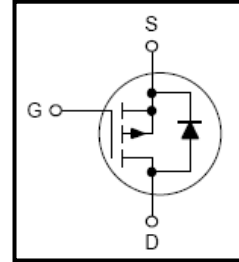
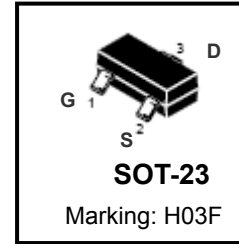


**-20V, P-Channel MOSFET**
**Features**

- -3.2A, -20V,  $R_{DS(on)}$ (Max 130m $\Omega$ )@ $V_{GS}=-4.5V$
- -1.8 V Rated for Low Voltage Gate Drive
- SOT-23 Surface Mount for Small Footprint
- Single Pulse Avalanche Energy Rated


**General Description**

This Power MOSFET is produced using Winsemi's advanced MOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. This devices is specially well suited for Load/Power Management for Portables and Computing, Charging Circuits and Battery Protection


**Absolute Maximum Ratings**

Symbol	Parameter		Value	Units	
$V_{DSS}$	Drain Source Voltage		-20	V	
$I_D$	Continuous Drain Current(Note 1)	Steady State	$T_c=25^\circ C$	-2.8	A
			$T_c=85^\circ C$	-1.7	
		$t \leq 10s$	$T_c=25^\circ C$	-3.2	
$P_D$	Total Power Dissipation(Note 1)	Steady State $t \leq 10s$	$T_c=25^\circ C$	0.80	W
				1.25	
$I_D$	Continuous Drain Current(Note 2)	Steady State	$T_c=25^\circ C$	-1.8	A
			$T_c=85^\circ C$	-1.3	
			$T_c=25^\circ C$	0.42	
$P_D$	Total Power Dissipation(Note 2)		$T_c=25^\circ C$	0.42	W
$I_{DM}$	Drain Current Pulsed	$t=10s$		-7.5	A
$V_{GS}$	Gate to Source Voltage		$\pm 8$	V	
ESD	ESD Capability (Note 3)	$C=100pF, R_S = 1500\Omega$	225	V	
$T_J, T_{stg}$	Junction and Storage Temperature		-55~150	$^\circ C$	
$T_L$	Maximum lead Temperature for soldering purposes		260	$^\circ C$	

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{QJA}$	Thermal Resistance, Junction-to-Ambient(Note 1)	-	-	170	$^\circ C/W$
$R_{QJA}$	Thermal Resistance, Junction-to-Ambient(Note 1)			110	$^\circ C/W$
$R_{QJA}$	Thermal Resistance, Junction-to-Ambient(Note 2)			300	$^\circ C/W$

Note 1: Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)

Note 2: Surface-mounted on FR4 board using the minimum recommended pad size.

Note 3: ESD Rating Information: HBM Class 0

**Electrical Characteristics (Tc = 25°C)**

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current(Note 4)	I <sub>GSS</sub>	V <sub>GS</sub> = ±8 V, V <sub>DS</sub> = 0 V	-	-	±100	nA
Drain cut-off current(Note 4)	I <sub>DSS</sub>	V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V	-	-	-1.0	μA
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = -250 μA, V <sub>GS</sub> = 0 V	-20	-	-	V
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>DS</sub> , I <sub>D</sub> = -250 μA	-0.40	-	-1.5	V
Drain-source ON resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -2.8 A	-	95	130	mΩ
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -2.0 A		122	150	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = -5.0 V, I <sub>D</sub> = -2.8 A	-	6.5	-	S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -6 V,	-	477	-	pF
Reverse transfer capacitance	C <sub>rss</sub>	V <sub>GS</sub> = 0 V,	-	80	-	
Output capacitance	C <sub>oss</sub>	f = 1 MHz	-	127	-	
Switching time (Note 5)	Turn-on Delay time	td(on)	V <sub>GS</sub> = -4.5 V,	-	5	ns
	Turn-on Rise time	tr	V <sub>DS</sub> = -6 V,	-	19	
	Turn-off Delay time	td(off)	I <sub>D</sub> = -1.0 A,	-	95	
	Turn-off Fall time	tf	R <sub>G</sub> = 6.0 Ω, RL=6Ω,	-	65	
Total gate charge	Qg	V <sub>GS</sub> = -4.5 V,	-	5.4	8.5	nC
Gate-source charge	Qgs	V <sub>DS</sub> = -10 V,	-	0.8	-	
Gate-drain ("miller") Charge	Qgd	I <sub>D</sub> = -2.8 A	-	1.1	-	

