20V N-Channel Enhancement Mode MOSFET
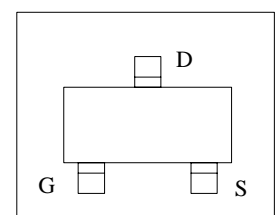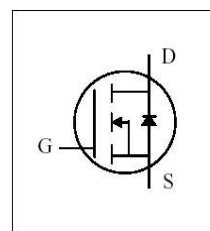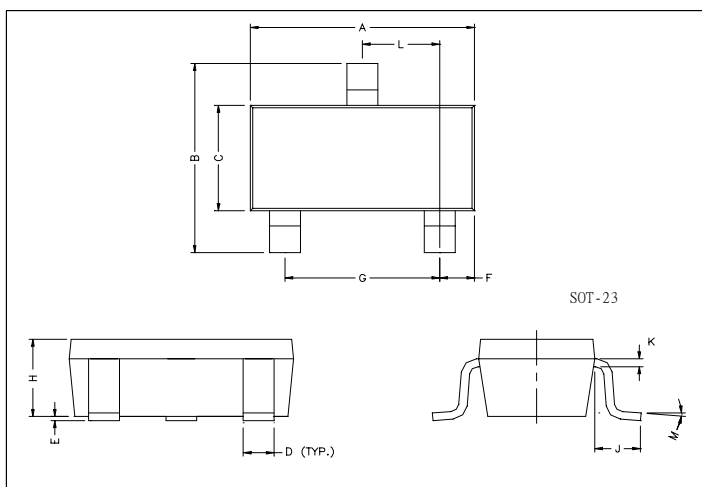
VDS= 20V

RDS(ON), Vgs@ 4.5V, Ids@3.6A $<$85mΩ

RDS(ON), Vgs@ 2.5V, Ids@ 2.0A $<$115mΩ

Features

Advanced trench process technology

High Density Cell Design For Ultra Low On-Resistance

Package Dimensions

SOT-23

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90	REF.
B	2.40	2.80	H	1.00	1.30
C	1.40	1.60	K	0.10	0.20
D	0.35	0.50	J	0.40	-
E	0	0.10	L	0.85	1.15
F	0.45	0.55	M	0°	10°

Maximum Ratings and Thermal Characteristics (TA = 25oC unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current		I_D	2.3	A
Pulsed Drain Current [1]		I_{DM}	8	
Maximum Power Dissipation [2]	TA = 25°	P_D	1.25	W
	TA = 75°C		0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Junction-to-Ambient Thermal Resistance (PCB mounted) [2]		R_{thJA}	100	°C/W
Junction-to-Ambient Thermal Resistance (PCB mounted) [3]			166	

Notes
[1] Pulse width limited by maximum junction temperature.
[2] Surface Mounted on FR4 Board, t ≤ 5 sec.
[3] Surface Mounted on FR4 Board.

