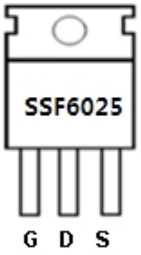
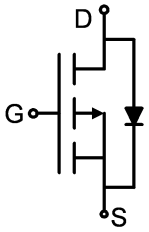
Main Product Characteristics:

V_{DSS}	-60V
$R_{DS}(on)$	12mΩ (typ.)
I_D	-60A

TO-220



Marking and pin Assignment



Schematic diagram

Features and Benefits:

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- High Power and current handing capability
- Fully Avalanche Rated

Description:

It utilizes the advanced trench processing techniques to achieve extremely low on resistance and low gate charge. These features combine to make this design an extremely efficient and reliable device for use in PWM, load switching and a wide variety of other applications.

Absolute max Rating:

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V①	-60	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V①	-50	
I_{DM}	Pulsed Drain Current②	-240	
I_{SM}	Pulsed Source Current (Body Diode)②	-240	
P_D @T_C = 25°C	Power Dissipation③	166	W
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.3mH	300	mJ
I_{AS}	Single Pulse Avalanche Current @ L=0.3mH	44	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

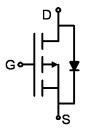
Thermal Resistance

Symbol	Characterizes	Value	Unit
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	62	℃/W
$R_{\theta JC}$	Maximum Junction-to-Case⑤	0.75	℃/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

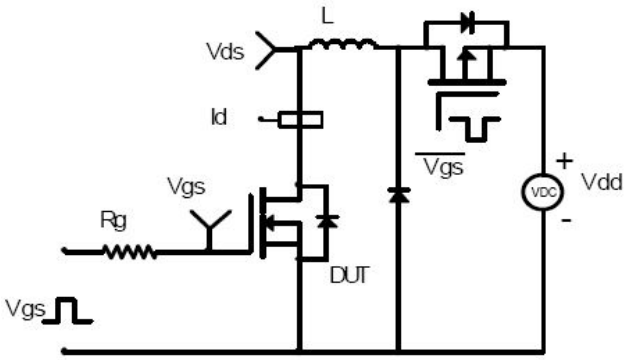
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	-60	—	—	V	V_{GS} = 0V, I_D =- 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	12	25	mΩ	V_{GS}=-10V, I_D =- 23A
		—	22	—		T_J = 125℃
$V_{GS(th)}$	Gate threshold voltage	-2	-2.6	-4	V	V_{DS} = V_{GS}, I_D =-250uA
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	V_{DS} =-60V,V_{GS} = 0V
		—	—	-50		T_J = 125°C
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =20V
	Gate-to-Source reverse leakage	—	—	-100		V_{GS} = -20V
Qg	Total gate charge	—	—	170	nC	I_D=-30A, V_{DD}=-40V, V_{GS}=-10V
Qgs	Gate-to-Source charge	—	—	30		
Qgd	Gate-to-Drain("Miller") charge	—	—	70		
td(on)	Turn-on delay time	—	15.2	—	ns	V_{DD}=-30V,I_D=-20A, R_L=1.50Ω,R_G=3.00Ω, V_{GS}=-10V
tr	Rise time	—	23.7	—		
td(off)	Turn-Off delay time	—	53.3	—		
tf	Fall time	—	12.7	—		
Ciss	Input capacitance	—	7456	—	pF	V_{DS}=-25V, V_{GS}=0V, f=1MHZ
Coss	Output capacitance	—	376	—		
Crss	Reverse transfer capacitance	—	293	—		

Source-Drain Ratings and Characteristics

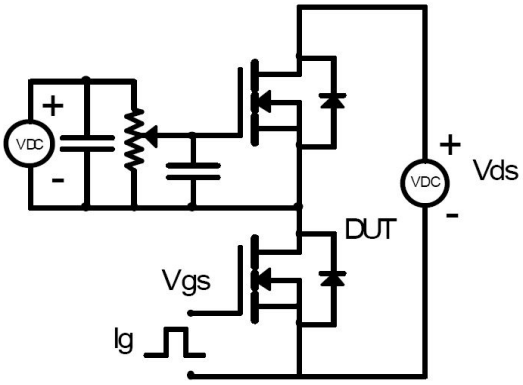
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Maximum Body-Diode Continuous Current	—	-60	—	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Maximum Body-Diode Pulse Current	—	-240	—	A	
V_{SD}	Diode Forward Voltage	—	-0.74	-1.2	V	T_J=25℃,I_S=-10A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	38.2	—	nS	T_J = 25℃, I_F =-20A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	62.5	—	nC	

Test circuits and Wave forms

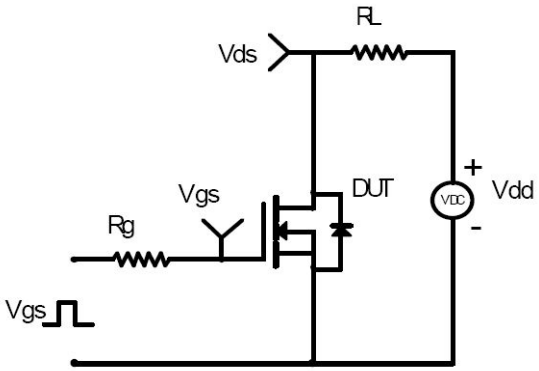
EAS Test Circuit:



