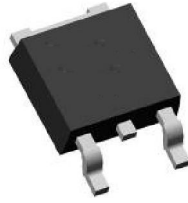


Main Product Characteristics

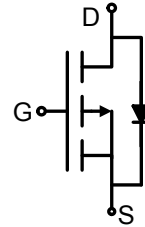
V_{DSS}	-60V
$R_{DS(on)}$	12m Ω (typ.)
I_D	-60A



TO-252



Marking and Pin Assignment



Schematic diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- High power and current handling capability
- Fully avalanche rated



Description

The SSFD6025 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
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ^①	-60	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ^①	-50	
I_{DM}	Pulsed Drain Current ^②	-240	
I_{SM}	Pulsed Source Current (Body Diode) ^②	-240	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ^③	166	W
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.3\text{mH}$	300	mJ
I_{AS}	Single Pulse Avalanche Current @ $L=0.3\text{mH}$	44	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	$^\circ\text{C}$

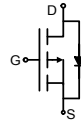
Thermal Resistance

Symbol	Characteristics	Value	Unit
$R_{\theta JA}$	Junction-to-Ambient ($t \leq 10s$) ④	62	$^{\circ}C/W$
$R_{\theta JC}$	Maximum Junction-to-Case⑤	0.75	$^{\circ}C/W$

Electrical Characteristics @ $T_A=25^{\circ}C$ unless otherwise specified

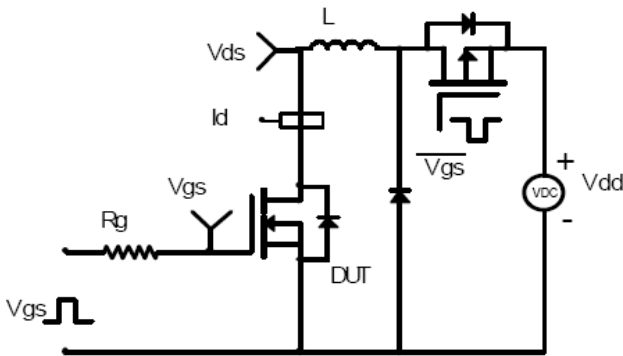
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	-60	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	12	25	m Ω	$V_{GS} = -10V,$ $I_D = -23A$
		—	22	—		$T_J = 125^{\circ}C$
$V_{GS(th)}$	Gate threshold voltage	-2	-2.6	-4	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	$V_{DS} = -60V, V_{GS} = 0V$
		—	—	-50		$T_J = 125^{\circ}C$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source reverse leakage	—	—	-100		$V_{GS} = -20V$
Q_g	Total gate charge	—	—	170	nC	$I_D = -30A,$ $V_{DD} = -40V,$ $V_{GS} = -10V$
Q_{gs}	Gate-to-Source charge	—	—	30		
Q_{gd}	Gate-to-Drain("Miller") charge	—	—	70		
$t_{d(on)}$	Turn-on delay time	—	15.2	—	ns	$V_{DD} = -30V, I_D = -20A,$ $R_L = 1.50\Omega, R_G = 3.00\Omega,$ $V_{GS} = -10V$
t_r	Rise time	—	23.7	—		
$t_{d(off)}$	Turn-Off delay time	—	53.3	—		
t_f	Fall time	—	12.7	—		
C_{iss}	Input capacitance	—	7456	—	pF	$V_{DS} = -25V,$ $V_{GS} = 0V,$ $f = 1MHz$
C_{oss}	Output capacitance	—	376	—		
C_{rss}	Reverse transfer capacitance	—	293	—		

Source-Drain Ratings and Characteristics

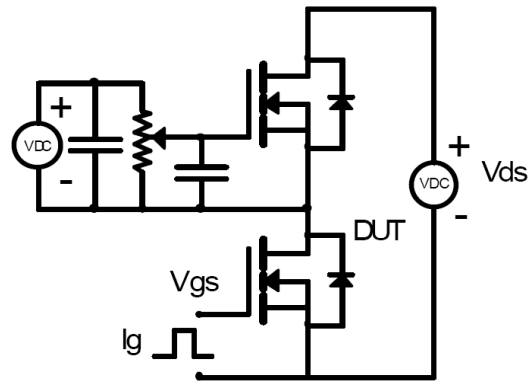
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Maximum Body-Diode Continuous Current	—	-60	—	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Maximum Body-Diode Pulse Current	—	-240	—	A	
V_{SD}	Diode Forward Voltage	—	-0.74	-1.2	V	$T_J = 25^{\circ}C, I_S = -10A, V_{GS} =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

