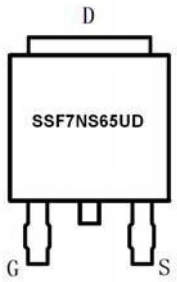
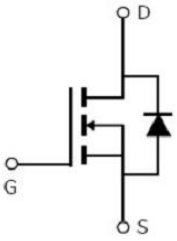
Main Product Characteristics

V_{DSS}	650V
R_{DS}(on)	0.52Ω (typ.)
I_D	7A①

TO-252 (DPAK)



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- High dv/dt and avalanche capabilities
- 100% avalanche tested
- Low input capacitance and gate charge
- Low gate input resistance

Description

The SSF7NS65UD series MOSFETs is a new technology, which combines an innovative technology and advance process. This new technology achieves low Rdson, energy saving, high reliability and uniformity, superior power density and space saving.

Absolute Max Rating

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	7	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V ①	5	
I_{DM}	Pulsed Drain Current ②	28	
P_D @T_C = 25°C	Power Dissipation ③	42	W
	Linear Derating Factor	0.33	W/°C
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=100mH	612	mJ
I_{AS}	Avalanche Current @ L=100mH	3.5	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

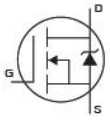
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	3.0	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	℃/W

Electrical Characteristics @T_A=25℃ unless otherwise specified

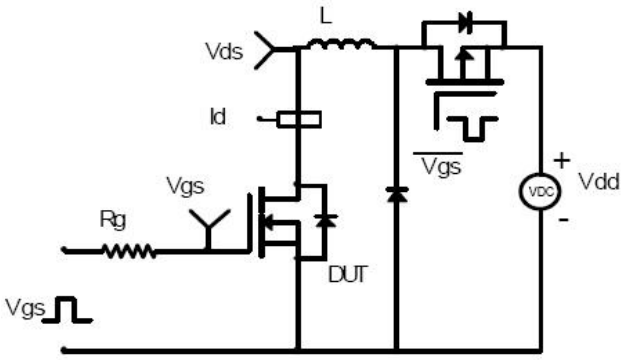
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown Voltage	650	—	—	V	V_{GS} = 0V, I_D = 250μA
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	0.52	0.75	Ω	V_{GS}=10V,I_D = 1A
		—	1.11	—		T_J = 125°C
		—	0.58	0.85	Ω	V_{GS}=10V,I_D = 4.8A
		—	1.36	—		T_J = 125°C
$V_{GS(th)}$	Gate Threshold Voltage	3	—	5	V	V_{DS} = V_{GS}, I_D = 250μA
		—	3.37	—		T_J = 125°C
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	V_{DS} =650V,V_{GS} = 0V
		—	—	50		T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} =30V
		—	—	-100		V_{GS} = -30V
Qg	Total Gate Charge	—	13	—	nC	I_D = 5A,
Qgs	Gate-to-Source Charge	—	2.6	—		V_{DS}=200V
Qgd	Gate-to-Drain("Miller") Charge	—	3.1	—		V_{GS} = 10V
td(on)	Turn-on Delay Time	—	11.8	—	ns	V_{GS}=10V,
tr	Rise Time	—	7.0	—		V_{DS} =310V,
td(off)	Turn-Off Delay Time	—	23.9	—		R_{GEN}=10Ω,
tf	Fall Time	—	5.6	—		I_D =3.5A
Ciss	Input Capacitance	—	540	—	pF	V_{GS} =0V
Coss	Output Capacitance	—	25	—		V_{DS}=100V
Crss	Reverse Transfer Capacitance	—	3	—		f = 600kHz

Source-Drain Ratings and Characteristics

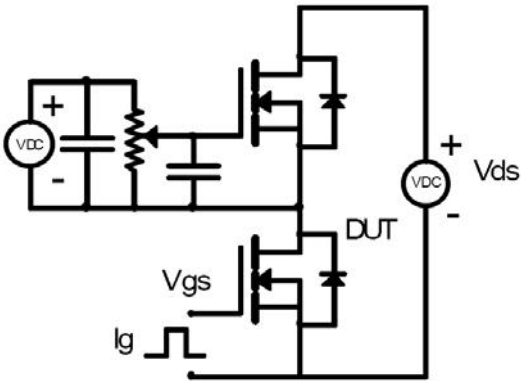
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode) ①	—	—	7	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	28	A	
V_{SD}	Diode Forward Voltage	—	0.85	1.2	V	I_S=4.8A, V_{GS}=0V
trr	Reverse Recovery Time	—	111	—	nS	TJ = 25°C, IF = 2.2A, di/dt = 100A/μs
Qrr	Reverse Recovery Charge	—	639	—	nC	