LEAD FREE
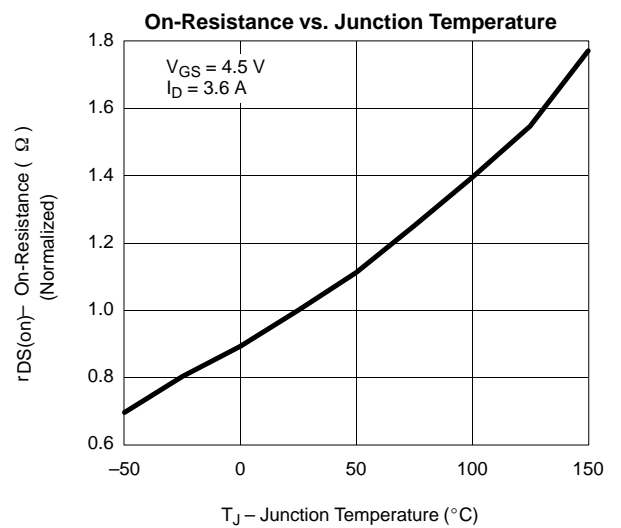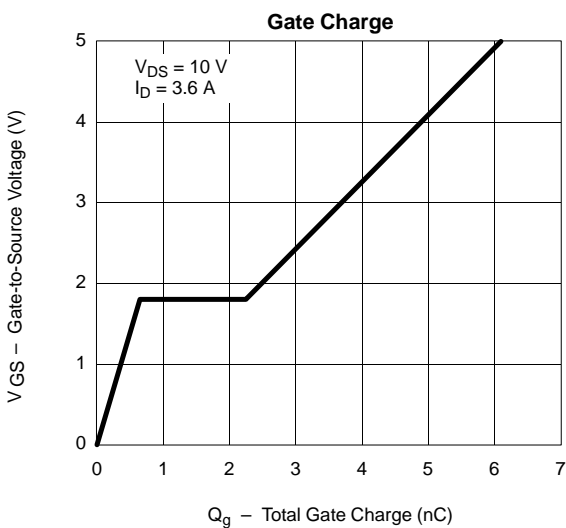ROHS COMPLIANT
QUALITY CERTIFICATION ISO9001 ISO14001
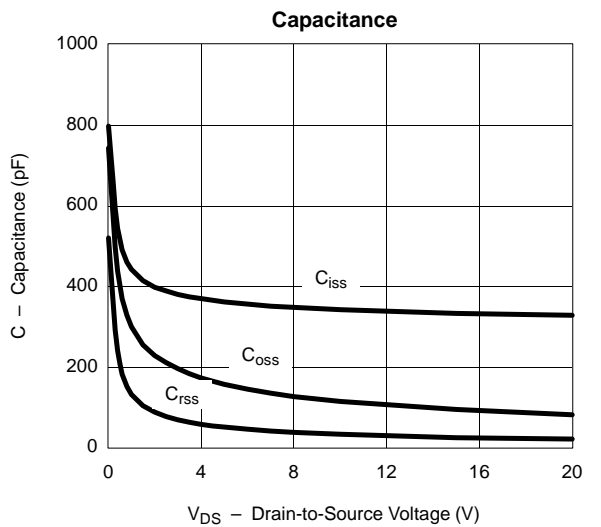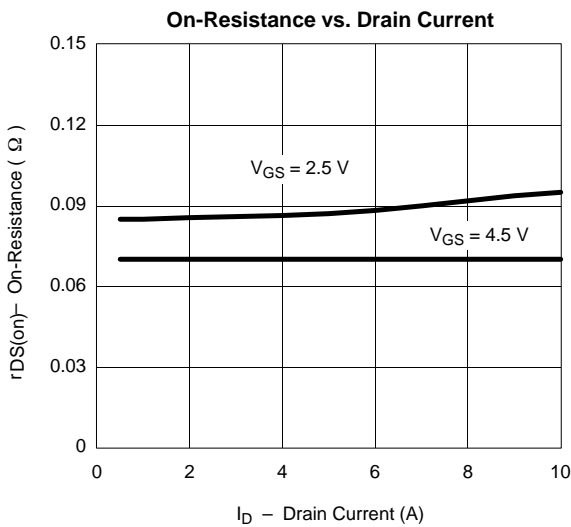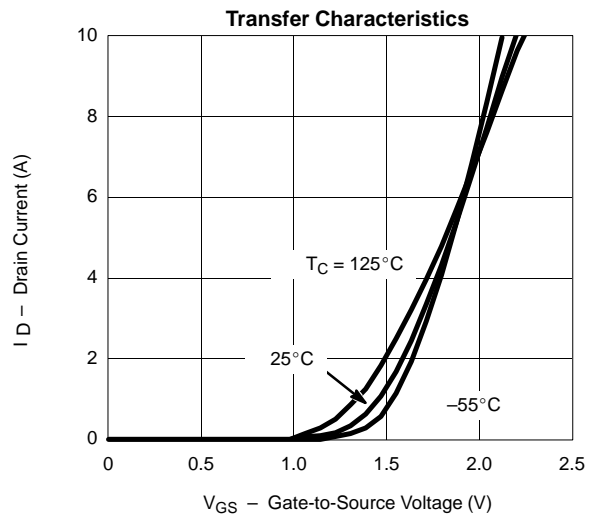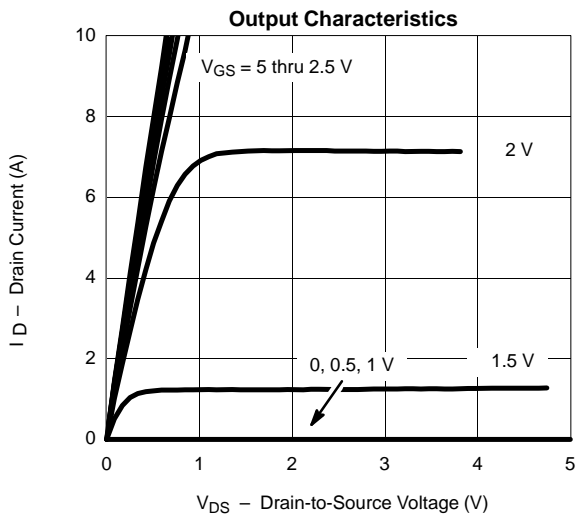SGS

