

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

■ FEATURES

- Low $R_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Low thermal impedance copper leadframe SOT23 saves board space
- Fast switching speed
- High performance trench technology
- ROHS compliant
- MSL: 3

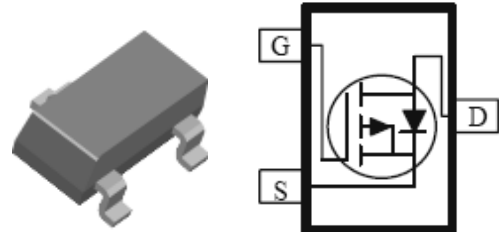
■ Product Summary

MOSFET		
V_{DS}	$R_{DS(on)}m(\Omega)$	I_D (A)
-20 V	100 @ $V_{GS} = -4.5$ V	-2.8
	150 @ $V_{GS} = -2.8$ V	-2.0
	170 @ $V_{GS} = -1.8$ V	-2.0

■ Description

These miniature surface mount MOSFETs utilize High Cell Density process. Low $R_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are lower voltage application, power management in portable and battery-powered products such as computers, printers, and PCMCIA cards, cellular and cordless telephones.

■ SOT23



Maximum Ratings (TA = 25 °C UNLESS OTHERWISE NOTED)

Symbol	Parameter	Maximum	Unit
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	
I_D	Continuous Drain Current ^a	$T_A=25^\circ\text{C}$	-2.8
		$T_A=70^\circ\text{C}$	-2.1
I_{DM}	Pulsed Drain Current ^b	-10	A
I_S	Continuous Source Current (Diode Conduction) ^a	-1	A
P_D	Power Dissipation ^a	$T_A=25^\circ\text{C}$	1.38
	Linear Derating Factor		0.01
T_J, T_{stg}	Operation Junction and Storage Temperature Range	-55 to 150	°C

Thermal Resistance Ratings

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient ^a	90	°C/W

Notes:

- (a) Surface Mounted on 1" x 1" FR4 Board.
- (b) Pulse width limited by maximum junction temperature



Electrical Characteristics

SPECIFICATIONS (TA = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	-0.5	-0.8	-1.5	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±12V			±100	nA
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -20 V, V _{GS} = 0 V T _J = 25°C			-1	uA
		V _{DS} = -16 V, V _{GS} = 0 V, T _J = 55°C			-10	
Drain-Source On-Resistance ^a	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -2.8 A			100	mΩ
		V _{GS} = -2.5 V, I _D = -2.0 A			150	
		V _{GS} = -1.8 V, I _D = -2.0 A			170	
Diode Forward On Voltage	V _{SD}	I _S = -1.6 A, V _{GS} = 0 V			-1.2	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = -6V, V _{GS} = -5V I _D = -2.8A		6.396		nC
Gate-Source Charge	Q _{gs}			2.24		
Gate-Drain Charge	Q _{gd}			1.05		
Turn-On Delay Time	t _{d(on)}	V _{DS} =-15V, R _D =15Ω, R _G = 6Ω, V _{GS} = -10V		7.05		ns
Turn-On Rise Time	t _r			9.836		
Turn-Off Delay Time	t _{d(off)}			23.396		
Turn-Off Fall Time	t _f			7.692		
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-6V, f = 1.0MHz		660.8		pF
Output Capacitance	C _{oss}			110.4		
Reverse Transfer Capacitance	C _{rss}			37.6		

Notes:

(a) Pulse width ≤ 300us, duty cycle ≤ 2%

(b) Pulse width limited by Max. Junction temperature.