Test Circuits and Waveforms

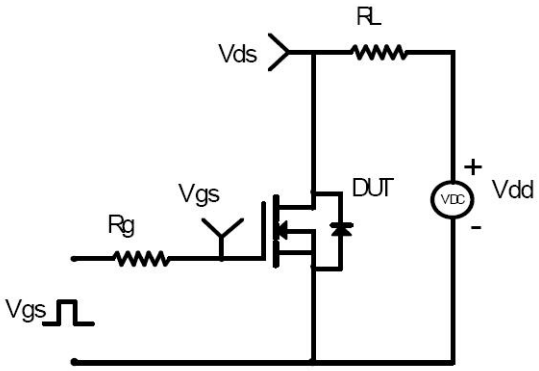
EAS Test Circuit:



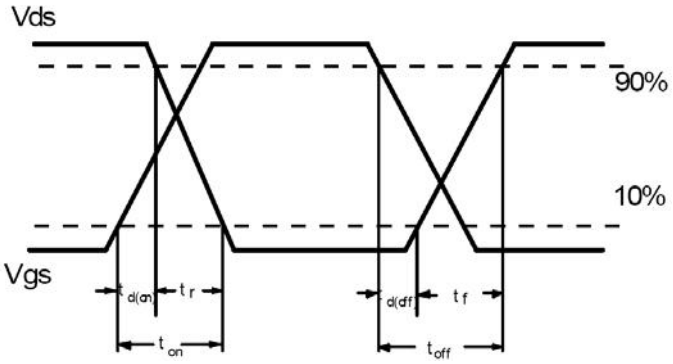
Gate Charge Test Circuit:



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.
③The 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 TA =25°C

