

P-Channel Enhancement Mode Field Effect Transistor

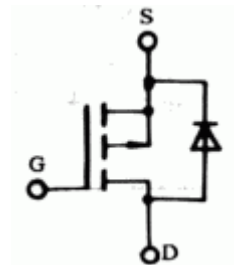
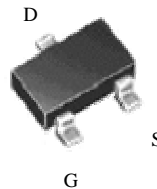
FEATURES

- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- SOT-23 package

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω) Typ
-20V	-3.6A	95 @ $V_{GS}=-4.5V$
		115 @ $V_{GS}=-2.5V$



NOTE: The SI2301BDS is available in a lead-free package



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous ^a @ $T_j=125^\circ C$	I_D	-3.6	A
- Pulse d^b	I_{DM}	-11	A
Drain-source Diode Forward Current ^a	I_S	-1.25	A
Maximum Power Dissipation ^a	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_j, T_{STG}	-55 to 150	$^\circ C$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient ^a	$R_{th JA}$	100	$^\circ C/W$
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SI2301BDS

ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-16V, V _{GS} =0V			1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±10V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.8	-1.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-2.8A		95	110	mΩ
		V _{GS} =-2.5V, I _D =-2.0A		115	145	
Forward Transconductance	g _{FS}	V _{GS} =-5V, I _D =-5A		5		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =-10V, V _{GS} =0V f=1.0MHz		586		pF
Output Capacitance	C _{OSS}			101		pF
Reverse Transfer Capacitance	C _{RSS}			59		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =-10V I _D =-2.8A, V _{GEN} =-4.5V R _L =10ohm R _{GEN} =6ohm		6.5		ns
Rise Time	t _r			32.1		ns
Turn-Off Delay Time	t _{D(OFF)}			58.4		ns
Fall Time	t _f			48		ns
Total Gate Charge	Q _g	V _{DS} =-10V, I _D =-3A V _{GS} =-4.5V		6		nC
Gate-Source Charge	Q _{gs}			1.35		nC
Gate-Drain Charge	Q _{gd}			1.5		nC

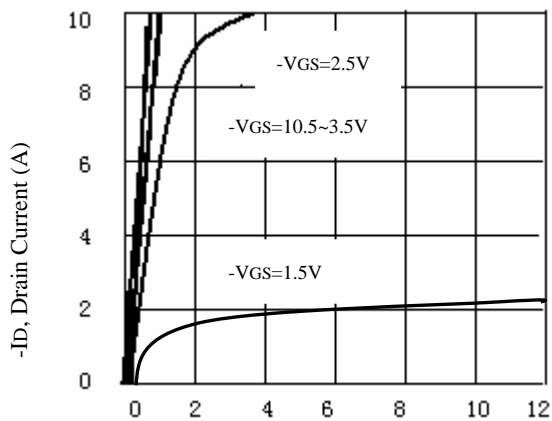
SI2301BDS

ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

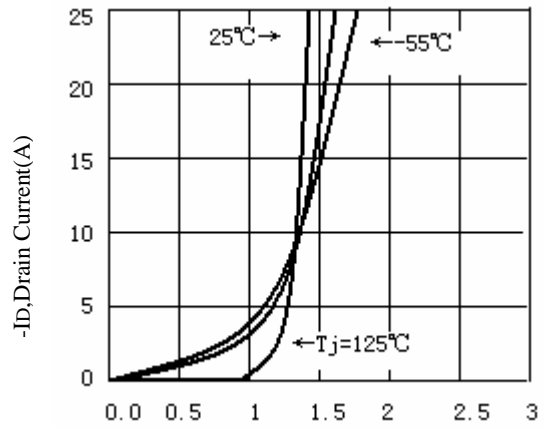
Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-1.25A		-0.81	-1.2	V

Notes

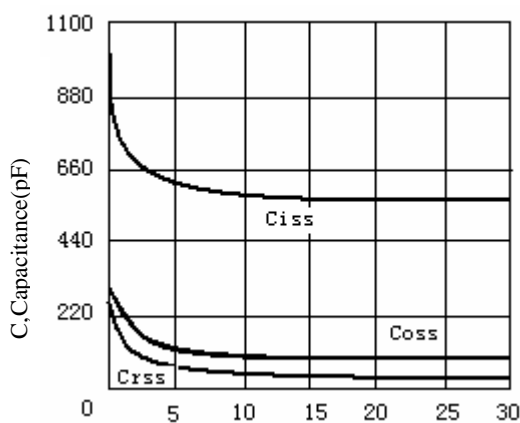
- Surface Mounted on FR4 Board, $t \leq 10\text{sec}$
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty $\leq 2\%$
- Guaranteed by design, not subject to production testing.



