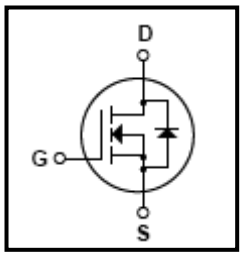
20V N-Channel MOSFET



Features

- 2.8A, 20V, $R_{DS(on)}$(Max 65mΩ)@V_{GS}=-4.5V
- 1.2 V Rated for Low Voltage Gate Drive
- SOT-23 Surface Mount for Small Footprint
- Single Pulse Avalanche Energy Rated

SOT-23

Marking: H04F

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 switching and PA switching.

Absolute Maximum Ratings(Tc=25℃ unless otherwise noted)

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		20	V
I_D	Continuous Drain Current		2.8	A
I_{DM}	Drain Current Pulsed		8	A
P_D	Total Power Dissipation(Note 1)		0.9	W
		Tc=75℃	0.6	
V_{GS}	Gate to Source Voltage		±8	V
ESD	ESD Capability (Note 3)	C=100pF,R_S = 1500Ω	225	V
T_J, T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Maximum lead Temperature for soldering purposes		260	℃

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	℃/W
R_{QJA}	Thermal Resistance, Junction-to-Ambient(Note 1)			110	℃/W
R_{QJA}	Thermal Resistance, Junction-to-Ambient(Note 2)			300	℃/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_{GSS}	V_{GS} = ±8 V, V_{DS} = 0 V	-	-	±100	nA
Drain cut−off current(Note 4)		I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V	-	-	-1	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	I_D = 250 μA, V_{GS} = 0 V	20	-	-	V
Gate threshold voltage		$V_{GS(th)}$	V_{DS} = V_{DS} I_D =-250 μA	0.65	-	1.2	V
Drain−source ON resistance		$R_{DS(ON)}$	VGS = 4.5 V, ID = 2.8 A	-	40	65	mΩ
			VGS = 2.5 V, ID = 2.0 A		50	95	
Forward Transconductance		gfs	VDS = 5.0 V, ID = 2.8 A	-	6.5	-	S
Input capacitance		C_{iss}	V_{DS} = 6 V,	-	428	-	pF
Reverse transfer capacitance		C_{rss}	V_{GS} = 0 V,	-	57	-	
Output capacitance		C_{oss}	f = 1 MHz	-	80	-	
Switching time (Note 5)	Turn-on Delay time	$t_{d(on)}$	V_{GS} = 4.5 V,	-	6.2	-	ns
	Turn−on Rise time	t_r	V_{DS} =6.0 V,	-	7.5	-	
	Turn-off Delay time	$t_{d(off)}$	I_D = 1.0 A,	-	16.0	-	
	Turn−off Fall time	t_f	R_G = 6 Ω, R_L=10 Ω	-	4.2	-	
Total gate charge		Qg	V_{GS} = 4.5V,	-	7.5	8.5	nC
Gate−source charge		Qgs	V_{DS} =6 V,	-	1.2	-	
Gate−drain (“miller”) Charge		Qgd	I_D = 2.8 A	-	2.2	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	2.8	A
Pulse drain reverse current	I_{DRP}	-	-	-	8.0	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 1.6A, V_{GS} = 0 V	-	0.76	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

