

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

■ FEATURES

- Low $R_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Low thermal impedance copper leadframe SOT-23 saves board space
- Fast switching speed
- High performance trench technology
- RoHS, Pb-free, Halogen free compliant

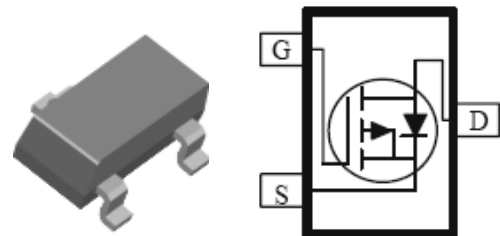
■ Description

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.

■ Product Summary

MOSFET		
V_{DS}	$R_{DS(on)}$ (m Ω)	I_D (A)
-20 V	53 @ $V_{GS} = -10$ V	-4.5
	65 @ $V_{GS} = -4.5$ V	-4.2

■ SOT-23



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	$T_A=25^\circ\text{C}$	-4.2
		$T_A=70^\circ\text{C}$	-3.4
I_{DM}	Pulsed Drain Current ^b	-10	A
P_D	Power Dissipation ^a	$T_A=25^\circ\text{C}$	1.38
	Linear Derating Factor	0.01	W/°C
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:

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

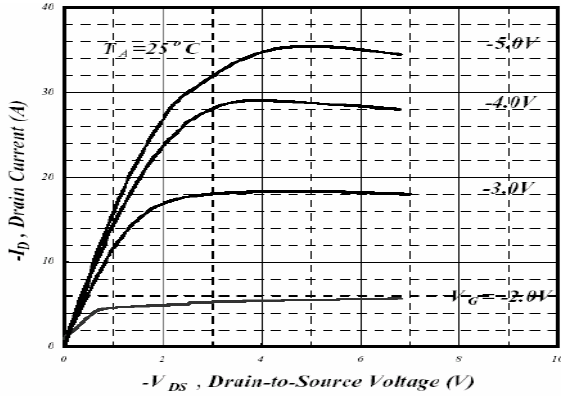
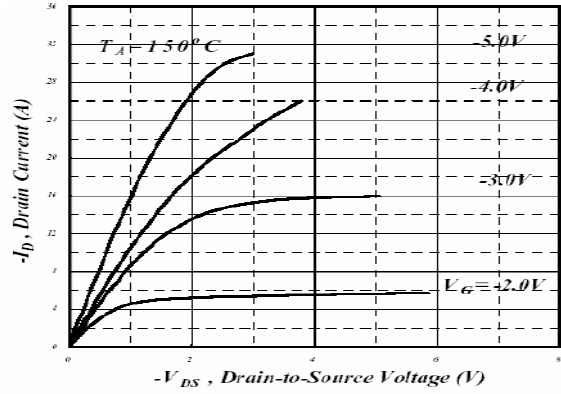
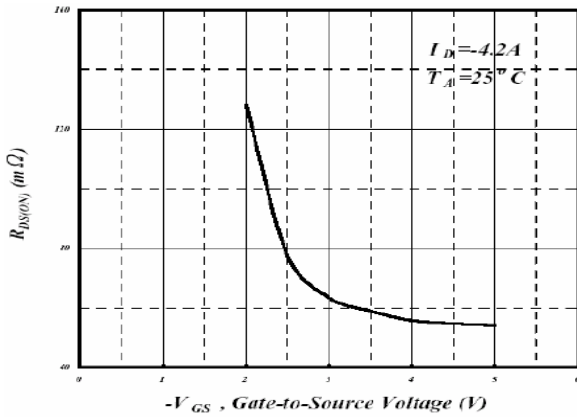
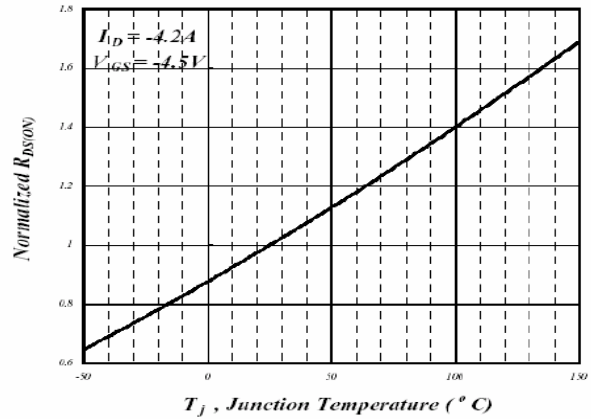
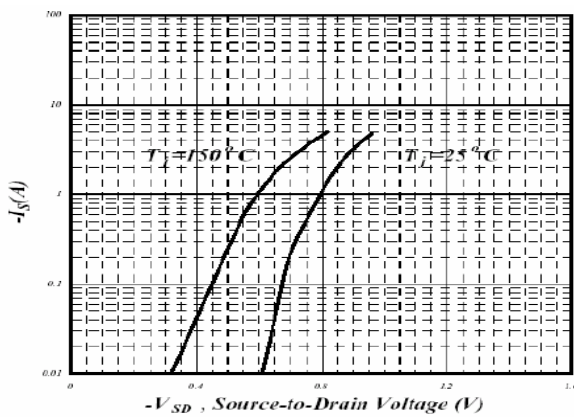
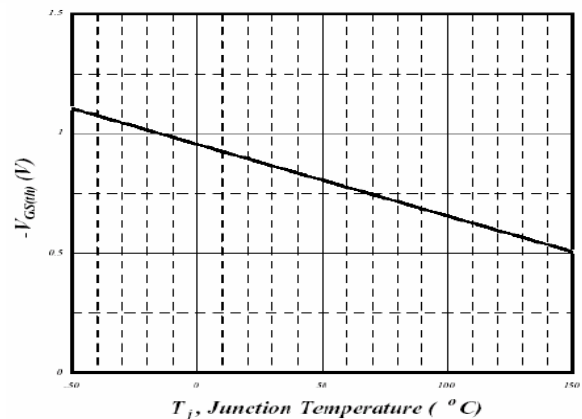
Electrical Characteristics