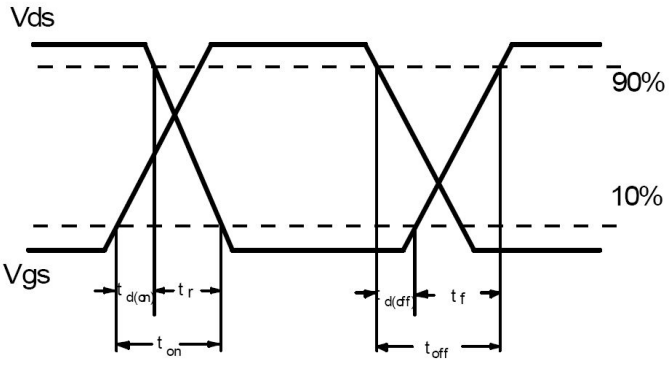
Gate charge test circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

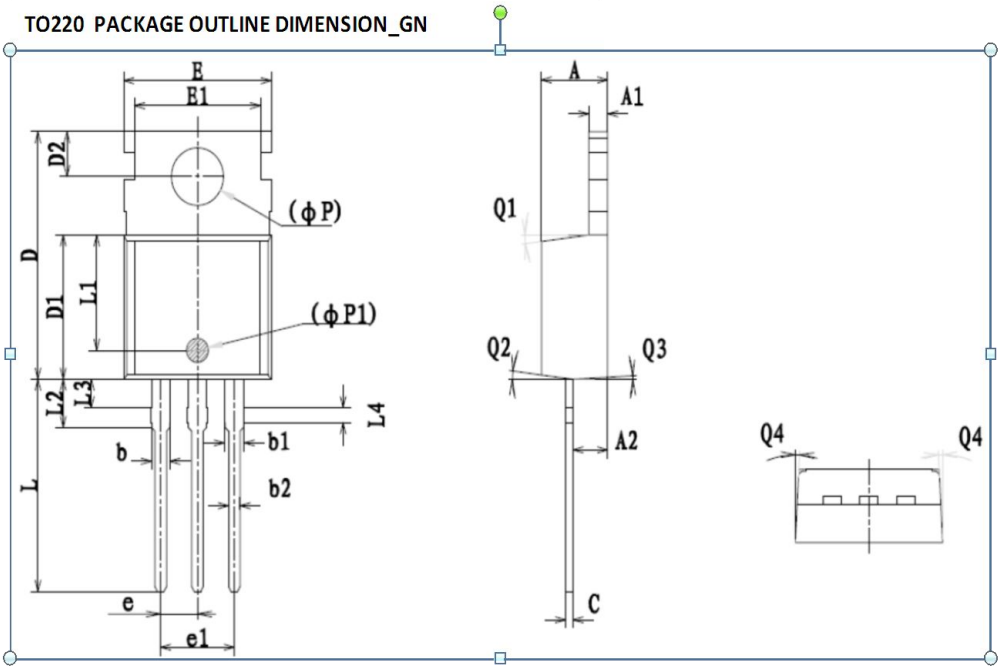
①Calculated continuous current based on maximum allowable junction temperature.

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

③The power dissipation 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

Mechanical Data：



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.400	4.550	4.700	0.173	0.179	0.185
A1	1.270	1.300	1.330	0.050	0.051	0.052
A2	2.240	2.340	2.440	0.088	0.092	0.096
b	–	1.270	–	-	0.050	-
b1	1.270	1.370	1.470	0.050	0.054	0.058
b2	0.750	0.800	0.850	0.030	0.031	0.033
C	0.480	0.500	0.520	0.019	0.020	0.021
D	15.100	15.400	15.700	0.594	0.606	0.618
D1	8.800	8.900	9.000	0.346	0.350	0.354
D2	2.730	2.800	2.870	0.107	0.110	0.113
E	9.900	10.000	10.100	0.390	0.394	0.398
E1	-	8.700	-	-	0.343	-
ΦP	3.570	3.600	3.630	0.141	0.142	0.143
ΦP1	1.400	1.500	1.600	0.055	0.059	0.063
e		2.54BSC			0.1BSC	
e1		5.08BSC			0.2BSC	
L	13.150	13.360	13.570	0.518	0.526	0.534
L1		7.35REF			0.29REF	
L2	2.900	3.000	3.100	0.114	0.118	0.122
L3	1.650	1.750	1.850	0.065	0.069	0.073
L4	0.900	1.000	1.100	0.035	0.039	0.043
Q1	5^0	7^0	9^0	5^0	7^0	9^0
Q2	5^0	7^0	9^0	5^0	7^0	9^0
Q3	5^0	7^0	9^0	5^0	7^0	9^0
Q4	1^0	3^0	5^0	1^0	3^0	5^0

Ordering and Marking Information

Device Marking: SSF6025

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

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℃ to 150℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=150℃ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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