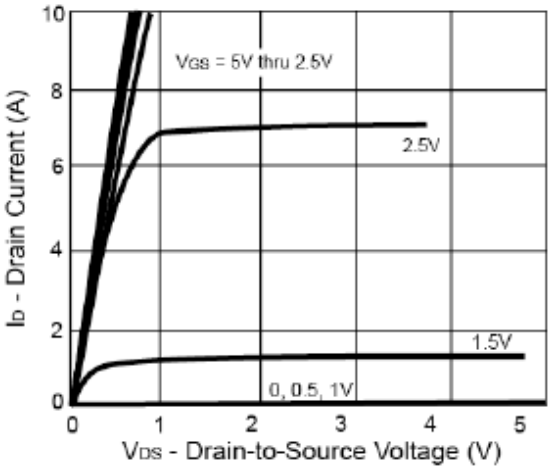


Fig. 1 On-State Characteristics

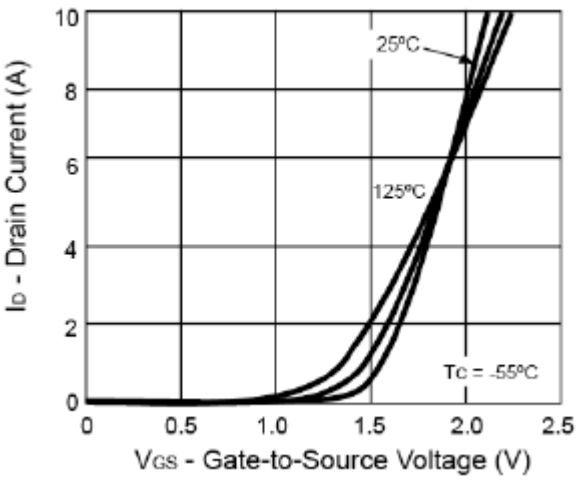


Fig.2 Transfer Current Characteristics

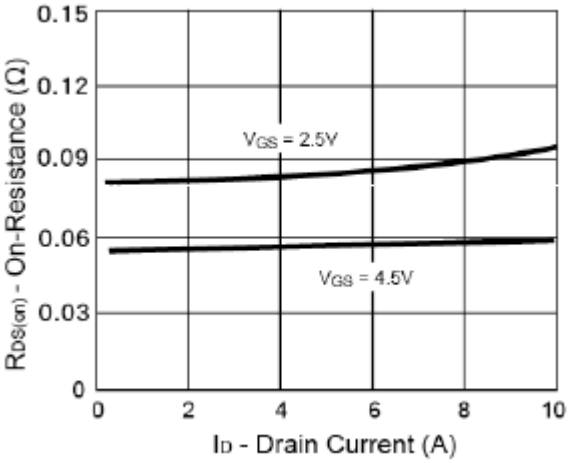


Fig.3 On−Resistance vs. Drain Current

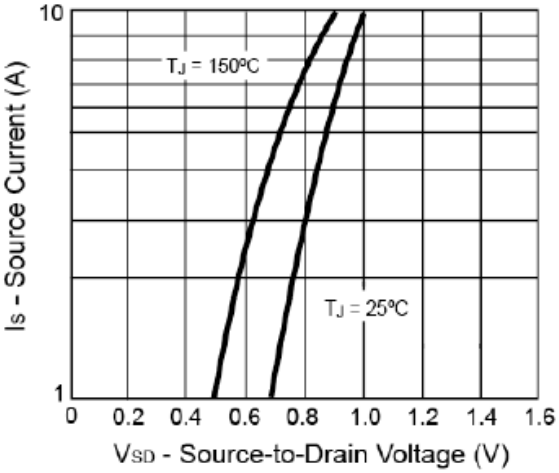


Fig.4 Diode Forward Voltage vs. Current

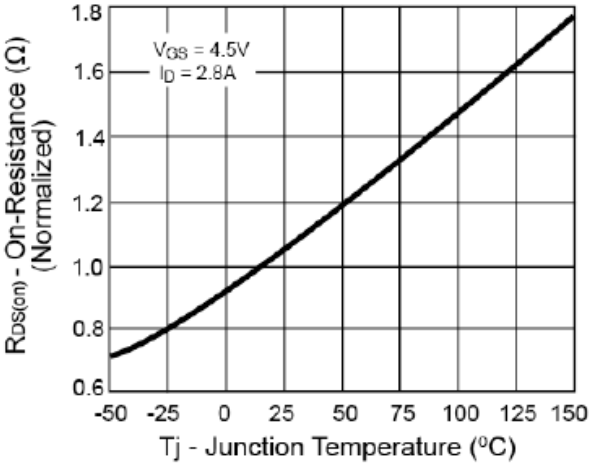


Fig.5 On-Resistance Variation vs Junction Temperature

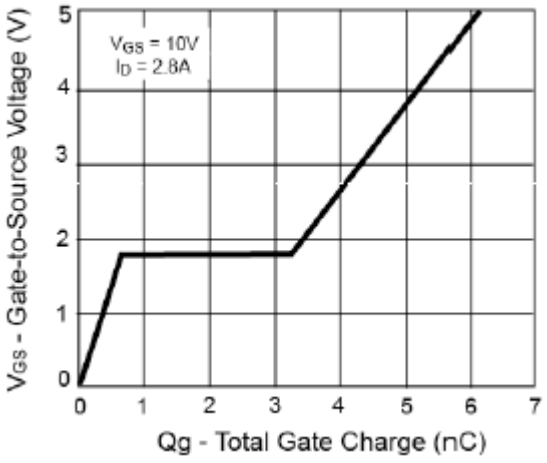


Fig.6 Gate Charge Characteristics

