

## Features

- Excellent Stability and Uniformity
- High Dense Cell Design for Extremely Low RDS(ON)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

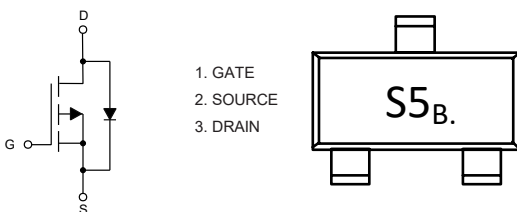
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance:90°C/W Junction to Ambient(Steady-State)<sup>(2)</sup>

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±10	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	-4.2
		$T_A=100^\circ\text{C}$	-2.7
Pulsed Drain Current <sup>(3)</sup>	$I_{DM}$	-21	A
Total Power Dissipation <sup>(4)</sup>	$P_D$	1.4	W

Note:

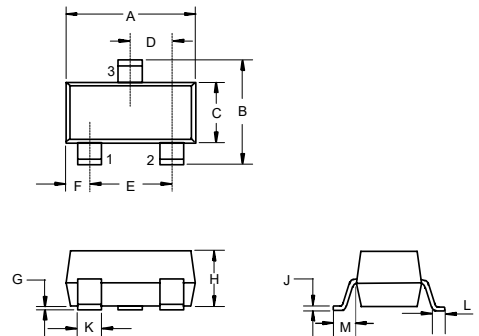
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA} t \leq 10\text{s}$  and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction to ambient thermal resistance.

## Internal Structure and Marking Code



# P-CHANNEL MOSFET

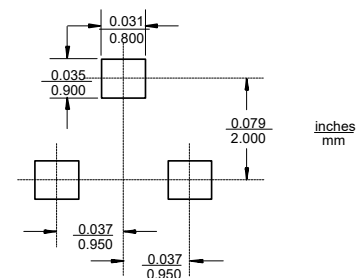
## SOT-23



### DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	
M	0.022 REF		0.55 REF		

### Suggested Solder Pad Layout



**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5		-0.9	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4A$		30	39	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3A$		38	49	
		$V_{GS}=1.8V, I_D=-2A$		51	63	
Gate Resistance	$R_g$	F=1 MHz, Open drain		14.1		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				-4.2	A
Pulse Diode Forward Current	$I_{SM}$				-10	
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-3.3A$		-0.8	-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=-4.1A, dI_F/dt=100A/\mu s$		38		ns
Reverse Recovery Charge	$Q_{rr}$			22		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-4V, V_{GS}=0V, f=1MHz$		821		pF
Output Capacitance	$C_{oss}$			149		
Reverse Transfer Capacitance	$C_{rss}$			126		
Total Gate Charge	$Q_g$	$V_{DS}=-4V, V_{GS}=-4.5V, I_D=-4.1A$		8.58		nC
	$Q_g$	$V_{DS}=-4V, V_{GS}=-2.5V, I_D=-4.1A$		4.7		
Gate-Source Charge	$Q_{gs}$	$V_{DS}=-4V, V_{GS}=-2.5V, I_D=-4.1A$		1.2		
Gate-Drain Charge	$Q_{gd}$	$V_{DS}=-4V, V_{GS}=-2.5V, I_D=-4.1A$		1.4		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-4V, V_{GS}=-4.5V, R_{GEN}=-4.5\Omega, I_D=-3.3A$		8.6		ns
Turn-On Rise Time	$t_r$			12		
Turn-Off Delay Time	$t_{d(off)}$			61		
Turn-Off Fall Time	$t_f$			26		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

