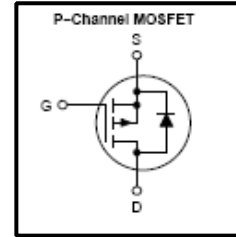


Trench Power MOSFET

-20 V, Single P-Channel, SOT-23

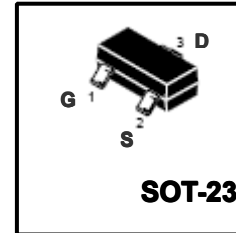
Features

- -3.2A, -20V, $R_{DS(on)}$ (Max 85m Ω)@ $V_{GS}=-4.5V$
- -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	$T_c=25^\circ C$	-2.4	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	$T_c=25^\circ C$	0.73	W
			$t \leq 10s$	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)			W	
I_{DM}	Drain Current Pulsed	$t=10s$	-7.5	A	
V_{GS}	Gate to Source Voltage		± 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 _{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	-0.40	-0.72	-1.5	V	
Drain-source ON resistance	R _{DS(ON)}	V _{GS} = -4.5 V, I _D = -1.6 A	-	70	85	mΩ	
		V _{GS} = -2.5 V, I _D = -1.3 A	-	90	120		
		V _{GS} = -1.8 V, I _D = -0.9 A	-	112	200		
Forward Transconductance	g _{fs}	V _{DS} = -5.0 V, I _D = -2.3 A	-	75	-	S	
Input capacitance	C _{iss}	V _{DS} = -10 V,	-	675	-	pF	
Reverse transfer capacitance	C _{rss}	V _{GS} = 0 V,	-	75	-		
Output capacitance	C _{oss}	f = 1 MHz	-	100	-		
Switching time (Note 5)	Rise time	tr	V _{GS} = -4.5 V,	-	12.6	-	ns
	Turn-on time	ton	V _{DS} = -10 V,	-	7.5	-	
	Fall time	tf	I _D = -1.6 A,	-	21.0	-	
	Turn-off time	toff	R _G = 6.0 Ω	-	30.2	-	
Total gate charge (gate-source plus gate-drain)	Qg	V _{GS} = -4.5 V, V _{DS} = -10 V,	-	7.5	8.5	nC	
Gate-source charge	Qgs	I _D = -1.6 A	-	1.2	-		
Gate-drain ("miller") Charge	Qgd		-	2.2	-		
Reverse Recovery Charge	R _G		-	6.5	-	Ω	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I _{DR}	-	-	-	-2.4	A
Pulse drain reverse current	I _{DRP}	-	-	-	-7.5	A
Forward voltage (diode)	V _{DSF}	I _{DR} = -2.4A, V _{GS} = 0 V	-	-0.82	-1.2	V
Reverse recovery time	t _{rr}	I _{DR} = -2.4A, V _{GS} = 0 V, dI _{DR} / dt = 100 A / μs	-	12.8	15	ns
Charge Time	t _a		-	9.9		ns
Discharge Time	t _b		-	3.0		ns
Reverse recovery charge	Q _{rr}		-	1008	-	μC