Test circuits and Wave forms

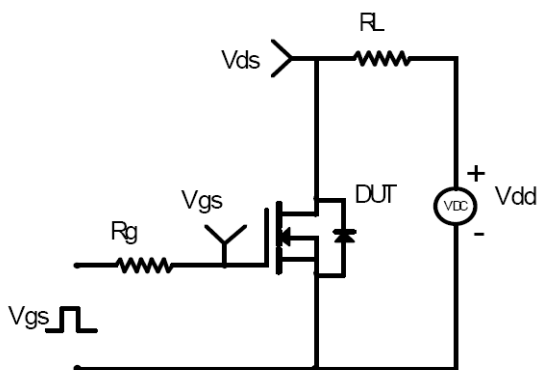
EAS Test Circuit



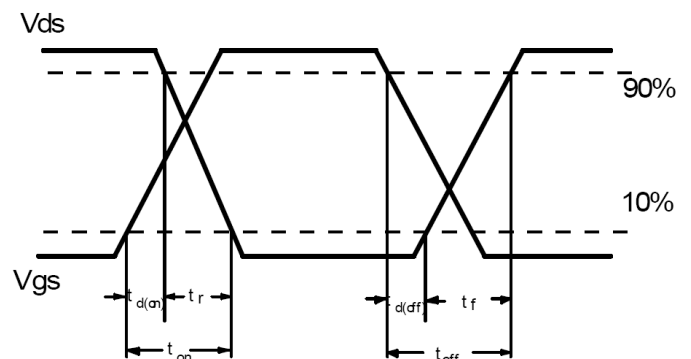
Gate Charge Test Circuit



Switching Time Test Circuit



Switching Waveforms

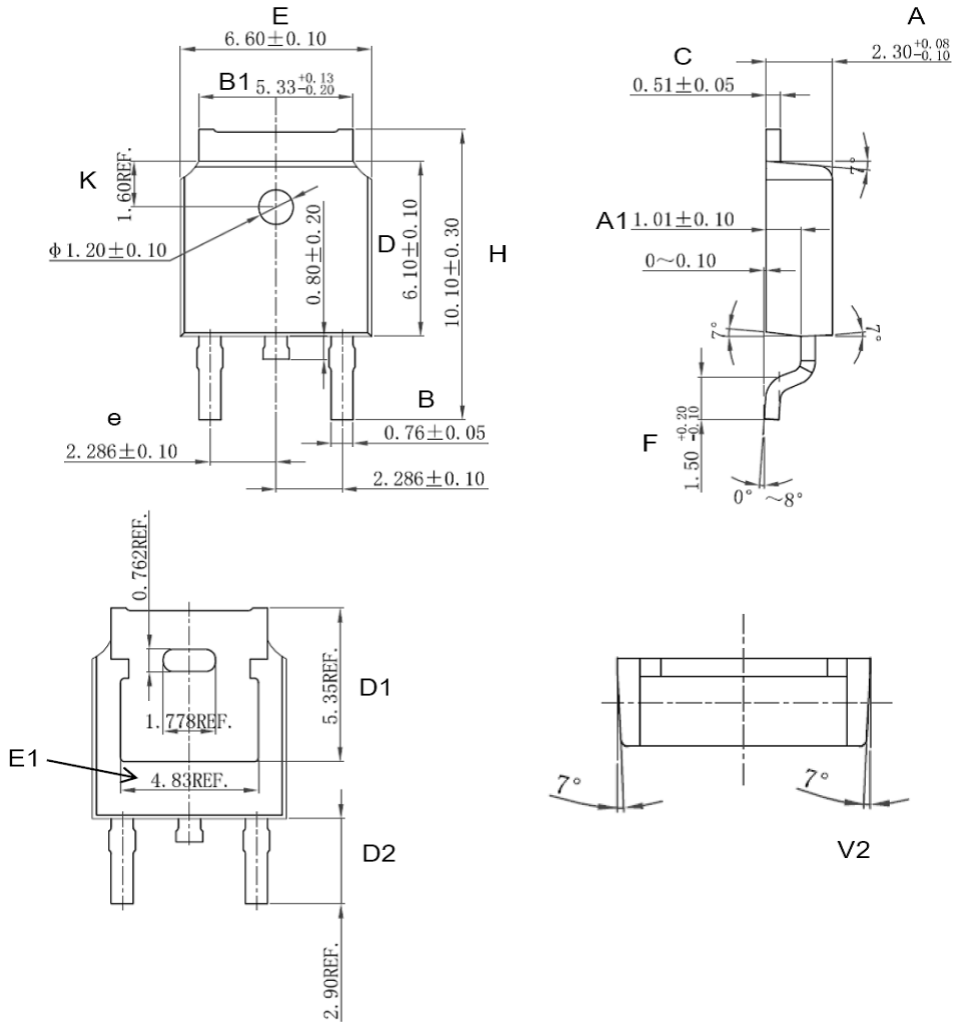


Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation P_D 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 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Mechanical Data

DPAK PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	2.300	2.380	0.087	0.091	0.094
A1	0.910	1.010	1.110	0.036	0.040	0.044
B	0.710	0.760	0.810	0.028	0.030	0.032
B1	5.130	5.330	5.460	0.202	0.210	0.215
C	0.460	0.510	0.560	0.018	0.020	0.022
D	6.000	6.100	6.200	0.236	0.240	0.244
D1	5.350 (REF)			0.211 (REF)		
D2	2.900 (REF)			0.114 (REF)		
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.83 (REF)			0.190 (REF)		
e	2.186	2.286	2.386	0.086	0.090	0.094
H	9.800	10.100	10.400	0.386	0.398	0.409
F	1.400	1.500	1.700	0.055	0.059	0.067
K	1.600 (REF)			0.063 (REF)		
V2	8° (REF)			8° (REF)		

Ordering and Marking Information

Device Marking: SSFD6025

Package (Available)
TO-252
Operating Temperature Range
C : -55 to 150°C

Devices per Unit

Option1:

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO-252	2500	2	5000	7	35000

Option2:

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO-252	2500	1	2500	10	25000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to 150°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)	$T_j=150^{\circ}\text{C}$ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices