

## FEATURES

$V_{DS} = -12V, I_D = -8A$

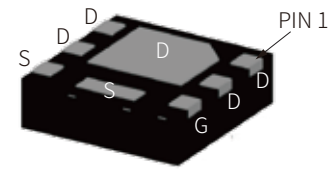
$R_{DS(ON)}$  (Typ.) = 23mΩ @  $V_{GS} = -4.5V$

$R_{DS(ON)}$  (Typ.) = 32mΩ @  $V_{GS} = -2.5V$

High power and current handling capability

Lead free product is acquired

Surface mount package



DFN2020-6L

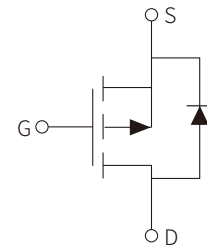
1208

Marking

## APPLICATION

PWM applications

Load switch



Schematic Symbol

## APPROVALS

**RoHS** Compliance with 2011/65/EU

**HF** Compliance with IEC61249-2-21:2003

## ABSOLUTE MAXIMUM RATINGS( $T_a = 25^\circ C$ )

Parameter	Symbol	Value	Unit	
Drain-source voltage	$V_{DS}$	-12	V	
Gate-source voltage	$V_{GS}$	±12	V	
Drain current-continuous	$I_D$	$T_c = 25^\circ C$	-8 <sup>a</sup>	A
		$T_c = 70^\circ C$	-8 <sup>a</sup>	A
		$T_A = 25^\circ C$	-8 <sup>a,b,c</sup>	A
		$T_A = 70^\circ C$	-6 <sup>b,c</sup>	A
Drain-source Diode forward current	$I_S$	$T_c = 25^\circ C$	-8 <sup>a</sup>	A
		$T_A = 25^\circ C$	-2.9 <sup>b,c</sup>	A
Drain current-continuous	$P_D$	$T_c = 25^\circ C$	18	W
		$T_c = 70^\circ C$	12	W
		$T_A = 25^\circ C$	3.5 <sup>b,c</sup>	W
		$T_A = 70^\circ C$	2.2 <sup>b,c</sup>	W
Operating junction Temperature range	$T_J$	-55 to 150	°C	
Maximum junction-to-ambient <sup>b,d</sup> $t \leq 5s$	$R_{thJA}$	36	°C/W	
Maximum junction-to-case (drain) Steady state	$R_{thJC}$	6.5	°C/W	

a. Package limited; b. Surface mounted on 1" x 1" FR4 board  
c.  $t = 5s$ ; d. Maximum under steady state conditions is 80 °C/W

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

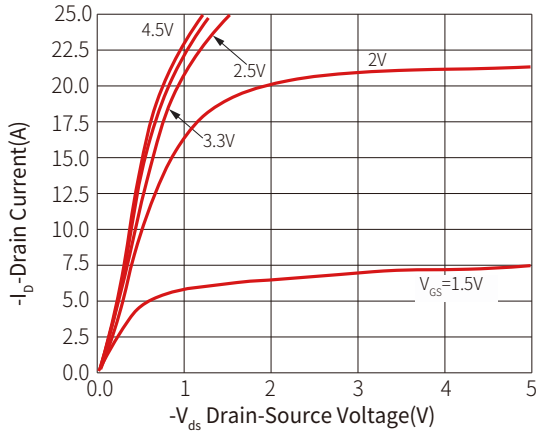
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-12	-16.5		V
Gate-body leakage	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-12V, V_{GS}=0V$			-1	$\mu A$
<b>ON Characteristics</b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.40	-0.65	-1	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-8A$		23	35	m $\Omega$
		$V_{GS}=-2.5V, I_D=-6A$		32	45	m $\Omega$
Forward transconductance	$g_{fs}$	$V_{GS}=-10V, I_D=-6.7A$		30		S
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=-6V,$ $f=1.0MHz$		1153		pF
Output capacitance	$C_{oss}$			233		pF
Reverse transfer capacitance	$C_{rss}$			211		pF
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-4A$		15		nC
Gate-Source Charge	$Q_{gs}$			1.62		nC
Gate-Drain Charge	$Q_{gd}$			5.33		nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=-6V, V_{GEN}=-4.5V$ $I_D=-4A, R_L=1.2\Omega$ $R_{GEN}=1\Omega$		13		ns
Turn-on Rise Time	$t_r$			36		ns
Turn-Off Delay Time	$t_{d(off)}$			32		ns
Turn-Off Fall Time	$t_f$			12		ns
<b>Drain Source Body Diode Characteristics</b>						
Source Drain Diode Forward Voltage	$V_{SD}$	$I_S=-1.25A, V_{GS}=0V$		-0.81	-1.2	V

