

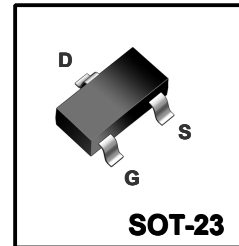
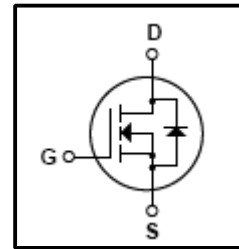
**20V N-Channel MOSFET**

**Features**

- 6A, 20V,  $R_{DS(on)}$ (Max 40m $\Omega$ )@ $V_{GS}=4.5V$
- 1.8 V Rated for Low Voltage Gate Drive
- SOT-23 Surface Mount for Small Footprint
- Single Pulse Avalanche Energy Rated
- RoHS compliant

**General Description**

This 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** ( $T_c=25^{\circ}C$  unless otherwise noted)

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain Source Voltage	20	V
$I_D$	Continuous Drain Current	6	A
$I_{DM}$	Drain Current Pulsed	20	A
$P_D$	Total Power Dissipation(Note 1)	0.3	W
$V_{GS}$	Gate to Source Voltage	$\pm 12$	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 (Mounted on a ceramic board (1000mm $^2$  $\times$ 0.8mm) 1units)  
 Note 2: Surface-mounted on FR4 board using the minimum recommended pad size.

**Electrical Characteristics** ( $T_C = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit	
Gate leakage current(Note 4)	$I_{GSS}$	$V_{GS} = \pm 10\text{ V}, V_{DS} = 0\text{ V}$	-	-	$\pm 100$	nA	
Drain cut-off current(Note 4)	$I_{DSS}$	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$	-	-	-1	$\mu\text{A}$	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 250\ \mu\text{A}, V_{GS} = 0\text{ V}$	20	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{DS} I_D = -250\ \mu\text{A}$	0.5	-	1.0	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 4.5\text{ V}, I_D = 3\text{ A}$	-	32	40	m $\Omega$	
		$V_{GS} = 2.5\text{ V}, I_D = 2.0\text{ A}$		40	55		
		$V_{GS} = 1.8\text{ V}, I_D = 1.0\text{ A}$		65	110		
Forward Transconductance	$g_{fs}$	$V_{DS} = 5.0\text{ V}, I_D = 2.8\text{ A}$	-	6.5	-	S	
Input capacitance	$C_{iss}$	$V_{DS} = 10\text{ V},$	-	430	-	pF	
Reverse transfer capacitance	$C_{rss}$	$V_{GS} = 0\text{ V},$	-	90	-		
Output capacitance	$C_{oss}$	$f = 1\text{ MHz}$	-	110	-		
Switching time (Note 5)	Turn-on Delay time	$t_{d(on)}$	$V_{GS} = 4.5\text{ V},$	-	5	10	ns
	Turn-on Rise time	$t_r$	$V_{DS} = 10\text{ V},$	-	15	28	
	Turn-off Delay time	$t_{d(off)}$	$I_D = 1.0\text{ A},$	-	26	48	
	Turn-off Fall time	$t_f$	$R_G = 6\ \Omega, R_L = 10\ \Omega$	-	15	28	
Total gate charge	$Q_g$	$V_{GS} = 4.5\text{ V},$	-	6	8	nC	
Gate-source charge	$Q_{gs}$	$V_{GS} = 10\text{ V},$	-	0.7	-		
Gate-drain ("miller") Charge	$Q_{gd}$	$I_D = 6\text{ A}$	-	3	-		

**Source-Drain Ratings and Characteristics** ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	$I_{DR}$	-	-	-	6	A
Pulse drain reverse current	$I_{DRP}$	-	-	-	20	A
Forward voltage (diode)	$V_{DSF}$	$I_{DR} = 1\text{ A}, V_{GS} = 0\text{ V}$	-	0.7	1.3	V

