

Dual P-Channel -20V MOSFET

● FEATURES

RDS(ON) 65mΩ@VGS=-4.5V
 RDS(ON) 75mΩ@VGS=-2.5V
 RDS(ON) 80mΩ@VGS=-1.8V TYP

high density cell design for extremely low RDS(ON)
 Exceptional on-resistance and maximum DC current capability

● GENERAL DESCRIPTION

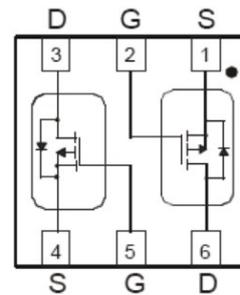
The FS2160 combines advanced trench MOSFET technology with a low resistance package to provide extremely low R_{DS(ON)}. This device is ideal for load switch and battery protection applications.

● PIN CONFIGURATION

DFN2020B-6



BOTTOM VIEW



TOP VIEW
Internal Schematic

Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	-20	V
Gate-Source Voltage	V _{GS}	±10	V
Drain Current-Continuous	I _D	-3.8	A
Drain Current -Pulsed (Note)	I _{DM}	-13	A
Maximum Power Dissipation	P _D	18	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 To 150	°C

Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	R _{qJC}	6.9	°C/W

NOTE:

- A: Surface mounted on FR4 Board using 1 in sq pad size, 1oz Cu.
- B: Surface mounted on FR4 board using the minimum recommended pad size, 1oz Cu.
- C: Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%
- D: Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.

FS2160

● Electrical Characteristics (T_J=25°C unless otherwise noted)

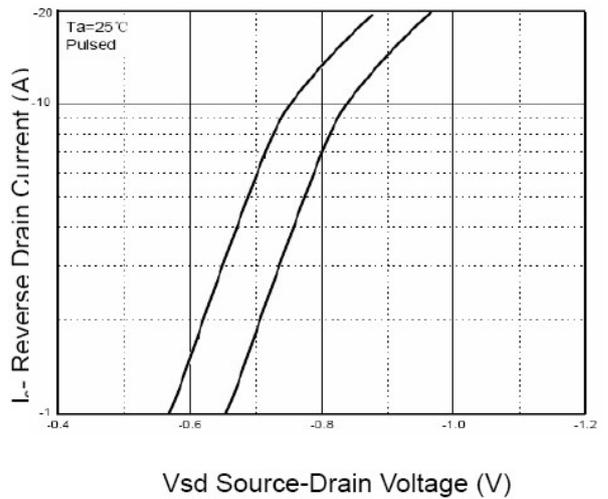
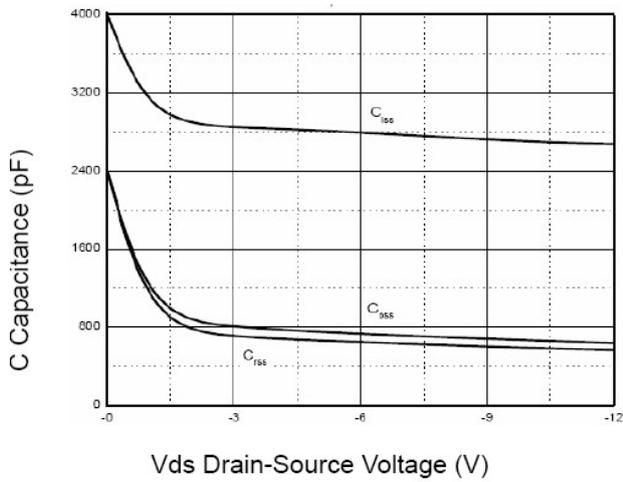
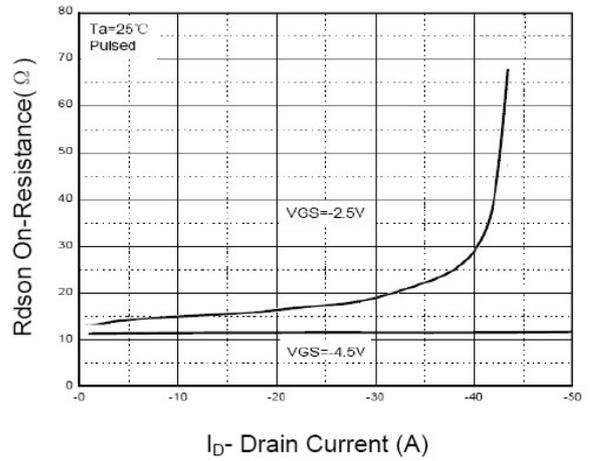
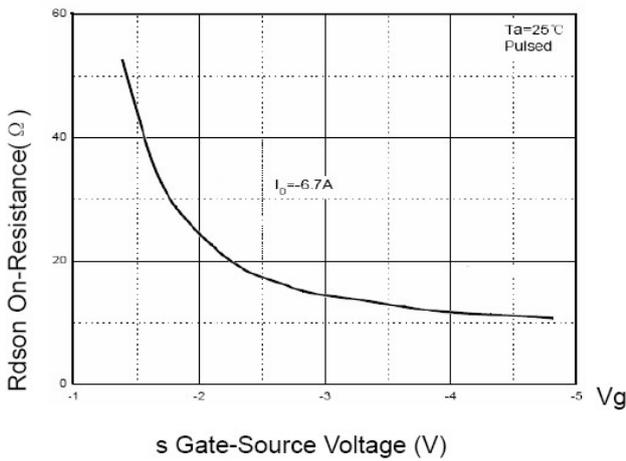
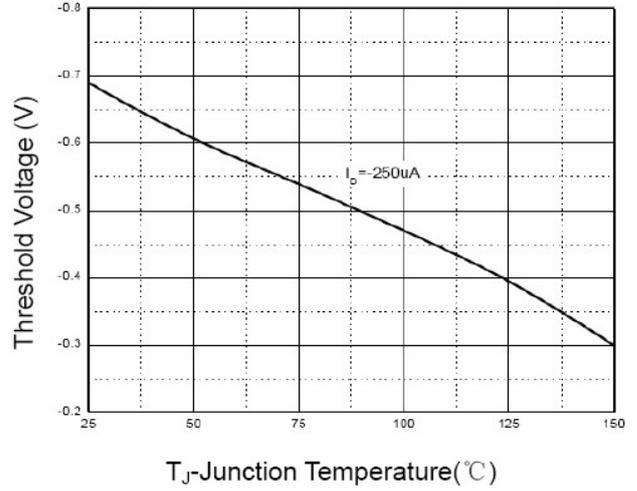
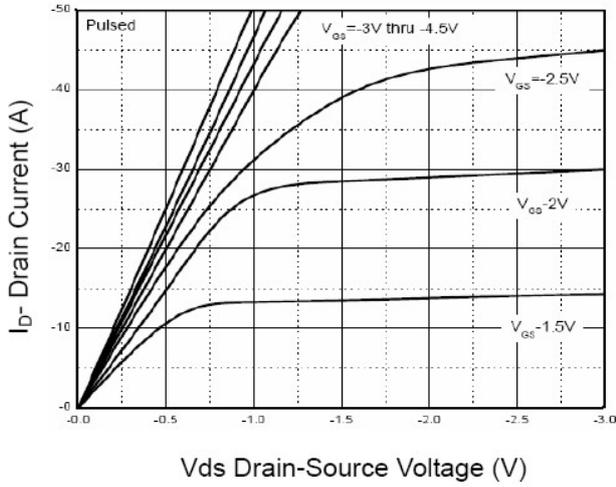
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR) DSS}	V _{GS} =0V, I _D =-250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-8V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-6.6A	-	50	65	mΩ
		V _{GS} =-2.5V, I _D =-3.5A	-	60	75	mΩ
		V _{GS} =-1.8V, I _D =-2.0A	-	80	95	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-6.7A	20	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, F=1.0MHz	-	1100	-	PF
Output Capacitance	C _{oss}		-	270	-	PF
Reverse Transfer Capacitance	C _{rss}		-	230	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-10V, I _D =-1A V _{GS} =-4.5V, R _{GEN} =10Ω	-	7	-	nS
Turn-on Rise Time	t _r		-	20	-	nS
Turn-Off Delay Time	t _{d(off)}		-	17	-	nS
Turn-Off Fall Time	t _f		-	8	-	nS
Total Gate Charge	Q _g	V _{DS} =-6V, I _D =-10A, V _{GS} =-4.5V	-	24	32	nC
Gate-Source Charge	Q _{gs}		-	3	-	nC
Gate-Drain Charge	Q _{gd}		-	6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note 3)	V _{SD}	V _{GS} =0V, I _S =-1A	-	-	-1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-1.6	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

