N-Channel 20-V (D-S) MOSFET

GENERAL DESCRIPTION

The 2300 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching and low in-line power loss are needed in a very small outline surface mount package.

FEATURES

- $R_{DS(ON)} \leqq 30m\Omega @ V_{GS}=4.5V$
- $R_{DS(ON)} \leqq 40m\Omega @ V_{GS}=2.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

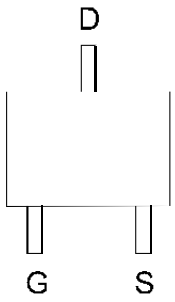
APPLICATIONS

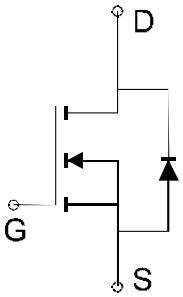
- Power Management in Note book
- Portable Equipment
- Load Switch
- DSC

PIN CONFIGURATION

(SOT-23)

Top View





Absolute Maximum Ratings (T_A=25℃ Unless Otherwise Noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current*	T_A=25℃	I_D	5	A
	T_A=70℃		4	
Pulsed Drain Current		I_{DM}	20	A
Maximum Power Dissipation	T_A=25℃	P_D	1.3	W
	T_A=70℃		0.8	
Operating Junction Temperature		T_J	-55 to 150	℃
Thermal Resistance-Junction to Ambient*		$R_{\theta JA}$	100	℃/W

* The device mounted on 1in^2 FR4 board with 2 oz copper

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Electrical Characteristics (T_A =25℃ Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	20			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.5		1.2	V
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V, V_{GS}=±12V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V			1	μA
$R_{DS(ON)}$	Drain-Source On-Resistance[a]	V_{GS}=4.5V, I_D= 4 A		24	30	mΩ
		V_{GS}=2.5V, I_D= 3.2A		32	40	
V_{SD}	Diode Forward Voltage	I_S=1.6A, V_{GS}=0V		0.7	1.2	V
DYNAMIC						
Qg	Total Gate Charge	V_{DS}=10V, V_{GS}=10V, I_D=4A		17		nC
Qg	Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_D=4A		8.3		
Qgs	Gate-Source Charge			2.0		
Qgd	Gate-Drain Charge			2.9		
Rg	Gate Resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.9		Ω
Ciss	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz		513		pF
Coss	Output Capacitance			87		
Crss	Reverse Transfer Capacitance			27		
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=10V, R_L =10Ω I_D=1.0A, V_{GEN}=4.5V, R_G=6Ω		9		ns
t_r	Turn-On Rise Time			18		
$t_{d(off)}$	Turn-Off Delay Time			43		
t_f	Turn-Off Fall Time			4		

Notes: a. Pulse test: pulse width≦ 300us, duty cycle≦ 2%, Guaranteed by design, not subject to production testing.

b.shchtech reserves the right to improve product design, functions and reliability without notice.

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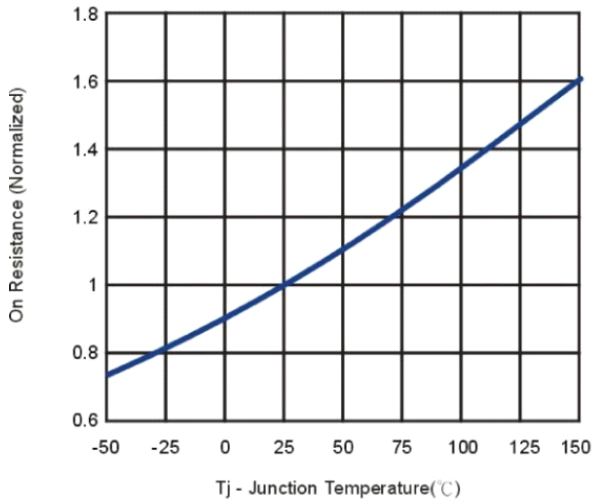
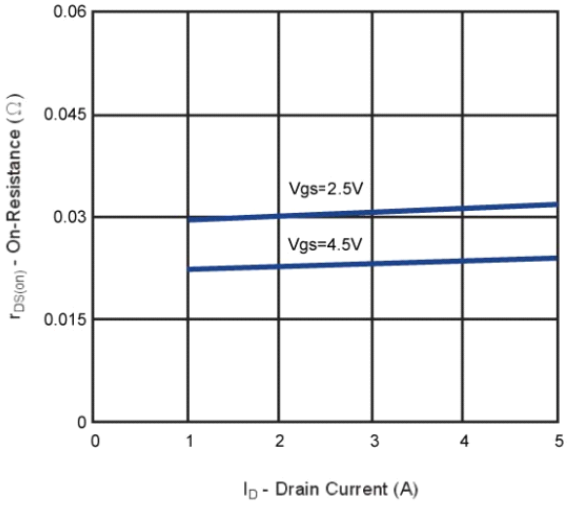
Typical Characteristics (TJ =25℃ Noted)