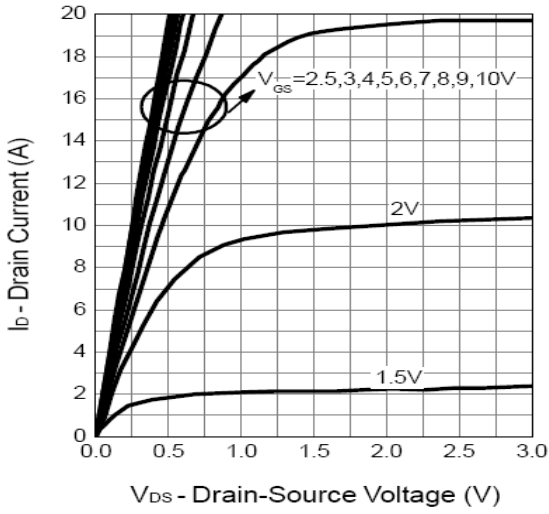
Note 4: Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle 3 2%.

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

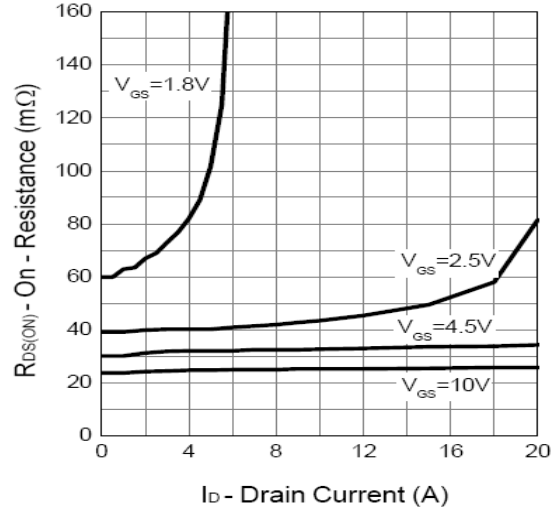
This transistor is an electrostatic sensitive device