**Notes:**

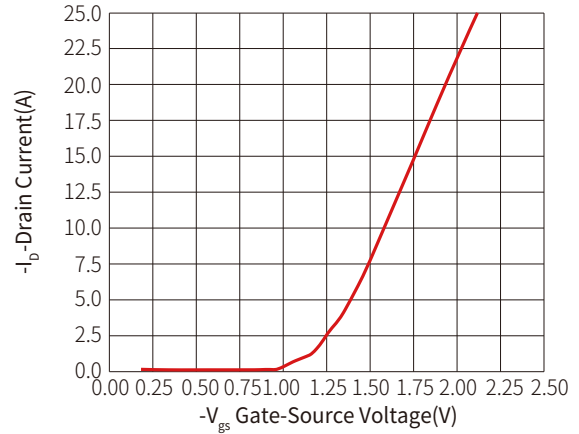
- 1.Pulse Test:Pulse Width $\leq 300\mu s$ ,Duty Cycle $\leq 2\%$ .
- 2.Dynamic parameters cannot be verified
- 3.Surface Mounted on FR4 Board,  $t\leq 10$  sec

# PARAMETER CHARACTERISTIC CURVE

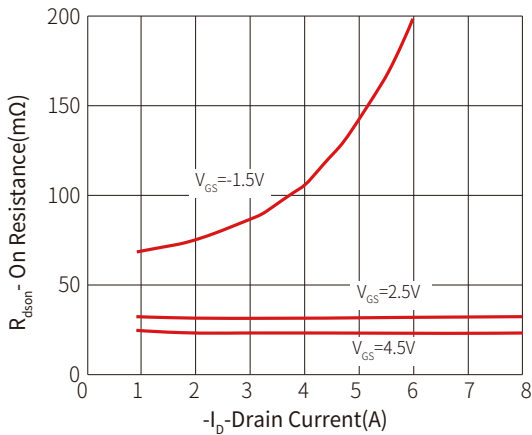
**Figure 1: Output Characteristics**



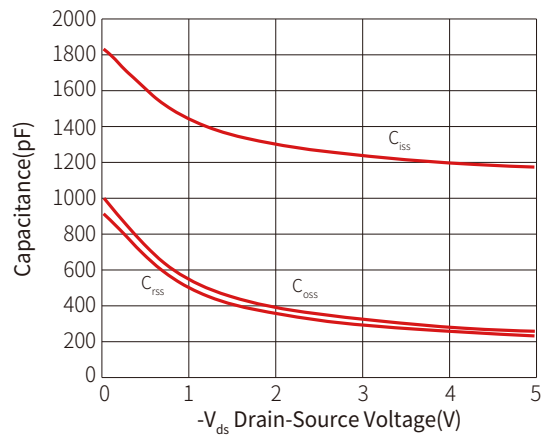
**Figure 2: Transfer Characteristics**



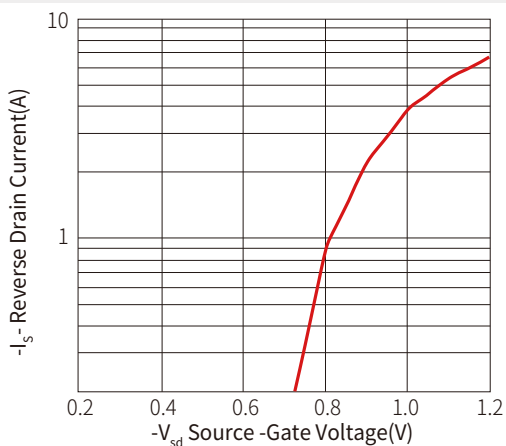
**Figure 3: R<sub>ds(on)</sub>-Drain current**



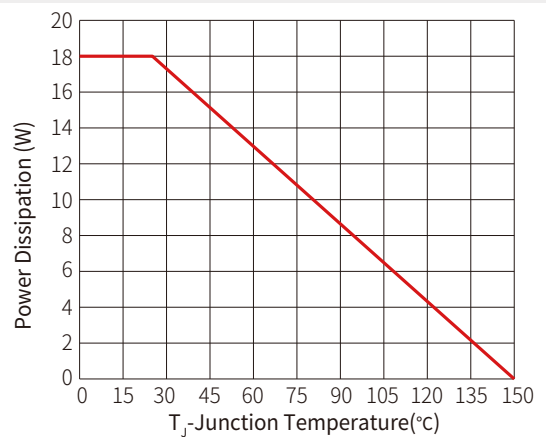
**Figure 4: Capacitance vs V<sub>ds</sub>**



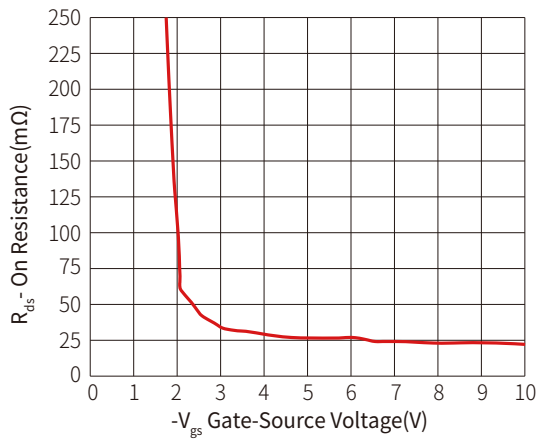
**Figure 5: Source-Drain Diode Forward**