FS2160

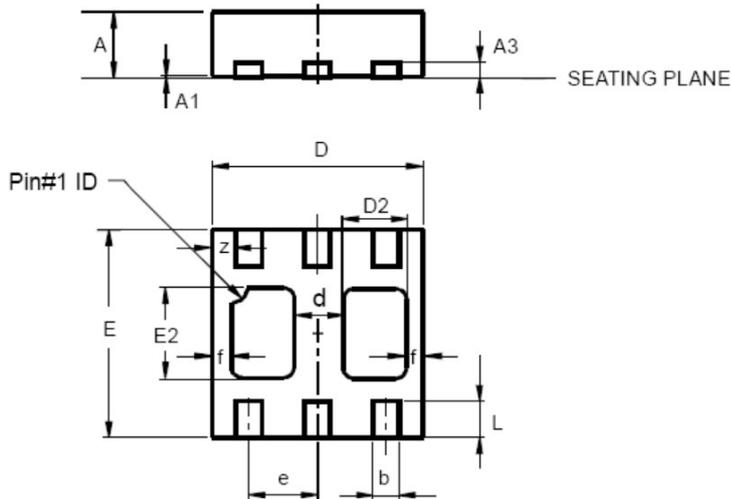
● Typical Performance Characteristics (T = 25°C)



FS2160

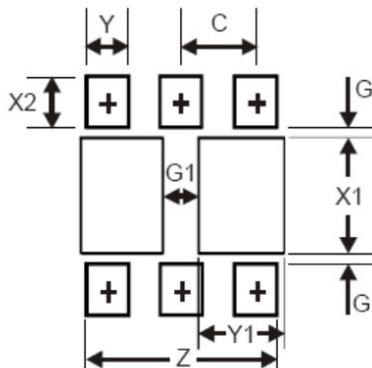
● DFN2020B-6L Package Information

Package Outline Dimensions



DFN2020B-6			
Dim	Min	Max	Typ
A	0.545	0.605	0.575
A1	0	0.05	0.02
A3	—	—	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
d	—	—	0.45
D2	0.50	0.70	0.60
e	—	—	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
f	—	—	0.15
L	0.25	0.35	0.30
z	—	—	0.225
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.67
G	0.20
G1	0.40
X1	1.0
X2	0.45
Y	0.37
Y1	0.70
C	0.65

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.