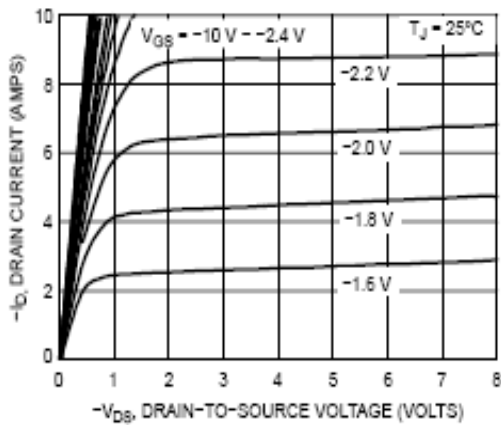
**Source-Drain Ratings and Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I <sub>DR</sub>	-	-	-	-1.6	A
Pulse drain reverse current	I <sub>DRP</sub>	-	-	-	-7.5	A
Forward voltage (diode)	V <sub>DSF</sub>	I <sub>DR</sub> = -1.6A, V <sub>GS</sub> = 0 V	-	-0.82	-1.2	V

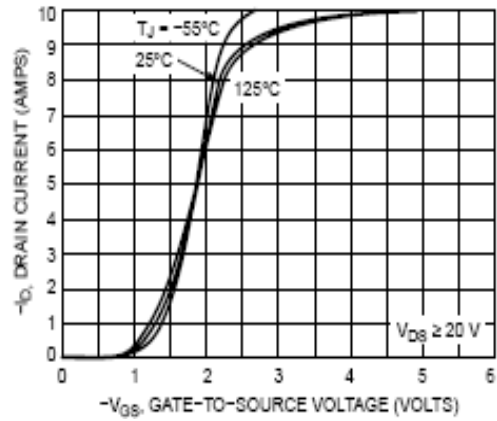
Note 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle 3 2%.

Note 5: Switching characteristics are independent of operating junction temperature.

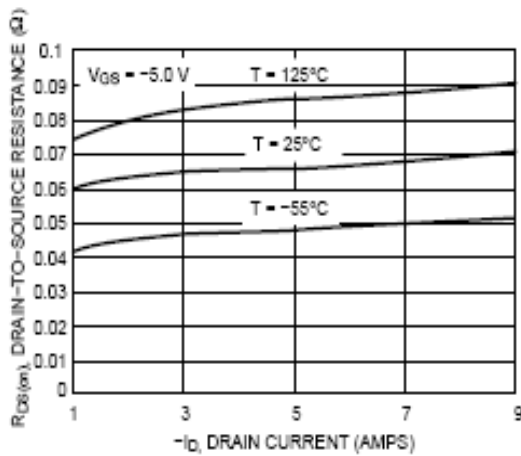
This transistor is an electrostatic sensitive device  
Please handle with caution



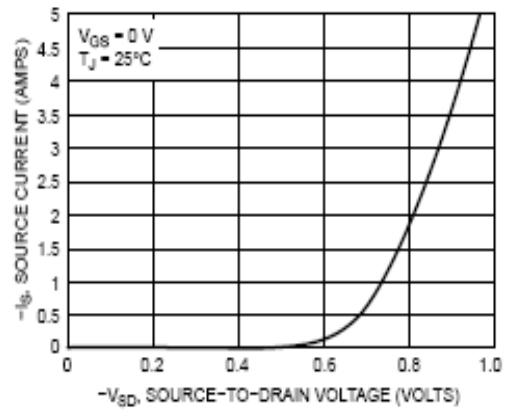
**Fig. 1 On-State Characteristics**



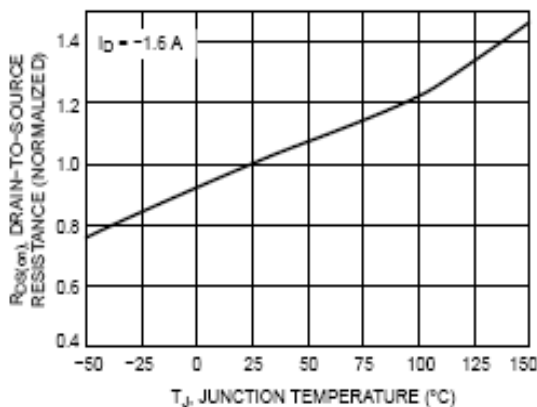
**Fig.2 Transfer Current Characteristics**