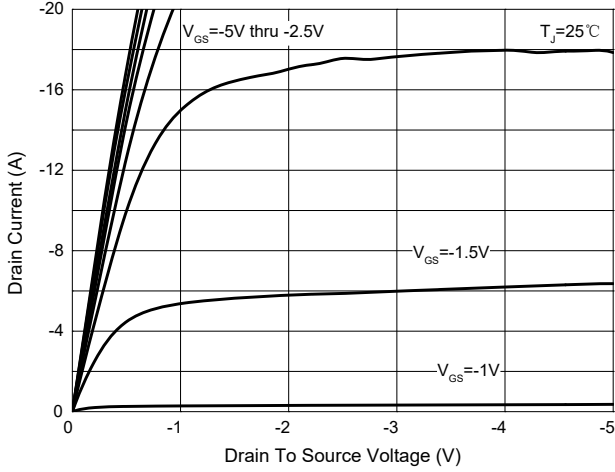


Fig. 2 - Transfer Characteristics

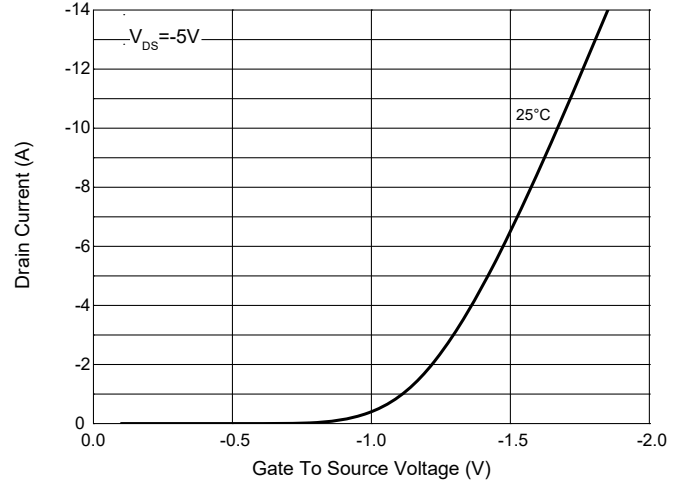


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

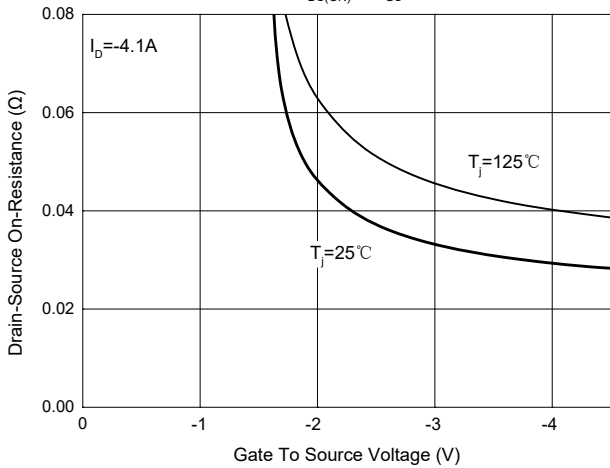


Fig. 4 -  $R_{DS(ON)} - I_D$

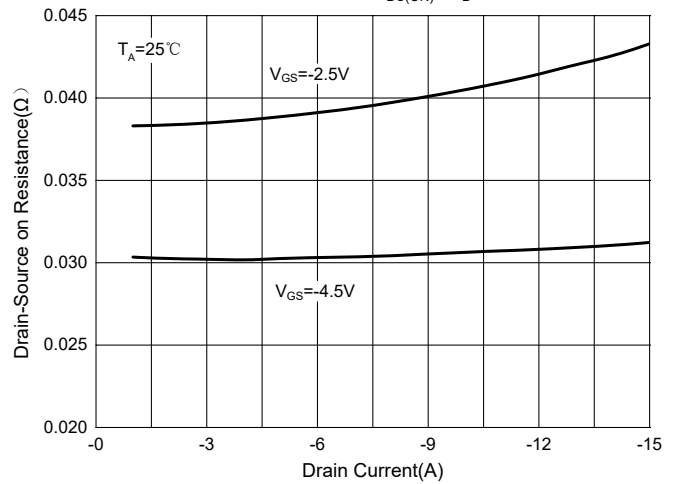


Fig. 5 - Capacitance Characteristics

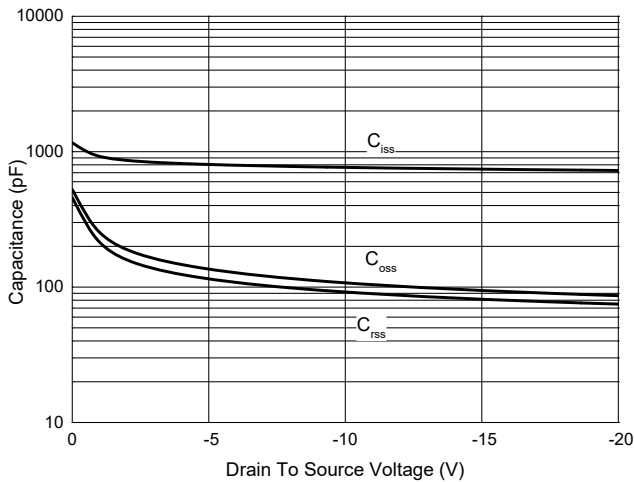
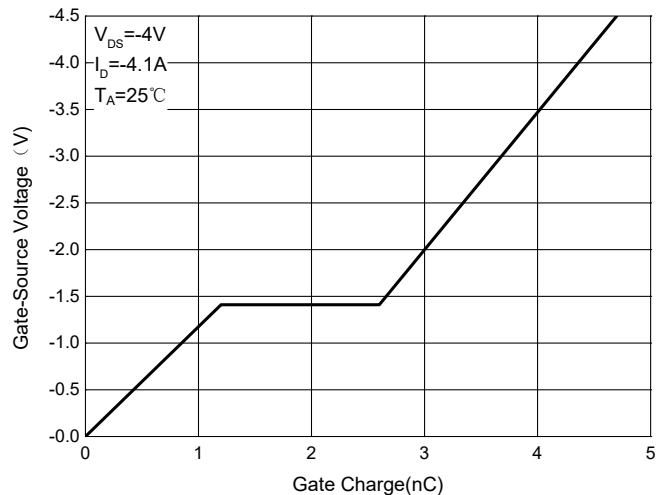