Typical Electrical and Thermal Characteristics

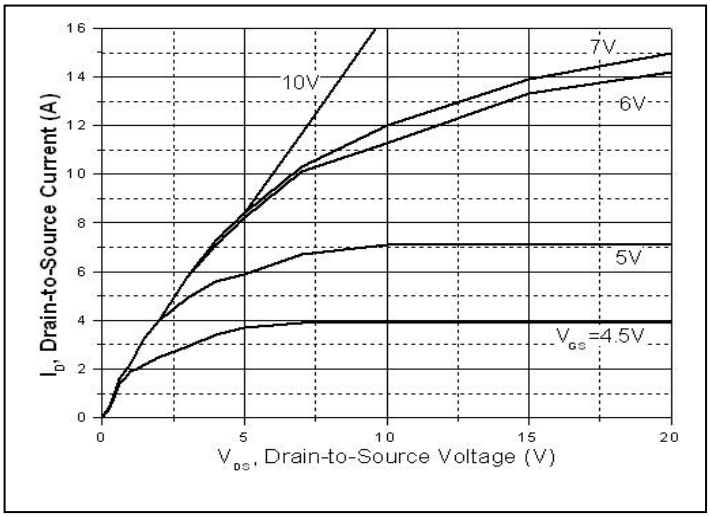


Figure 1.Typical Output Characteristics

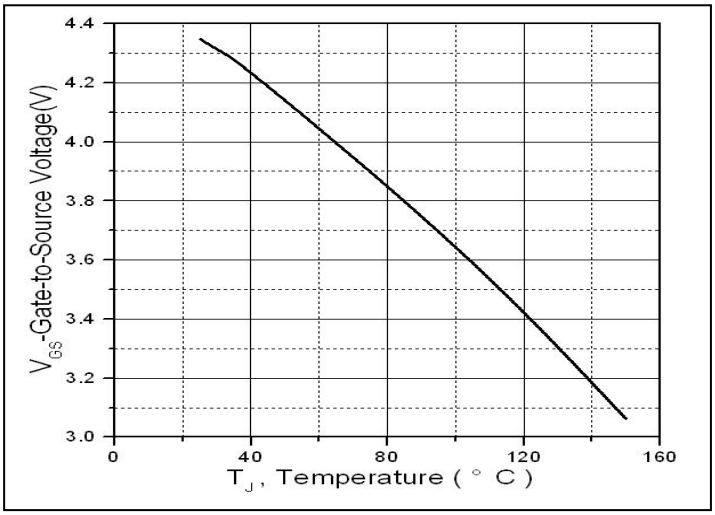


Figure 2. Gate to Source Cut-off Voltage

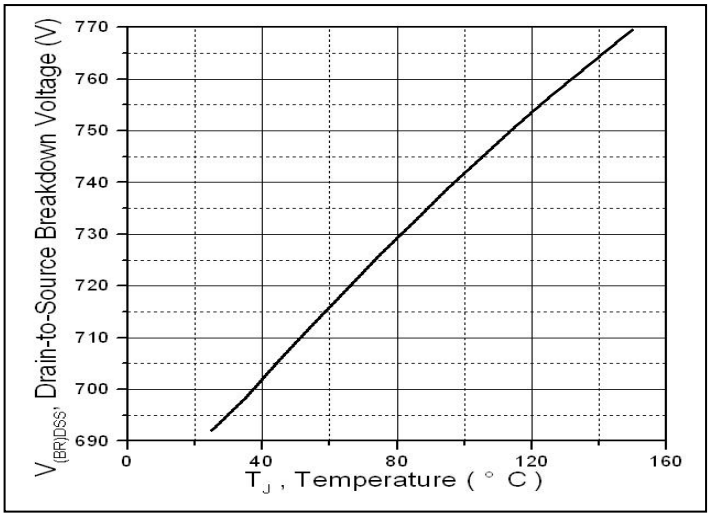


Figure 3. Drain-to-Source Breakdown Voltage vs. Case Temperature

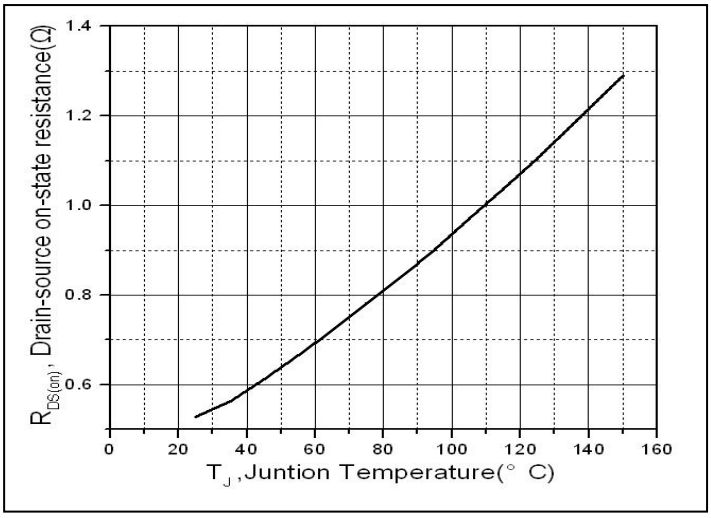


Figure 4. Normalized On-Resistance vs. Case Temperature