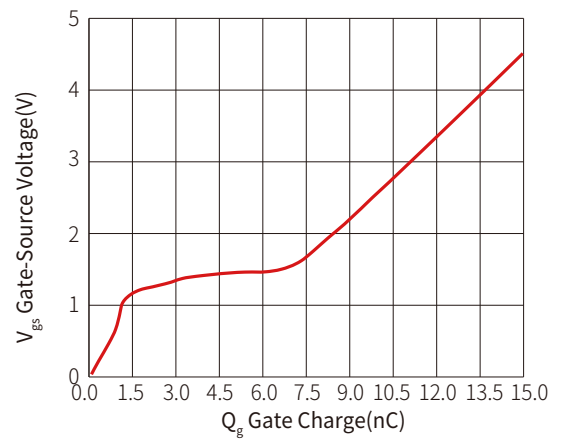
**Figure 6: Power De-rating**



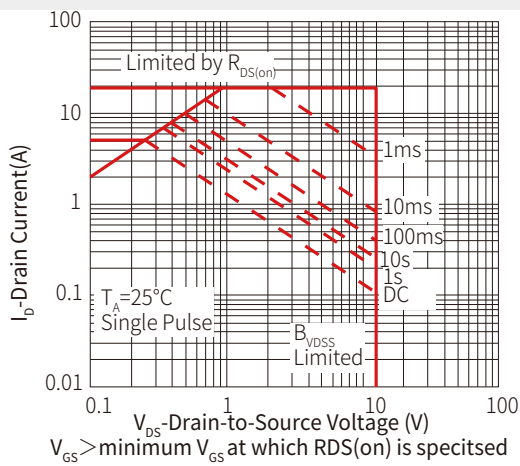
**Figure 7: R<sub>ds(on)</sub>-Gate Drain voltage**



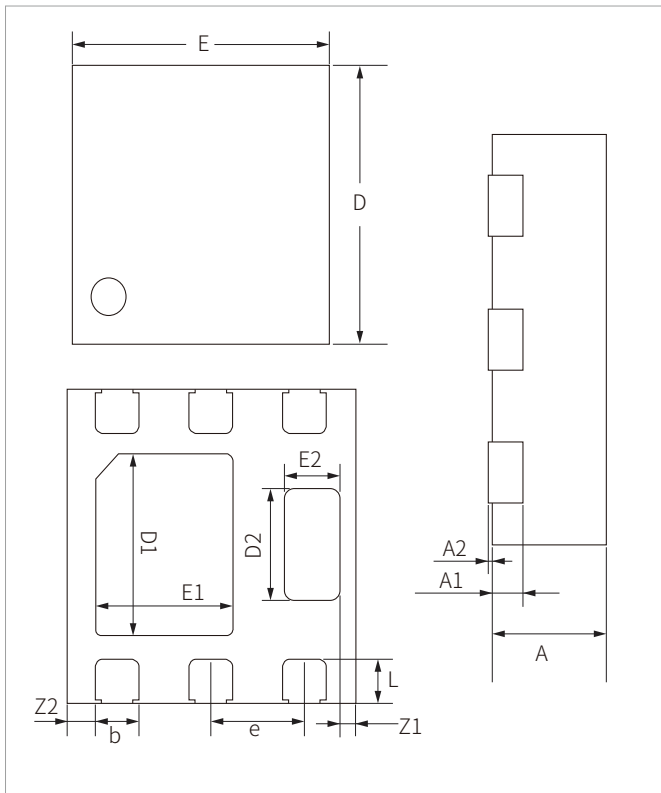
**Figure 8: Gate Charge**



**Figure 9: Safe Operation Area**



## DFN2020-6L PACKAGE INFORMATION



Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D	1.95	2.00	2.05	0.077	0.079	0.081
E	1.95	2.00	2.05	0.077	0.079	0.081
D1	1.10	1.15	1.20	0.043	0.045	0.047
E1	0.90	0.95	1.00	0.035	0.037	0.039
D2	0.65	0.70	0.75	0.026	0.028	0.030
E2	0.33	0.38	0.43	0.013	0.015	0.017
L	0.23	0.275	0.33	0.009	0.011	0.013
b	0.25	0.30	0.35	0.010	0.012	0.014
e	0.65BSC			0.026BSC		
A	0.40	0.50	0.60	0.016	0.020	0.024
A1	0.150REF			0.006REF		
A2	0.00	-	0.05	0.00	-	0.002
Z1	0.06	0.11	0.16	0.002	0.004	0.006
Z2	0.15	0.20	0.25	0.006	0.008	0.010

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM1208	DFN2020-6L	3000PCS	7"

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