Fig. 6 - GateCharge



Curve Characteristics

Fig.7-NormalizedOnResistanceCharacteristics

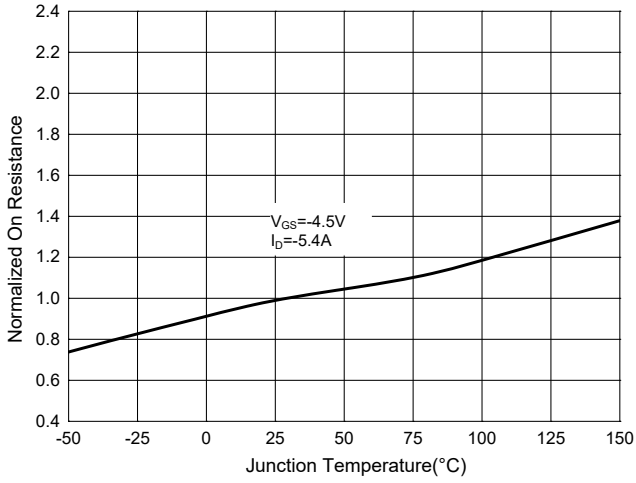


Fig. 8 - Normalized Threshold voltage

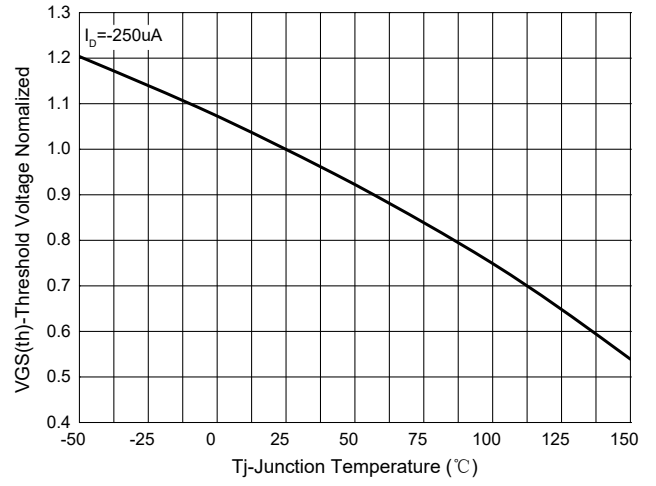


Fig. 9 -  $I_s - V_{SD}$

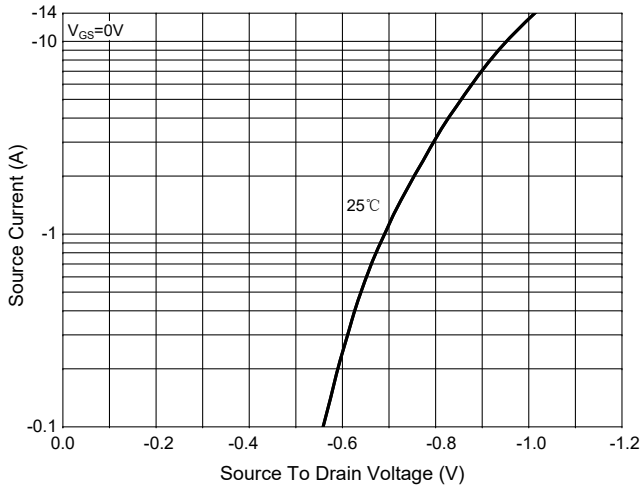


Fig. 10 - Current Dissipation

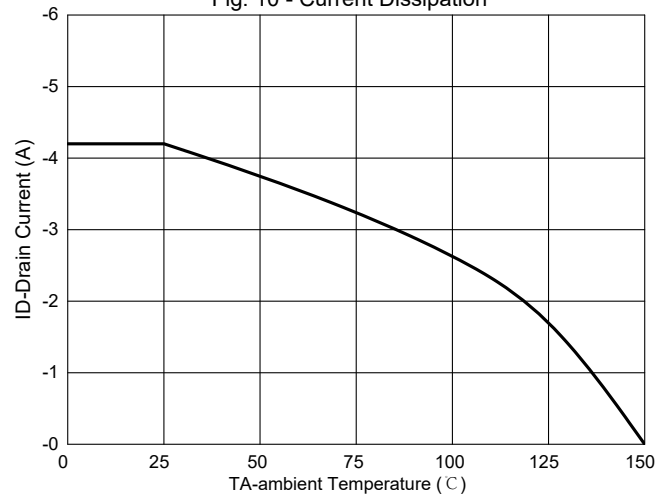