Typical Electrical Characteristics

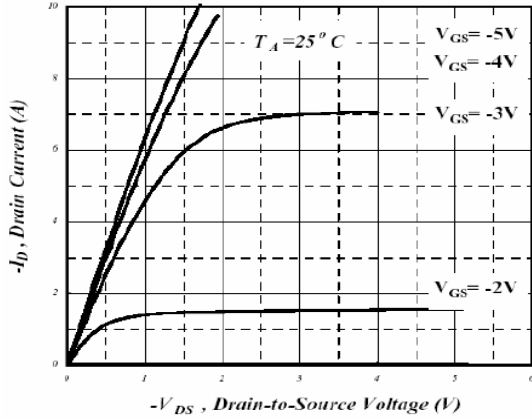


Fig 1. Typical Output Characteristics

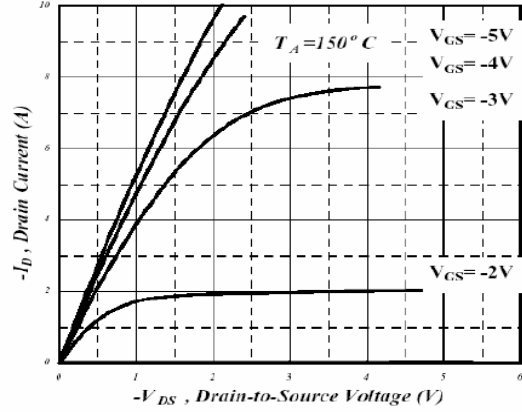


Fig 2. Typical Output Characteristics

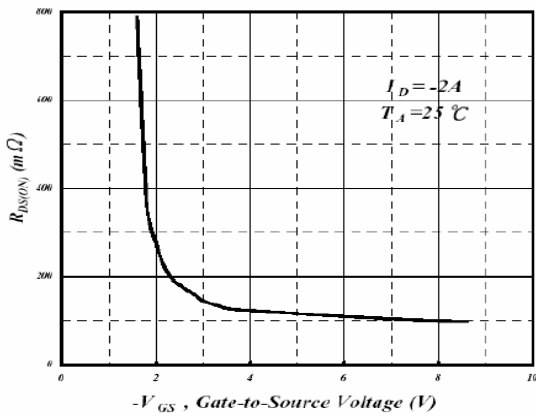


Fig 3. On-Resistance v.s. Gate Voltage

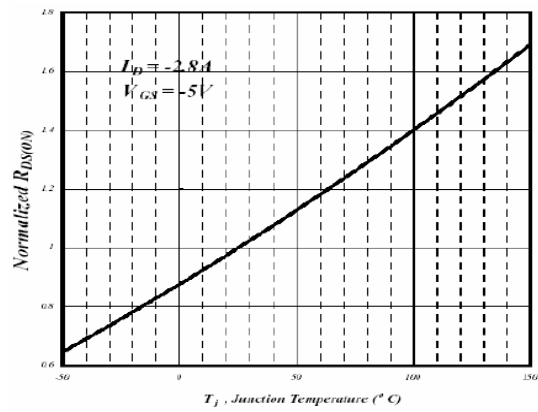


Fig 4. Normalized On-Resistance