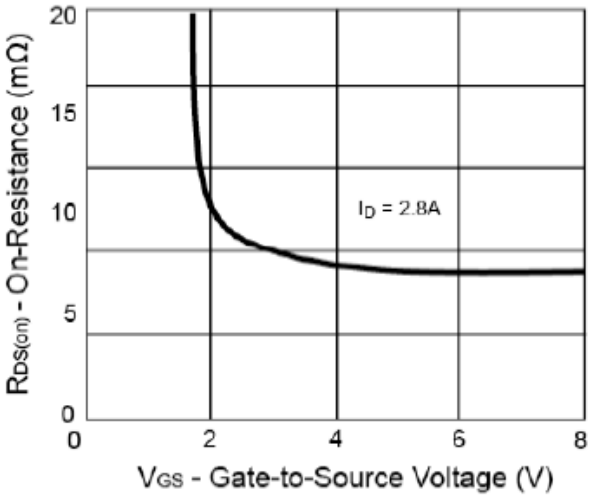


Fig.7 On−Resistance vs. Gate-Source Voltage

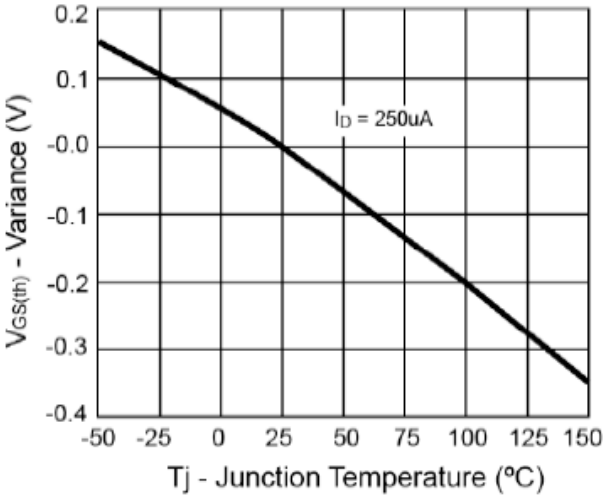


Fig.8 Threshold Voltage

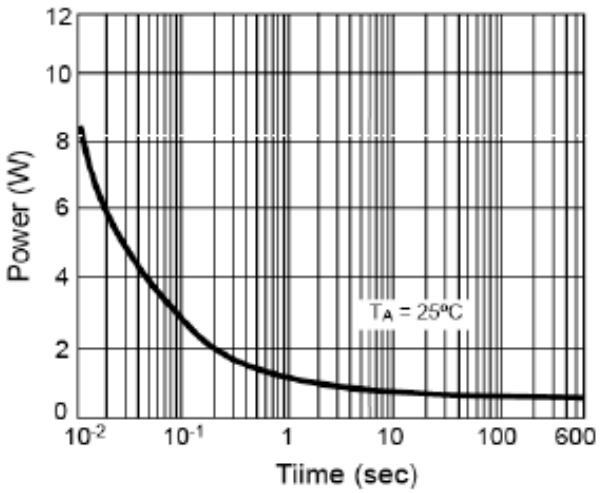


Fig.9 Single Pulse Power

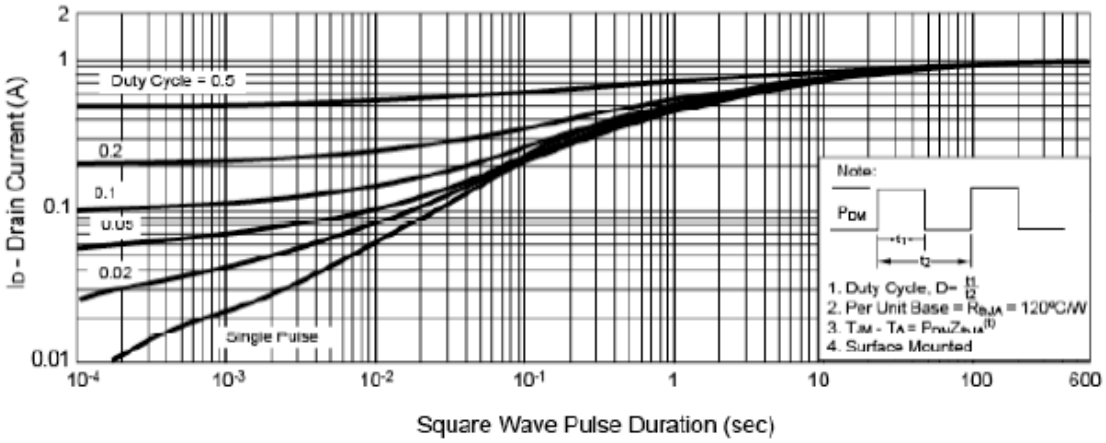


Fig.10 Drain Current and Temperature

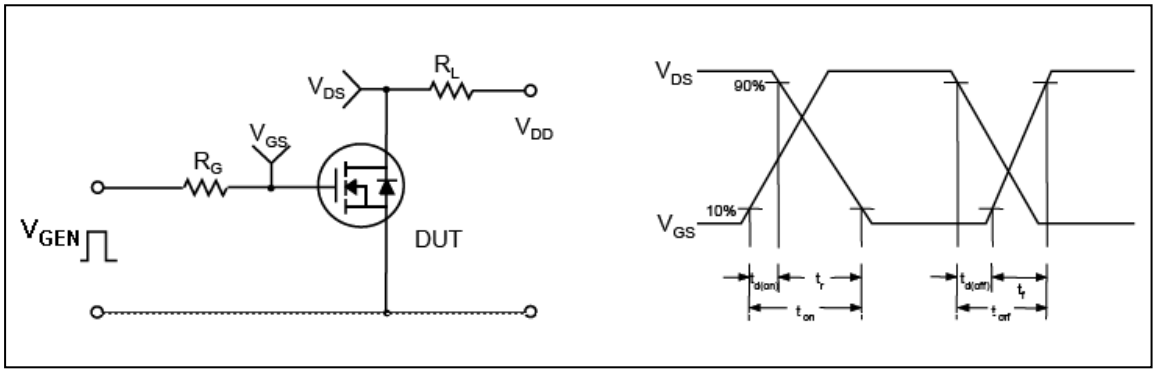


Fig.11 Resistive Switching Test & Waveforms

SOT-23 Package Dimension

DIM	MILLIMTERS		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°