Date: 2011/05

20V N-Channel Enhancement Mode MOSFET

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Miax.	Unit
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V$, $I_D = 10uA$	20			V
Drain-Source On-State Resistance [1]	$R_{DS(on)}$	$V_{GS} = 4.5V$, $I_D = 3.6A$		70	85	mΩ
		$V_{GS} = 2.5V$, $I_D = 3.1A$		85	115	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250uA$	0.6			V
Zero Gate Voltage Drain Current 0	I_{DSS}	$V_{DS} = 16V$, $V_{GS} = 0V$		1		uA
		$V_{DS} = 20V$, $V_{GS} = 0V$ TJ=55°C			10	
Gate Body Leakage	I_{GSS}	$V_{GS} = \pm 8V$, $V_{DS} = 0V$			±100	nA
Forward Transconductance [1]	g_{fs}	$V_{DS} = 5V$, $I_D = 3.6A$		10	—	S
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = 10V$, $I_D = 3.6A$ $V_{GS} = 4.5V$		5.4	10	nC
Gate-Source Charge	Q_{gs}			0.65		
Gate-Drain Charge	Q_{gd}			1.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10V$, RL=5.5Ω $I_D \cong 3.6A$, $V_{GEN} = 4.5V$ $R_G = 6Ω$		12	25	ns
Turn-On Rise Time	t_r			36	60	
Turn-Off Delay Time	$t_{d(off)}$			34	60	
Turn-Off Fall Time	t_f			10	25	
Input Capacitance	C_{iss}	$V_{DS} = 10V$, $V_{GS} = 0V$ f = 1.0 MHz		340		pF
Output Capacitance	C_{oss}			115		
Reverse Transfer Capacitance	C_{rss}			33		
Source-Drain Diode						
Max. Diode Forward Current	I_S				1.6	A
Diode Forward Voltage	V_{SD}	$I_S = 1.6A$, $V_{GS} = 0V$			1.2	V

[1] Pulse test: pulse width <= 300us, duty cycle<= 2%

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20V N-Channel Enhancement Mode MOSFET

Output Characteristics

V_{GS} = 5 thru 2.5 V

2 V

0, 0.5, 1 V

1.5 V

I_D – Drain Current (A)

V_{DS} – Drain-to-Source Voltage (V)

Transfer Characteristics

T_C = 125°C

25°C

−55°C

I_D – Drain Current (A)

V_{GS} – Gate-to-Source Voltage (V)

On-Resistance vs. Drain Current

V_{GS} = 2.5 V

V_{GS} = 4.5 V

$r_{DS(on)}$– On-Resistance (Ω)

I_D – Drain Current (A)

Capacitance

C_{iss}

C_{oss}

C_{rss}

C – Capacitance (pF)

V_{DS} – Drain-to-Source Voltage (V)

Gate Charge

V_{DS} = 10 V
I_D = 3.6 A

V_{GS} – Gate-to-Source Voltage (V)

Q_g – Total Gate Charge (nC)

On-Resistance vs. Junction Temperature

V_{GS} = 4.5 V
I_D = 3.6 A

$r_{DS(on)}$– On-Resistance (Ω)
(Normalized)

T_J – Junction Temperature (°C)

20V N-Channel Enhancement Mode MOSFET

Source-Drain Diode Forward Voltage

I_S – Source Current (A)