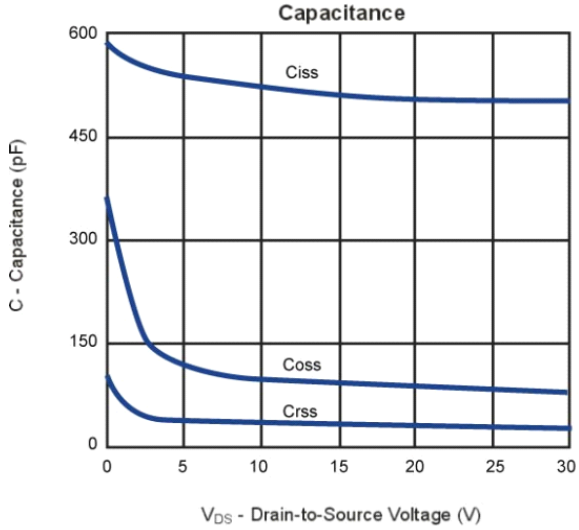
On Resistance vs. Junction Temperature



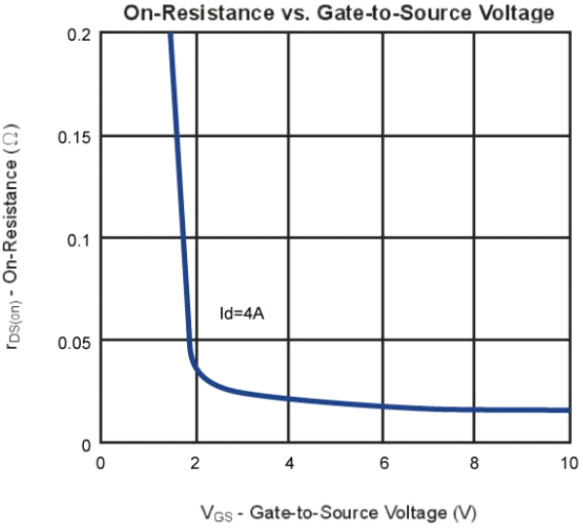
On-Resistance vs. Drain Current



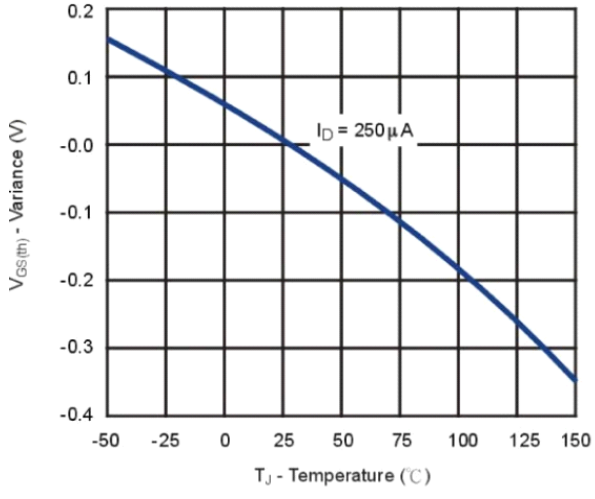
Capacitance



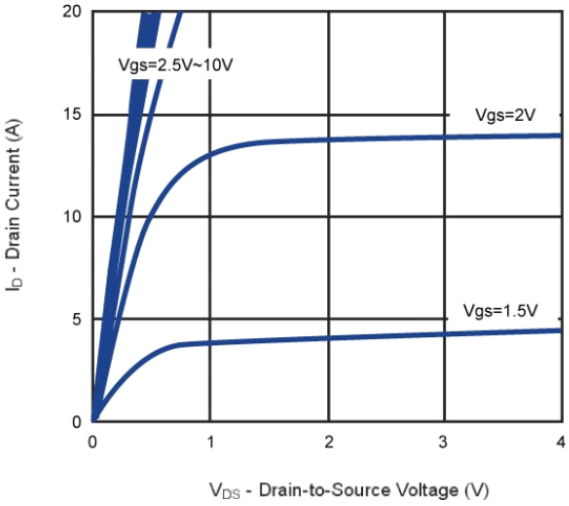