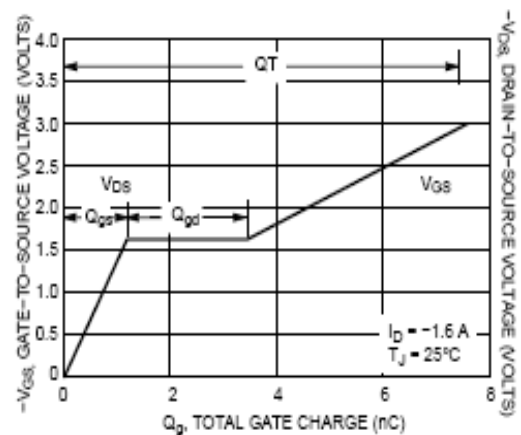
**Fig.3 On-Resistance vs. Drain Current and Temperature**



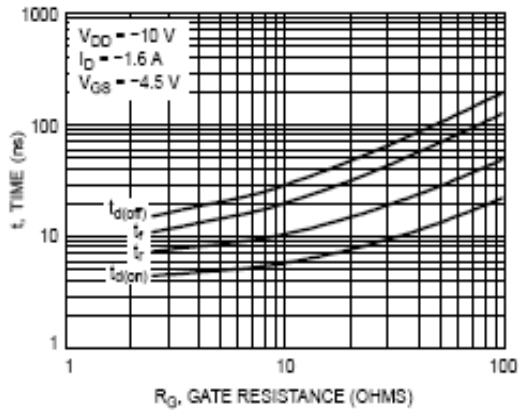
**Fig.4 Diode Forward Voltage vs. Current**



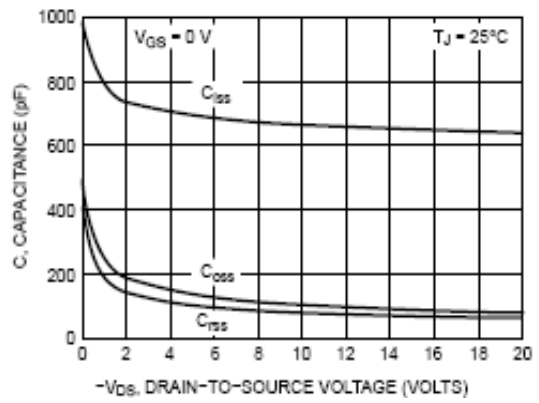
**Fig.5 On-Resistance Variation vs Junction Temperature**



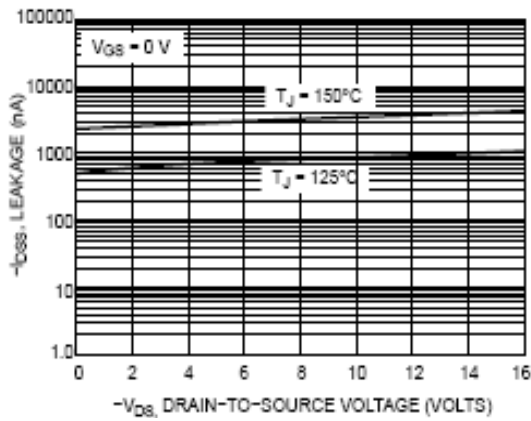
**Fig.6 Gate Charge Characteristics**



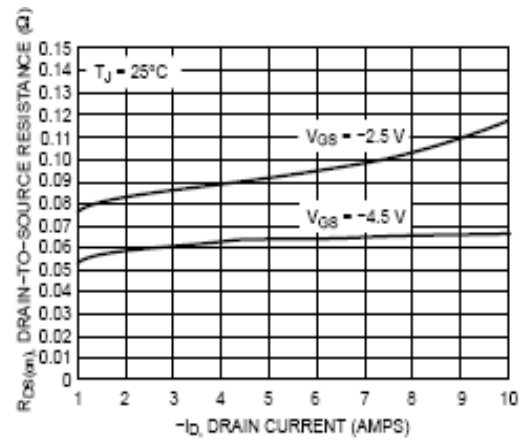
**Fig.7 Resistive Switching Time Variation vs. Gate Resistance**



**Fig.8 Maximum Drain Current vs Case Temperature**



**Fig.9 Drain-to-Source Leakage Current vs. Voltage**



**Fig.10 On-Resistance vs. Drain Current and Temperature**

**SOT-23 Package Dimension**

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.95		0.037	
A1	1.90		0.074	
B	2.60	3.00	0.102	0.118
C	1.40	1.70	0.055	0.067
D	2.80	3.10	0.110	0.122
E	1.00	1.30	0.039	0.051
F	0.00	0.10	0.000	0.004
G	0.35	0.50	0.014	0.020
H	0.10	0.20	0.004	0.008
I	0.30	0.60	0.012	0.024
J	50°	10°	50°	10°