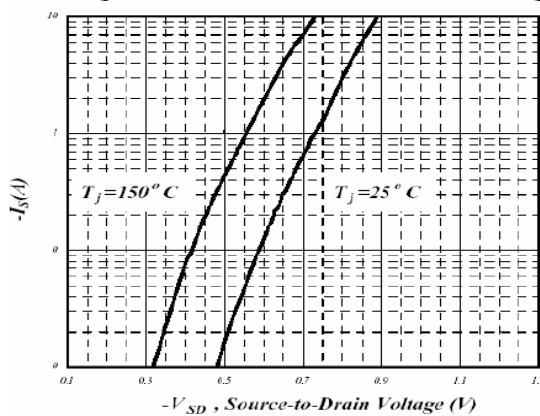


Fig 5. Forward Characteristic of Reverse Diode

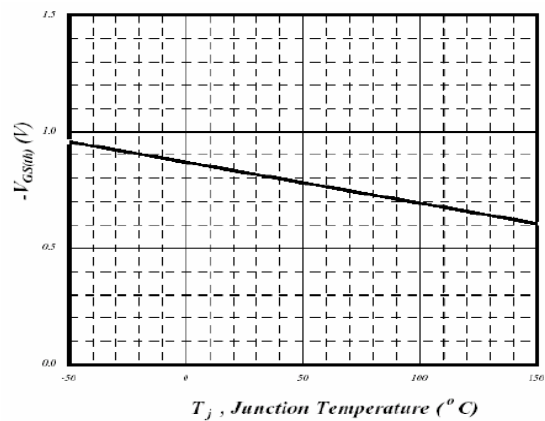
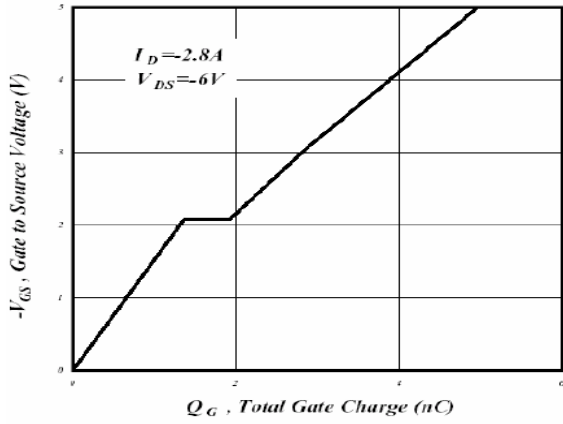
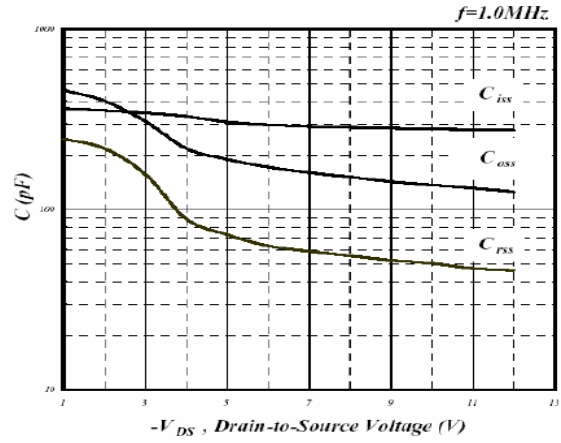
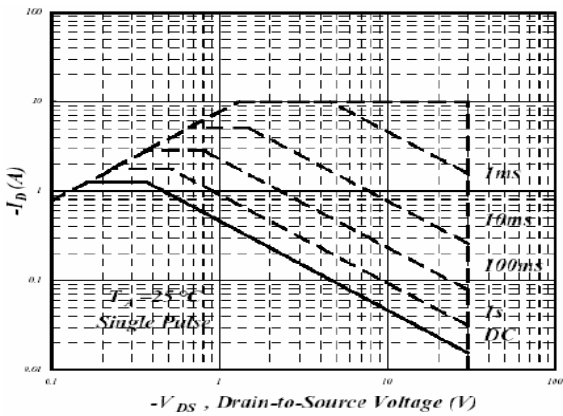
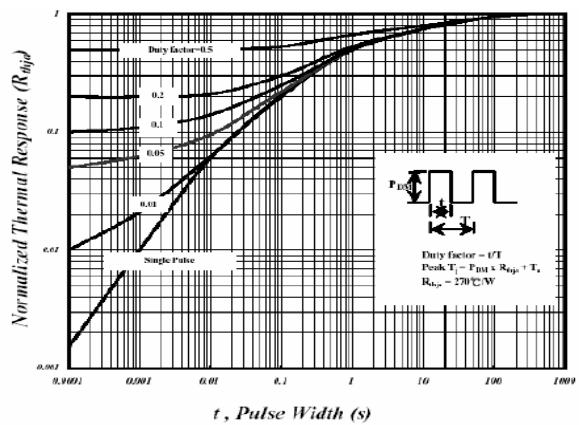
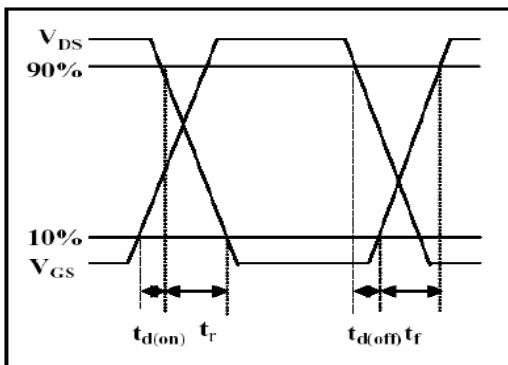
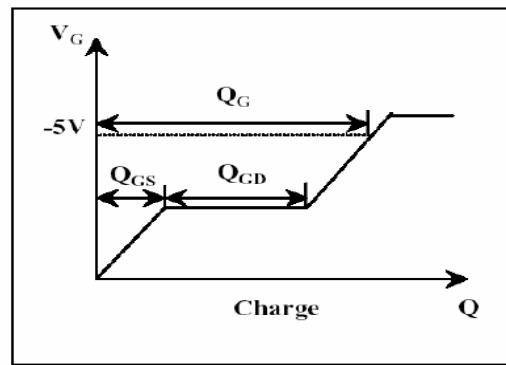