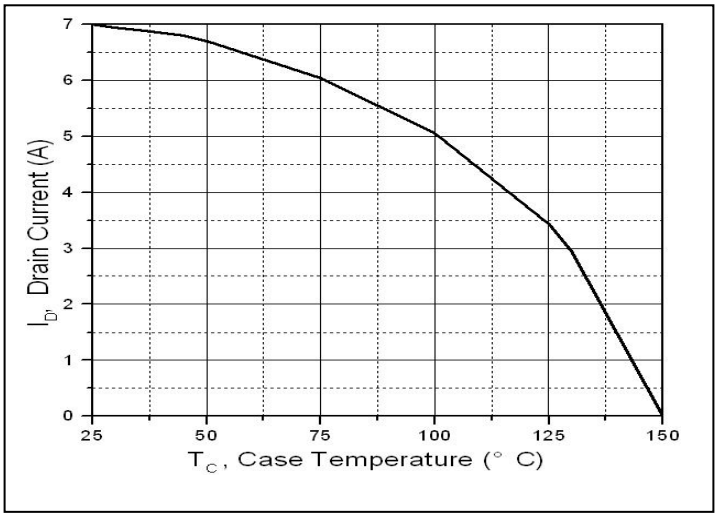


Figure 5. Maximum Drain Current vs. Case Temperature

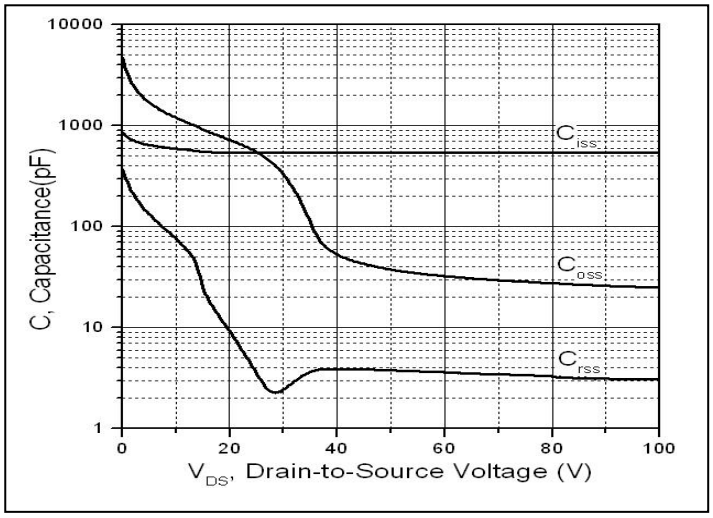


Figure 6. Typical Capacitance vs. Drain-to-Source Voltage

Typical Electrical and Thermal Characteristics

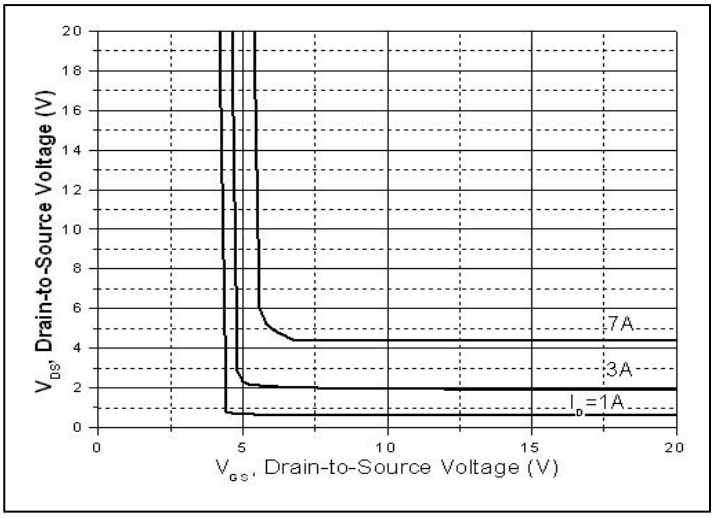


Figure7. Drain-to-Source Voltage vs. Gate-to-Source Voltage

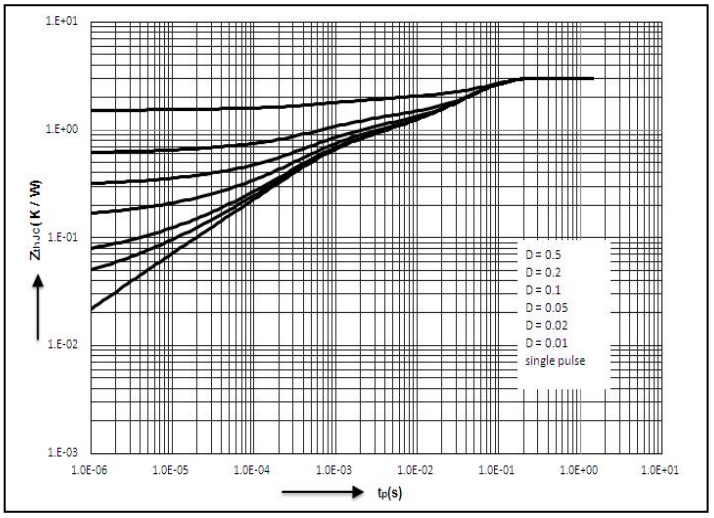