Please handle with caution

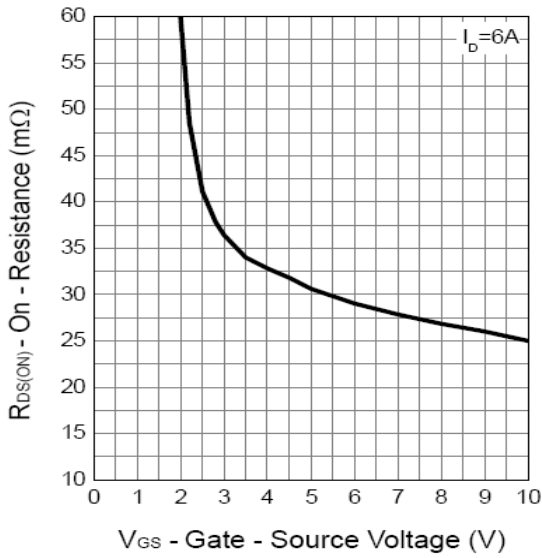
**Output Characteristics**



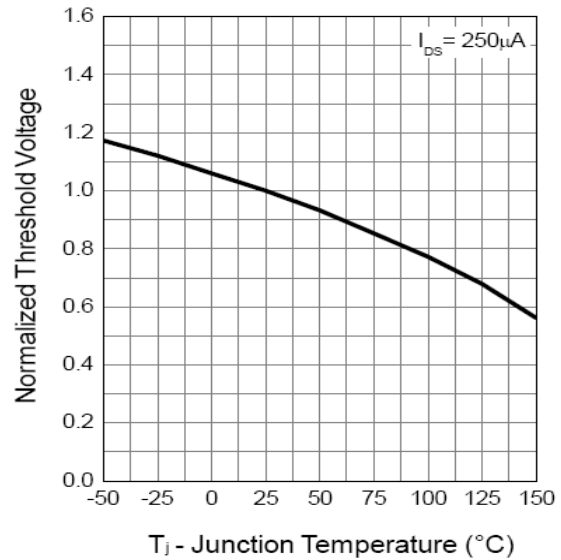
**Drain-Source On Resistance**



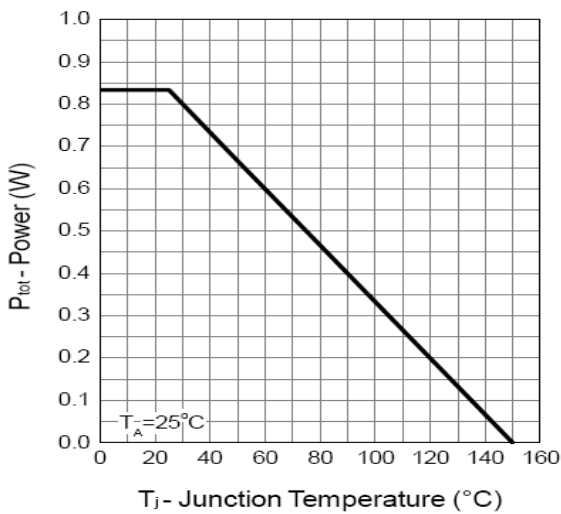
**Drain-Source On Resistance**



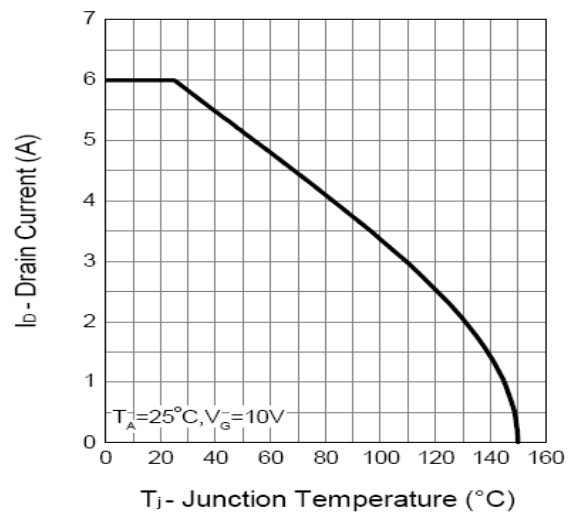
**Gate Threshold Voltage**



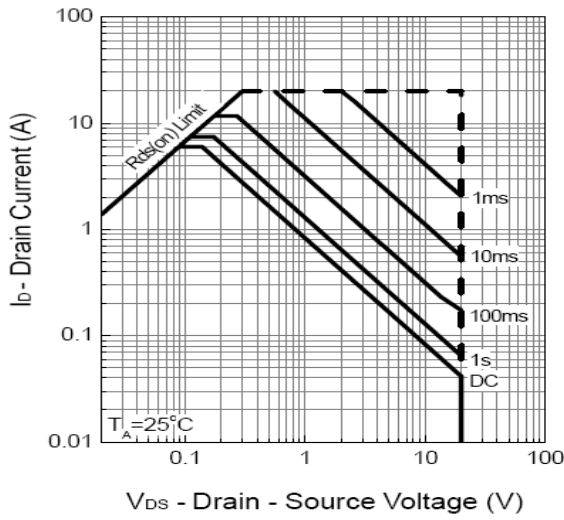