$T_J = 150°C$

$T_J = 25°C$

V_{SD} – Source-to-Drain Voltage (V)
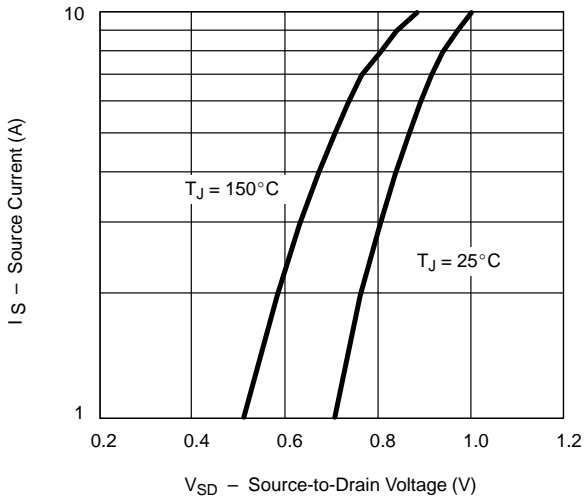
On-Resistance vs. Gate-to-Source Voltage

$r_{DS(on)}$ – On-Resistance (Ω)

$I_D = 3.6$ A

V_{GS} – Gate-to-Source Voltage (V)

Threshold Voltage

$V_{GS(th)}$ Variance (V)

$I_D = 250$ μA

T_J – Temperature (°C)

Single Pulse Power

Power (W)

$T_C = 25°C$
Single Pulse

Time (sec)
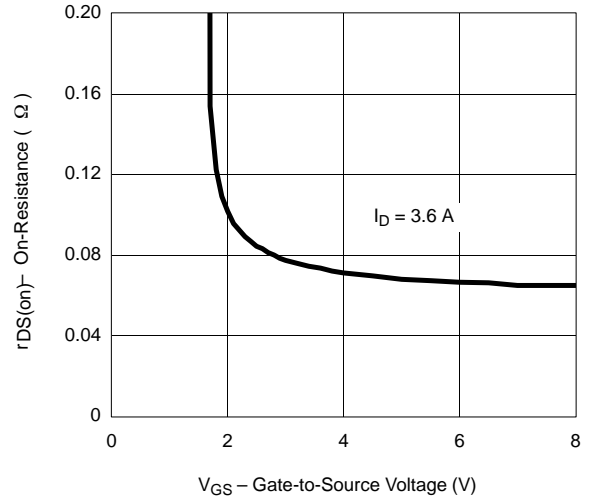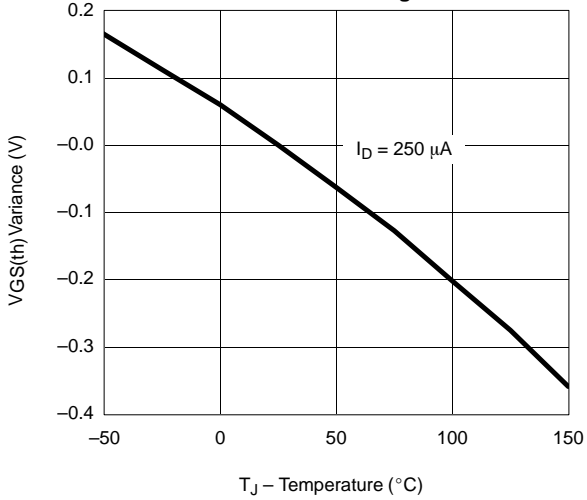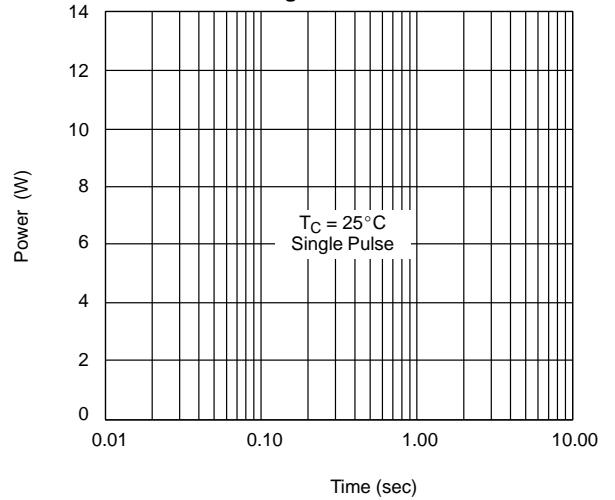
Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Effective Transient Thermal Impedance

Duty Cycle = 0.5

0.2

0.1

0.05

0.02

Single Pulse

Square Wave Pulse Duration (sec)