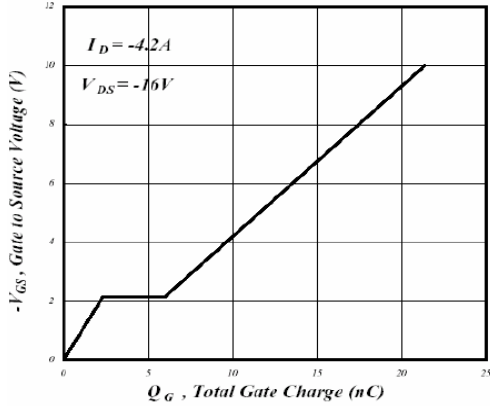
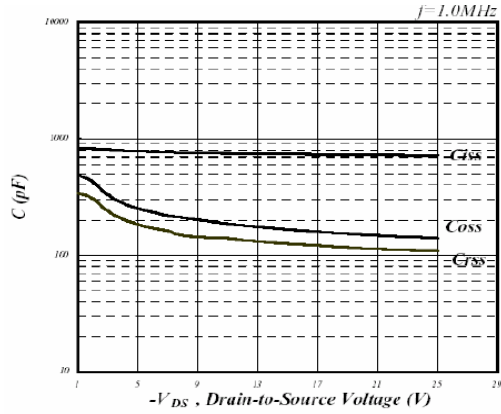
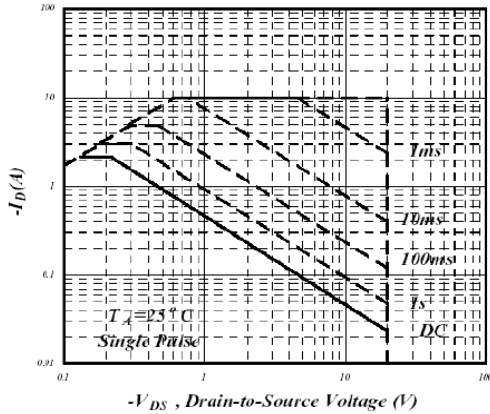
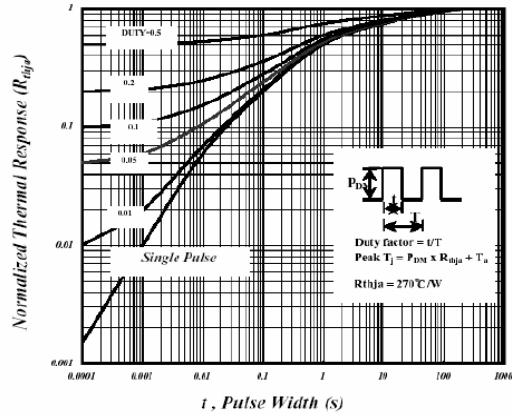
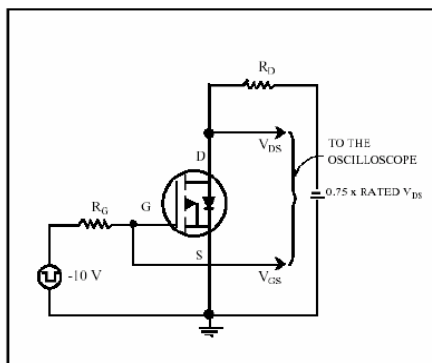
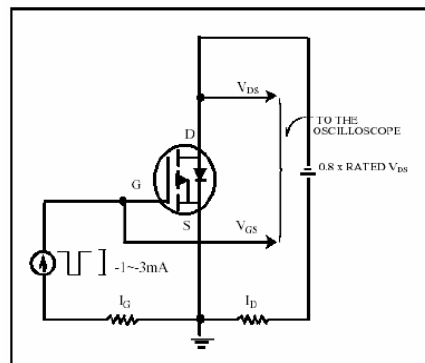
SPECIFICATIONS (TA = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	-0.5			V
Gate-Body Leakage	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} = -10 V, I _D = -4.5 A			53	mΩ
		V _{GS} = -4.5 V, I _D = -4.2 A			65	
		V _{GS} = -2.5 V, I _D = -2.0 A			100	
Forward Transconductance ^a	g _{fs}	V _{DS} = -5.0V, I _D = -2.8A		9		S
Diode Forward On Voltage	V _{SD}	I _S = -1.2 A, V _{GS} = 0 V			-1.2	V
Reverse Recovery Time ₂	T _{rr}	I _S =-4.2A, V _{GS} =0V dI/dt=100A/us		27.7		ns
Reverse Recovery Charge	Q _{rr}			22		nC
Dynamic ^b						
Total Gate Charge	Q _g	V _{DS} = -16V, V _{GS} = -4.5V I _D = -4.2A		10.6		nC
Gate-Source Charge	Q _{gs}			2.32		
Gate-Drain Charge	Q _{gd}			3.68		
Turn-On Delay Time	t _{d(on)}	V _{DS} =-15V, R _D =3.6Ω, I _D =-4.2A R _G = 6Ω, V _{GS} = -10V		5.9		ns
Turn-On Rise Time	t _r			3.6		
Turn-Off Delay Time	t _{d(off)}			32.4		
Turn-Off Fall Time	t _f			2.6		
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V, f = 1.0MHz		740		pF
Output Capacitance	C _{oss}			167		
Reverse Transfer Capacitance	C _{rss}			126		