- V_{DS}, Drain-to-Source Voltage (V)
Figure 1. Output Characteristics



-V_{GS}, Gate-to-source Voltage (V)
Figure 2. Transfer Characteristics



- V_{GS}, Drain-to Source Voltage
Figure3. Capacitance

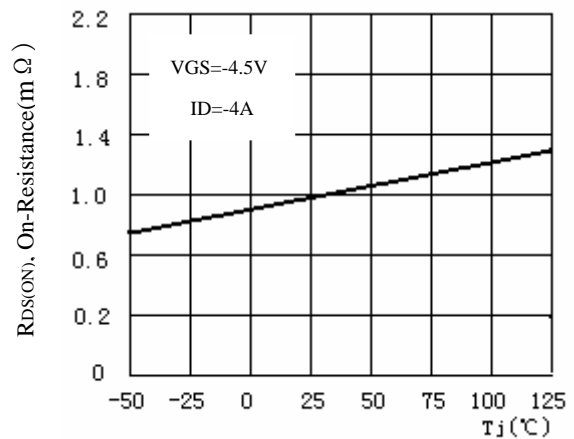
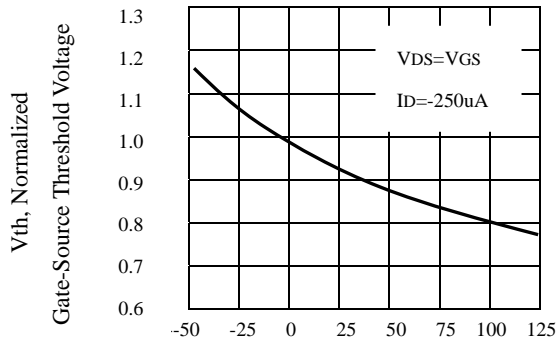
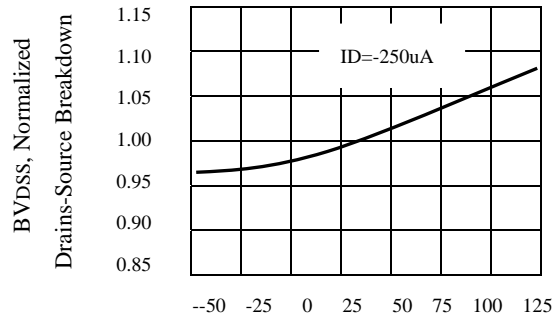


Figure4. On-Resistance Variation with Temperature

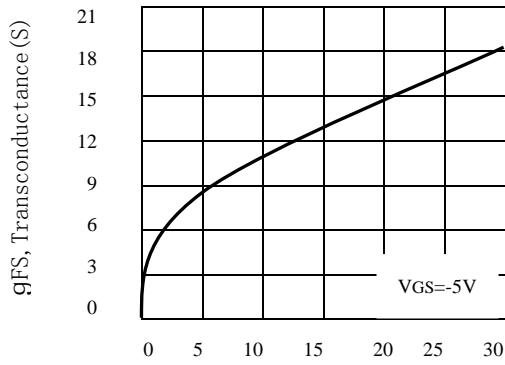
SI2301BDS



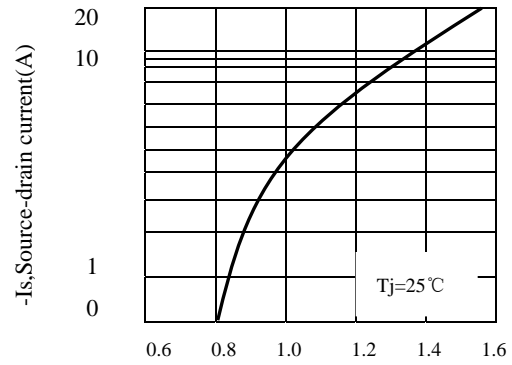
Tj, Junction Temperature (°C)
Figure 5. Gate Threshold Variation With Temperature



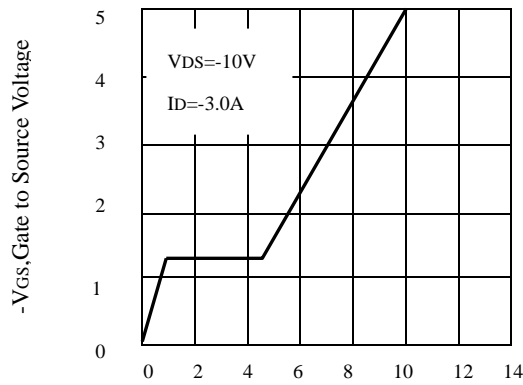
Tj, Junction Temperature (°C)
Figure 6. Breakdown Voltage Variation With Temperature



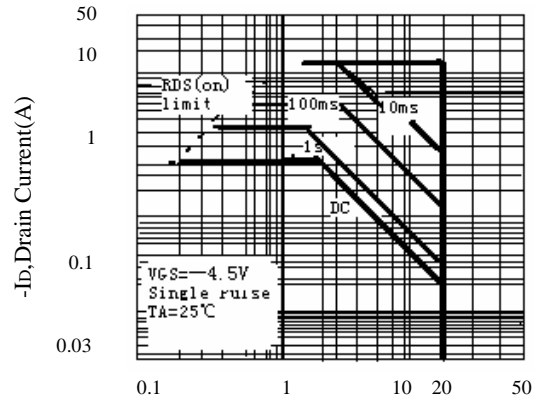
-ID, Drain-Source Current (A)
Figure 7. Transconductance Variation With Drain Current



-VSD, Body Diode Forward Voltage
Figure 8. Body Diode Forward Voltage Variation with Source Current



Qg, Total Gate Charge (nC)
Figure 9. Gate Charge



-VDS, Drain-Source Voltage (V)
Figure 10. Maximum Safe Operating Area