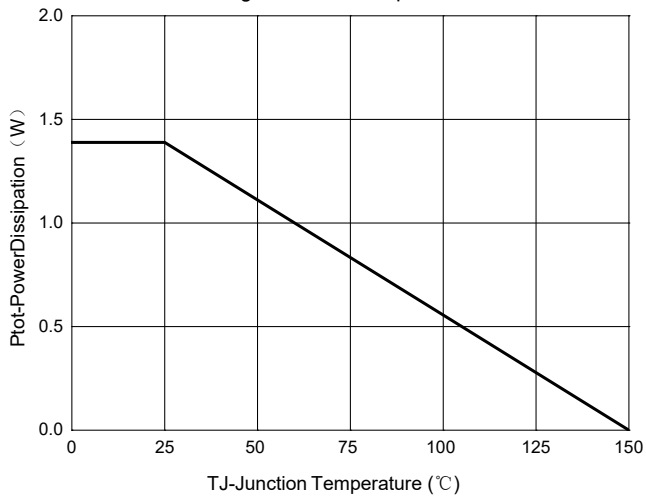


Fig.11-PowerDissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

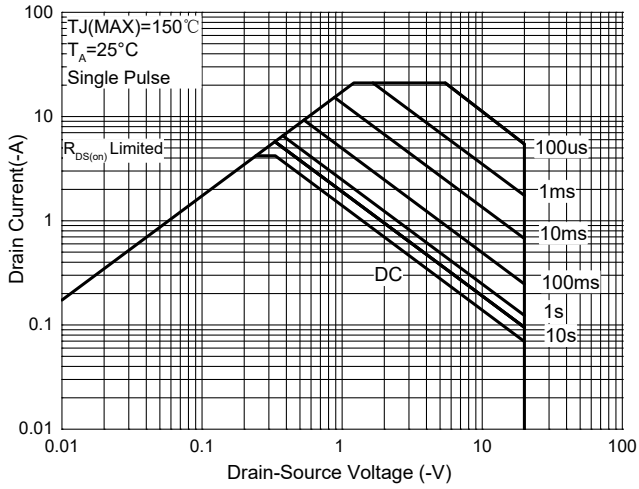
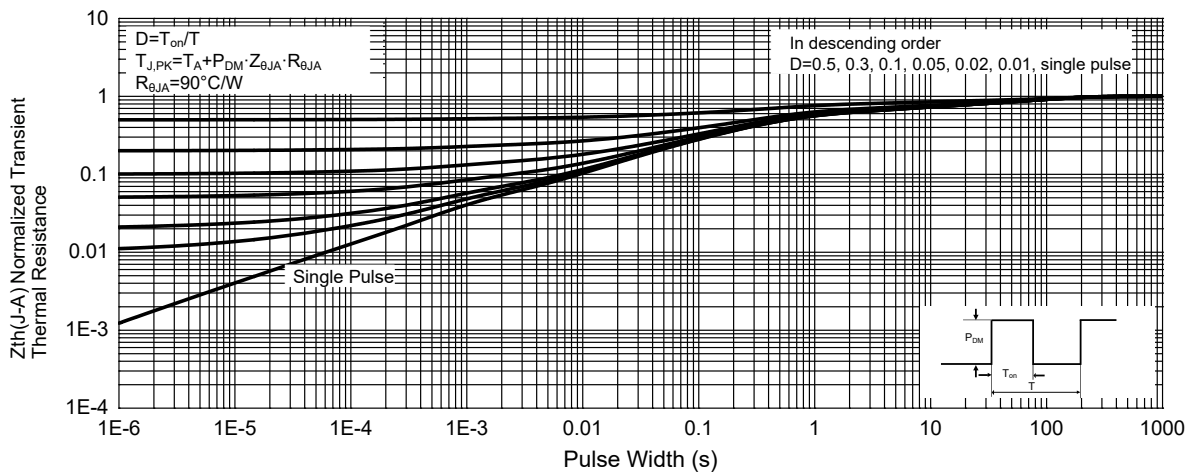


Fig. 13 -Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
SI2305B-TP	Tape&Reel: 3Kpcs/Reel
SI2305B-13P	Tape&Reel: 10Kpcs/Reel

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