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

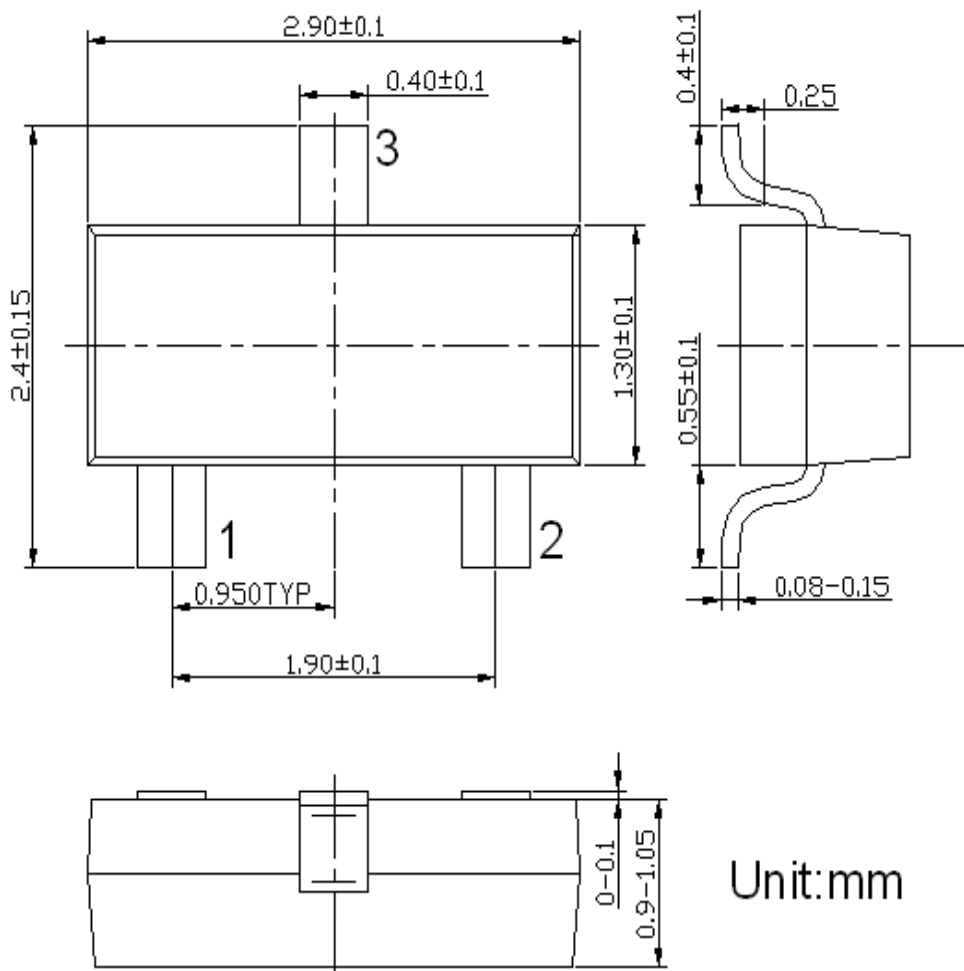
Typical Electrical Characteristics

Fig 7. Gate Charge Characteristics

Fig 8. Typical Capacitance Characteristics

Fig 9. Maximum Safe Operating Area

Fig 10. Effective Transient Thermal Impedance

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform

Ordering Information

Part number	Marking	package	Quantity per reel
SI2301	2301	SOT23	3000

Package Information

(SOT23)



Unit:mm

Carrier Dimensions

PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2
SOT23	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00
Tolerance	+0.3/-0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.05

A0	B0	K0	T
3.15	2.77	1.22	0.20
±0.1	±0.1	±0.1	±0.02