**Power Dissipation**



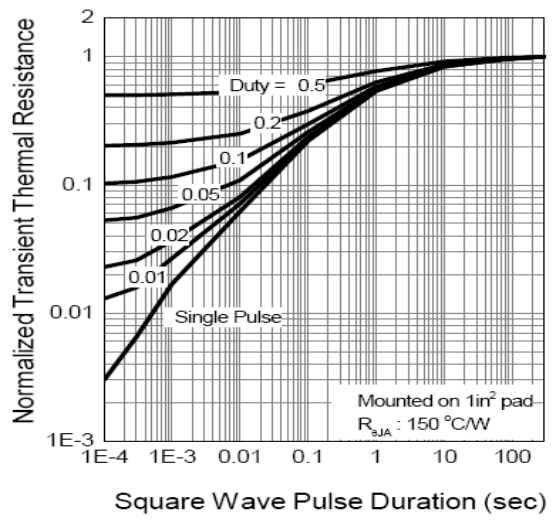
**Drain Current**



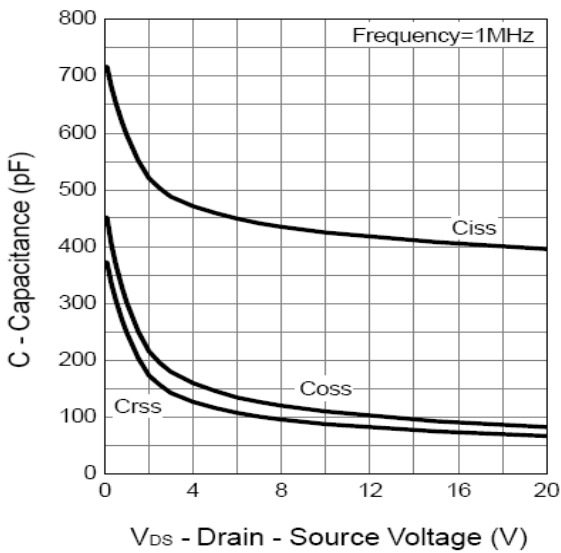
**Safe Operation Area**



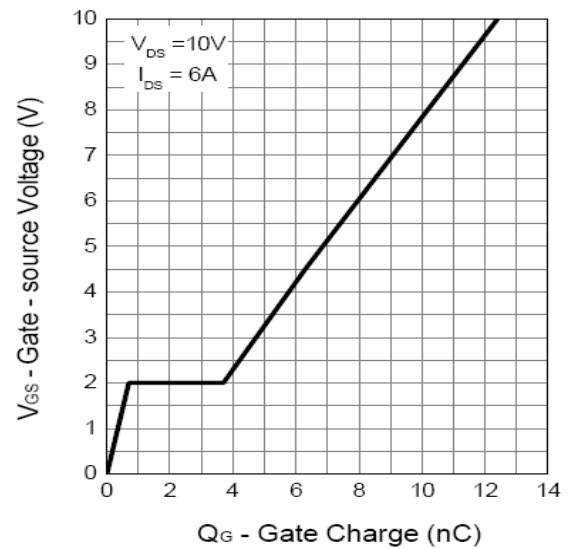
**Thermal Transient Impedance**



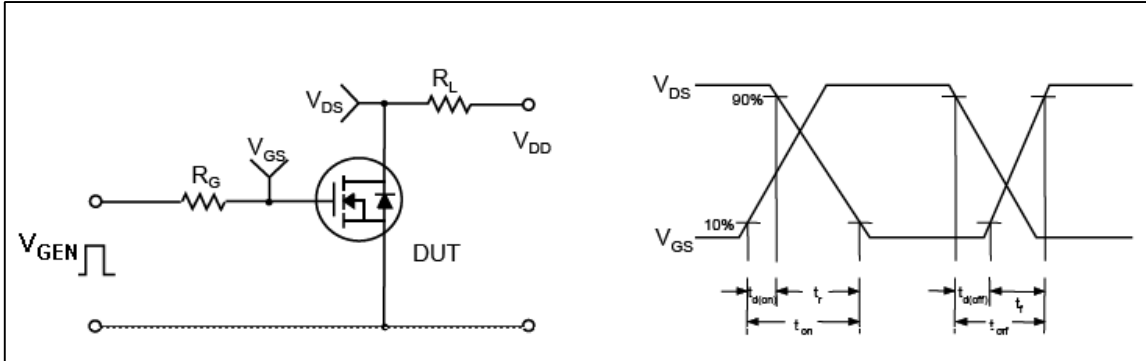
**Capacitance**



**Gate Charge**



**Resistive Switching Test & Waveforms**



**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°