Figure8. Maximum Effective Transient Thermal Impedance, Junction-to-Case

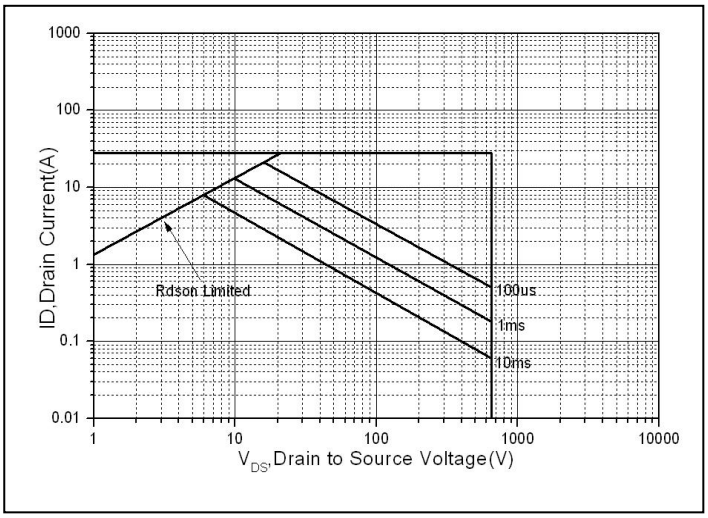
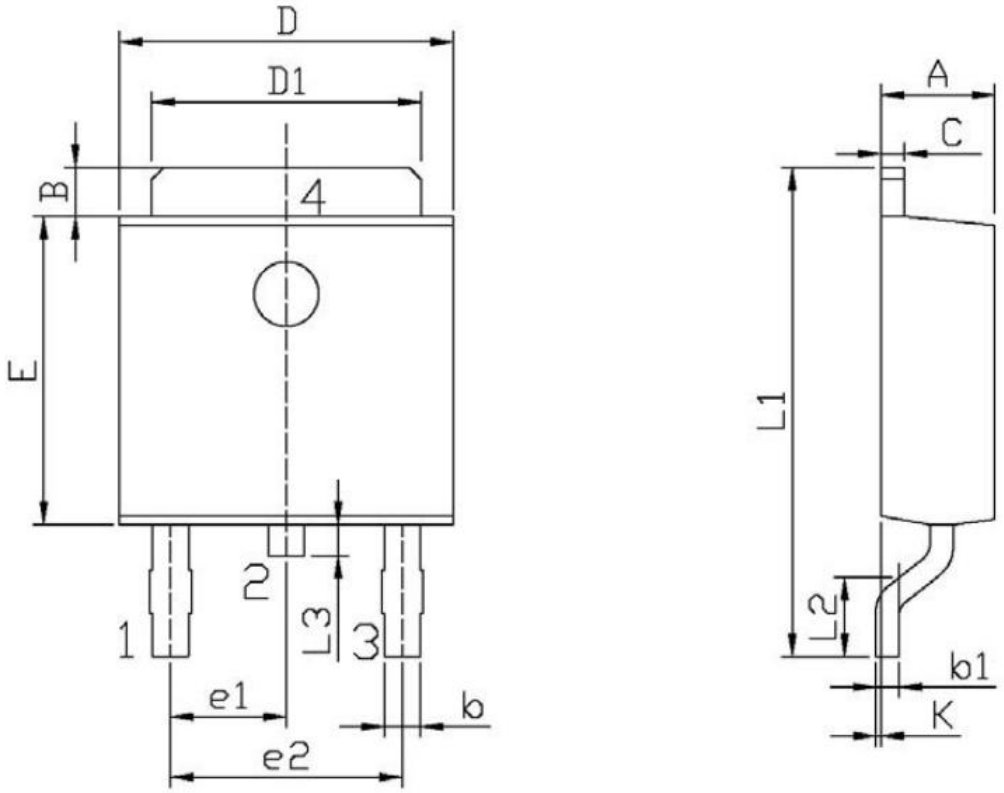


Figure9. Safe Operation Area

Mechanical Data

TO-252 Package Outline (Unit : mm)



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.50	0.70	e2	4.43	4.73
b1	0.45	0.55	L1	9.45	9.95
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10

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