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 v.s. Junction Temperature

Fig 5. Forward Characteristic of Reverse Diode

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

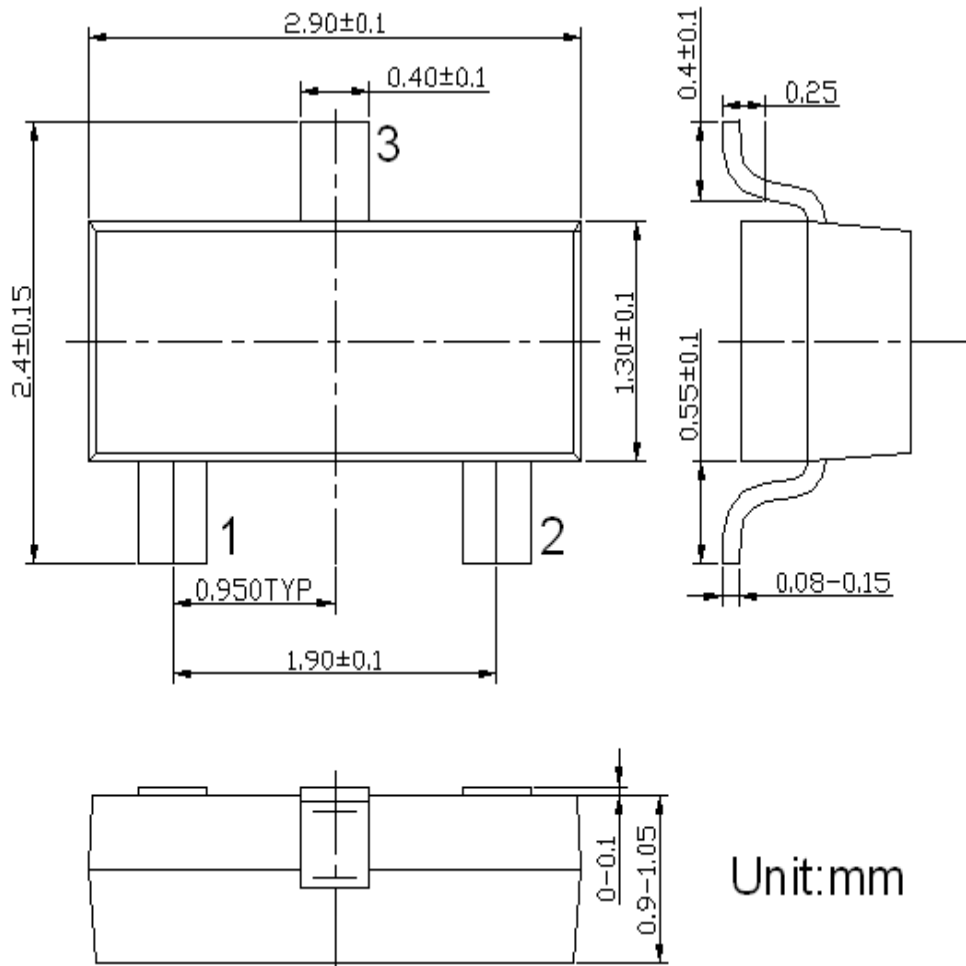
Typical Electrical Characteristics

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 Circuit

Fig 12. Gate Charge Circuit

Ordering Information

Part number	Marking	package	Quantity per reel
JY2305X	2305	SOT-23	3000

Package Information

- SOT-23 package
- MSL-3 Level

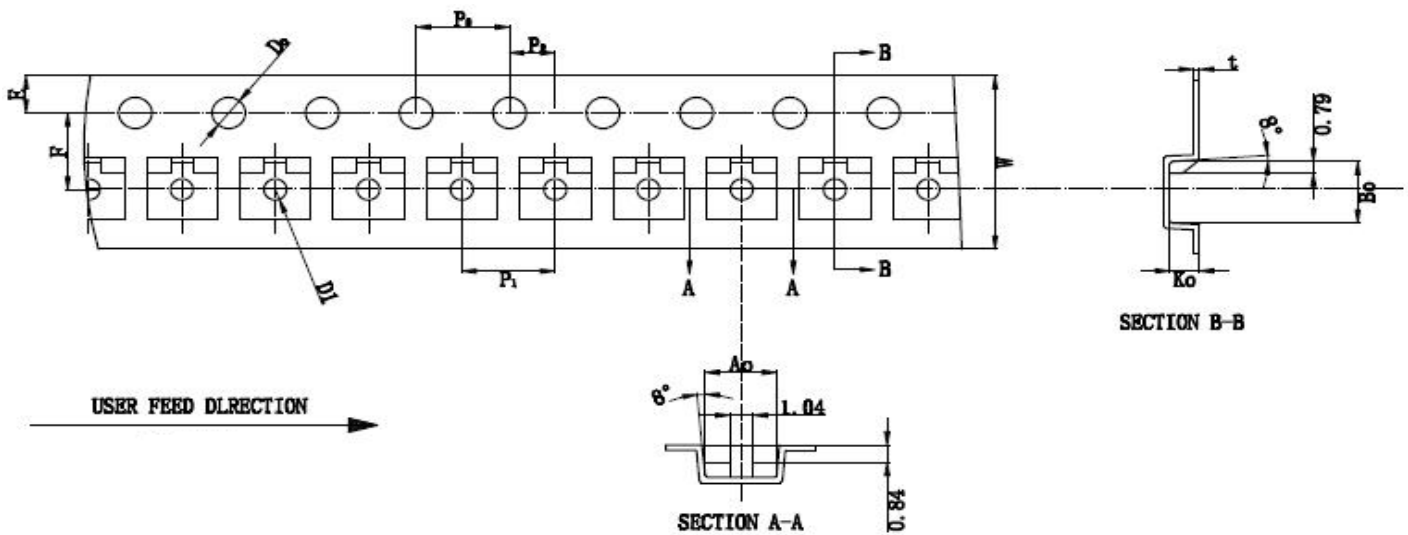


Unit: mm

Carrier Dimensions

PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2
SOT-23	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



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