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



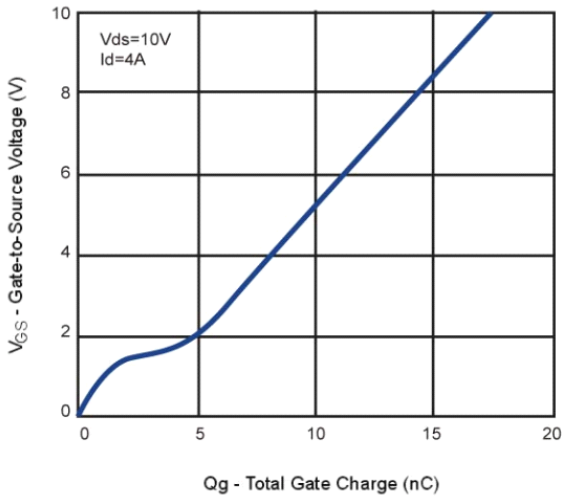
On-Region Characteristics



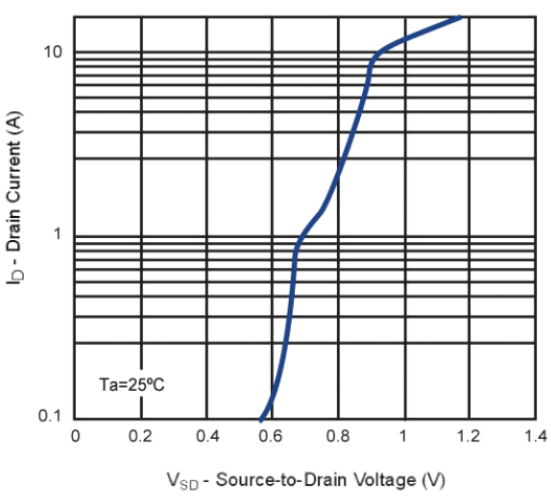
N-Channel 20-V (D-S) MOSFET

Typical Characteristics (T_J =25℃ Noted)