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

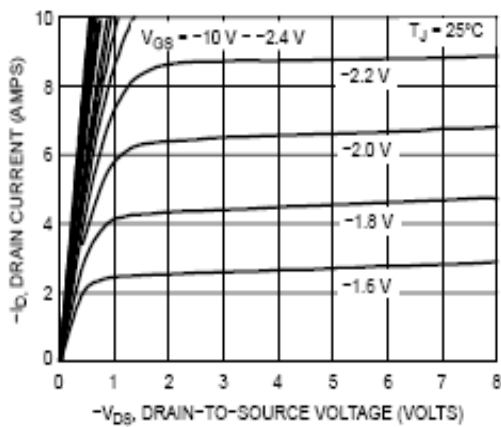


Fig. 1 On-State Characteristics

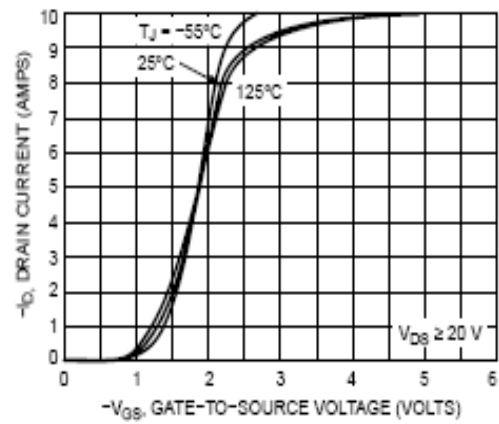


Fig. 2 Transfer Current Characteristics

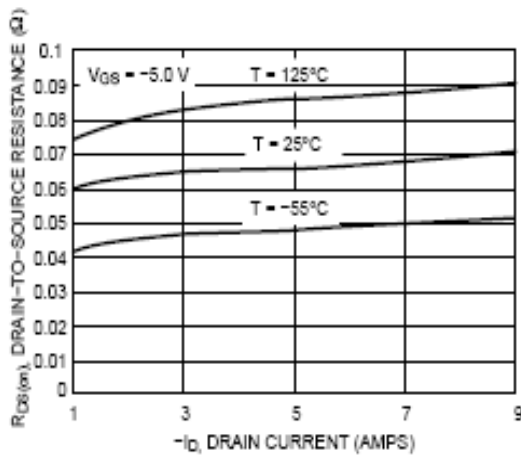


Fig. 3 On-Resistance vs. Drain Current and Temperature

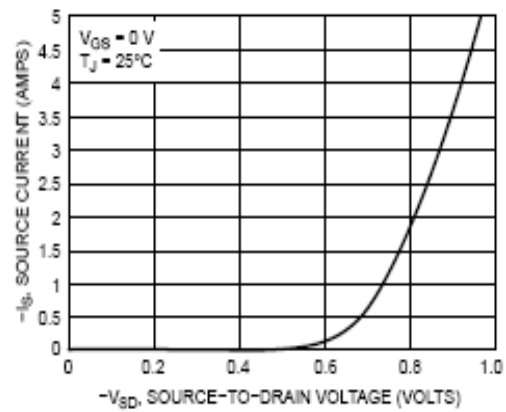


Fig. 4 Diode Forward Voltage vs. Current

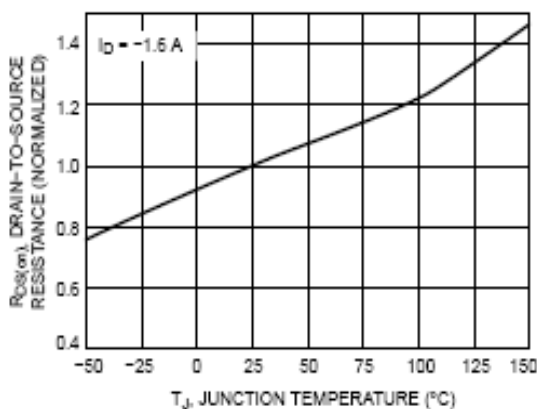


Fig. 5 On-Resistance Variation vs Junction Temperature

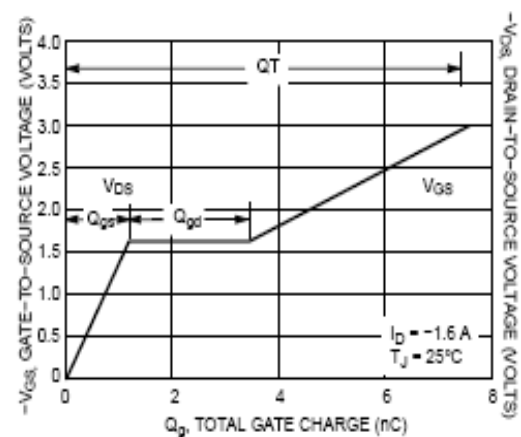


Fig. 6 Gate Charge Characteristics

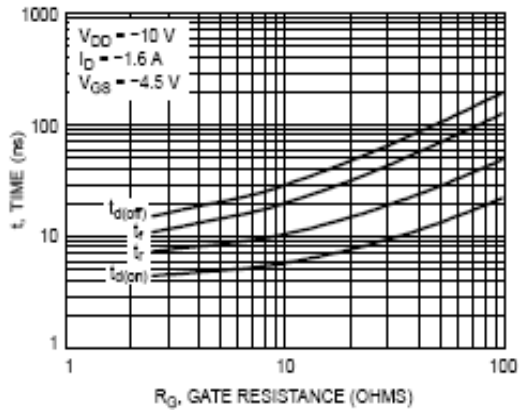


Fig.7 Resistive Switching Time Variation vs. Gate Resistance

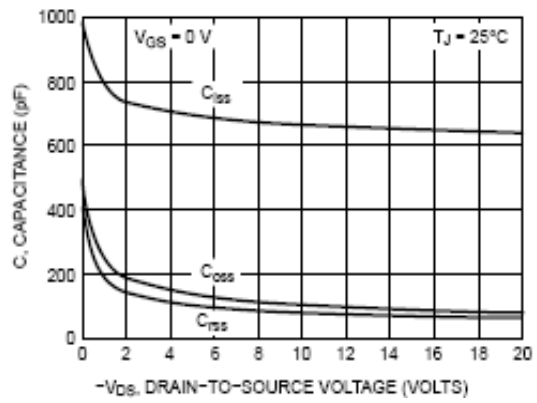


Fig.8 Maximum Drain Current vs Case Temperature

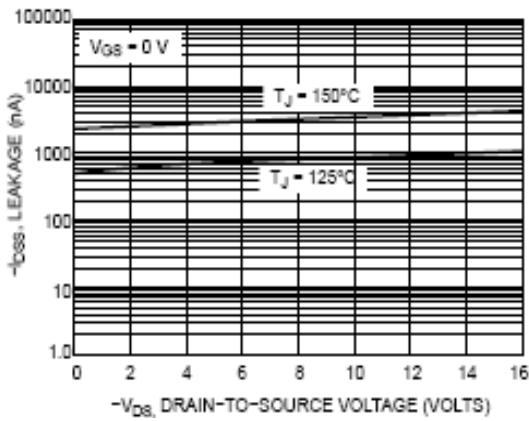


Fig.9 Drain-to-Source Leakage Current vs. Voltage

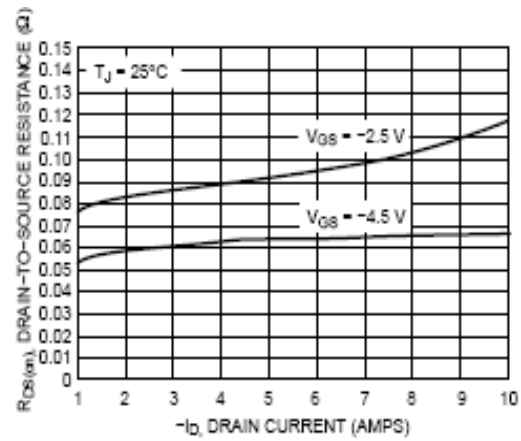


Fig.10 On-Resistance vs. Drain Current and Temperature

SOT-23 Package Dimension

