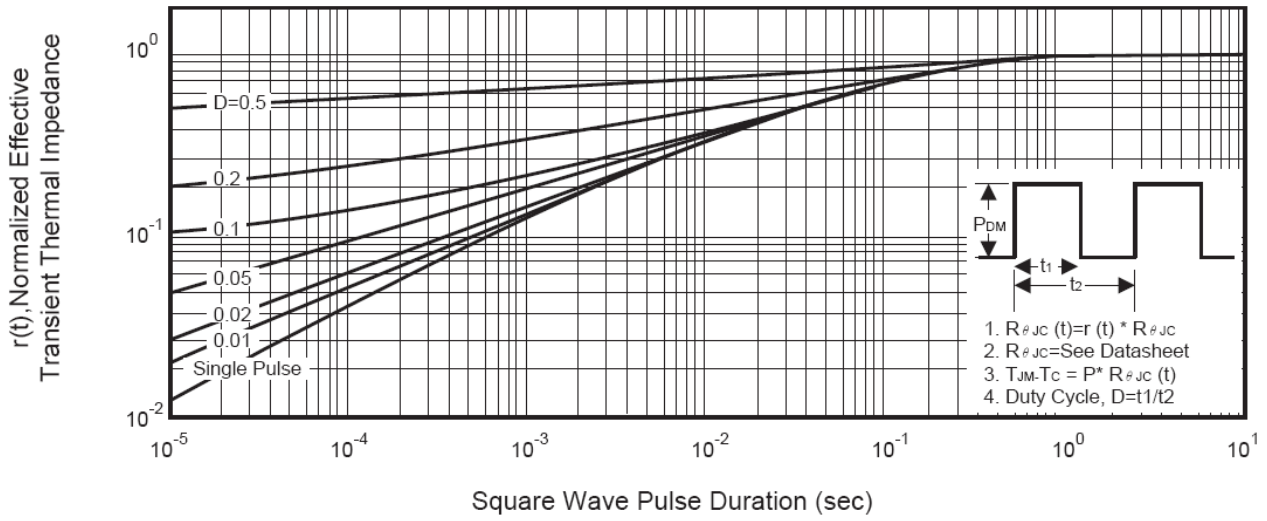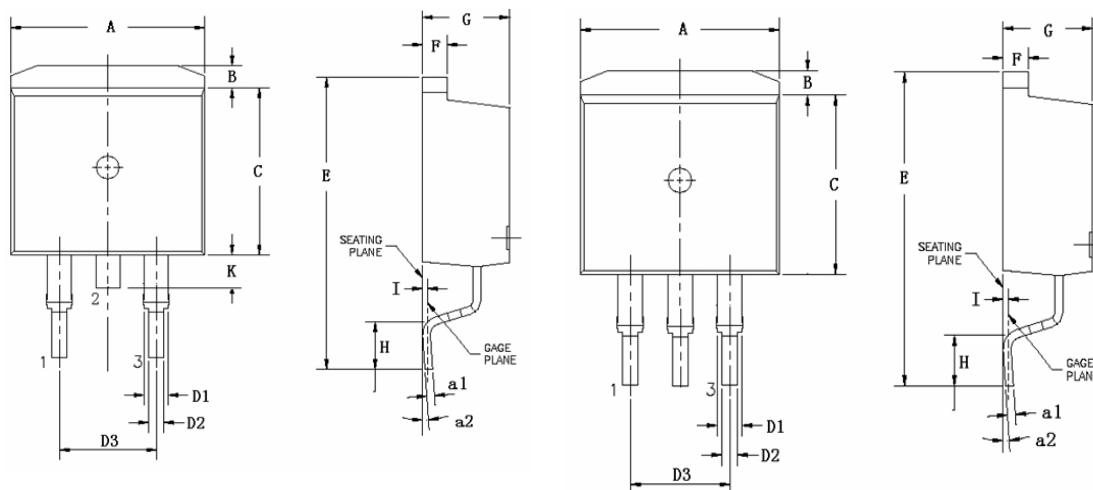4. Duty Cycle, $D = t1/t2$

Figure 7. Normalized Thermal Transient Impedance Curve

Mechanical Data：

D2PAK PACKAGE OUTLINE DIMENSION

Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	**Max**	**Min**	**Max**
A	9.660	10.280	0.380	0.405
B	1.020	1.320	0.040	0.052
C	8.590	9.400	0.338	0.370
D1	1.140	1.400	0.045	0.055
D2	0.700	0.950	0.028	0.037
D3	5.080 (TYP)		0.200 (TYP)	
E	15.090	15.390	0.594	0.606
F	1.150	1.400	0.045	0.055
G	4.300	4.700	0.169	0.185
H	2.290	2.790	0.090	0.110
I	0.250 (TYP)		0.010 (TYP)	
K	1.300	1.600	0.051	0.063
a1	0.450	0.650	0.018	0.026
a2	0^0	8^0	1^0	8^0

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