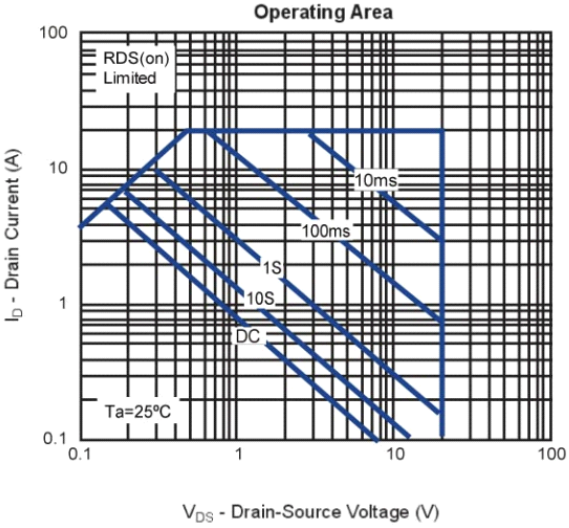
Gate Charge



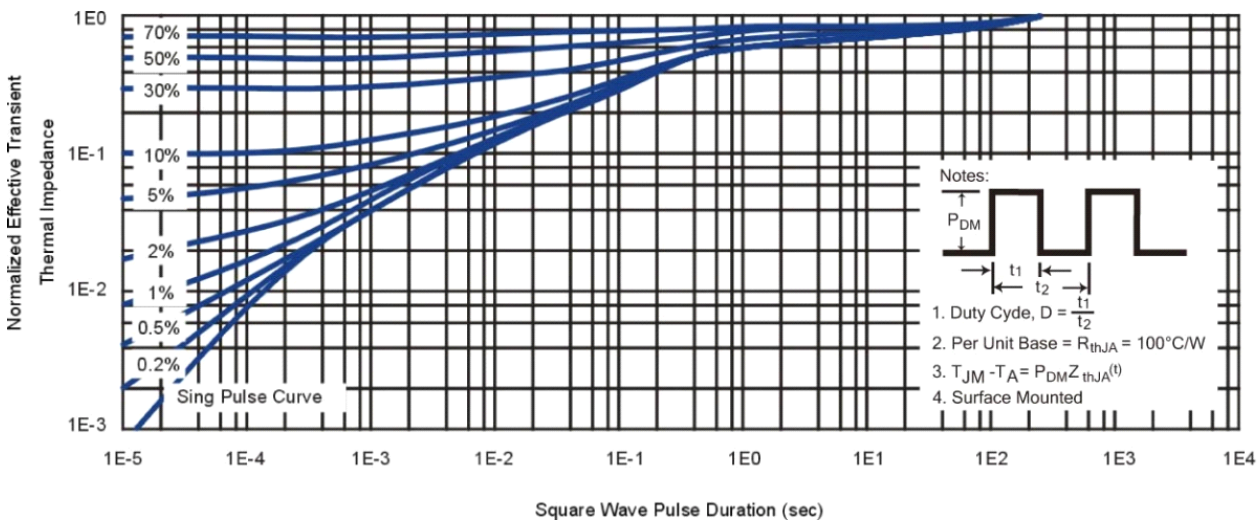
Body - Diode Characteristics



Maximum Forward Biased Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



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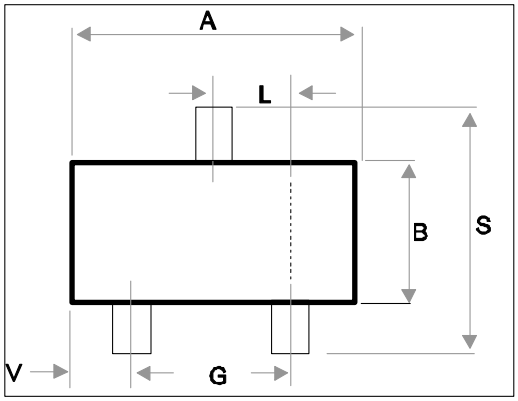
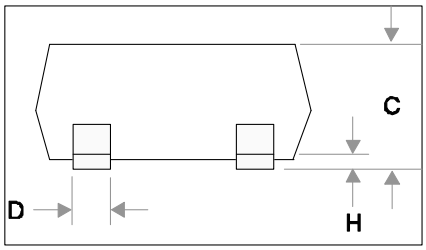
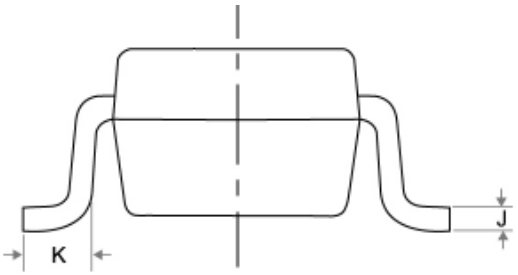
SOT-23 Package Outline







Symbol	MILLIMETERS (mm)	
	MIN	MAX
A	2.800	3.000
B	1.250	1.350
C	0.900	1.100
D	0.350	0.50
G	1.800	2.000
H	0.000	0.100
J	0.090	0.150
K	0.200	0.450
L	0.950TYP	
S	2.250	2.550
V	0.550	0.600