

SI2305

-20V P-Channel Enhancement Mode MOSFET

VDS= -20V

RDS(ON), Vgs@-4.5V, Ids@-4.1A < 52mΩ

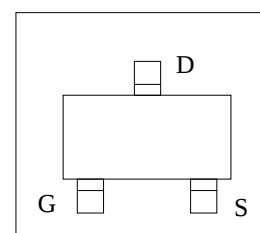
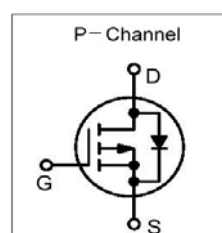
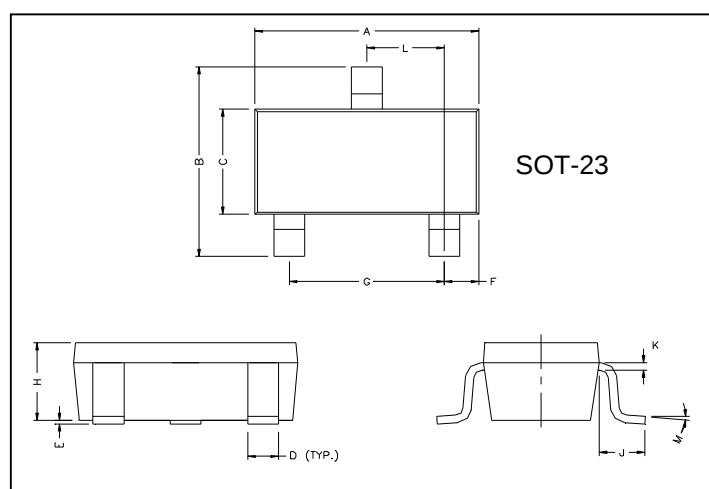
RDS(ON), Vgs@-2.5V, Ids@-3.0A < 75mΩ

Features

Advanced trench process technology

High Density Cell Design For Ultra Low On-Resistance

Package Dimensions



REF.	Millimeter		REF.	Millimete	
	Min.	Max.		Min.	Max.
A	2.80	3.00	G	1.80	2.00
B	2.30	2.50	H	0.90	1.1
C	1.20	1.40	K	0.10	0.20
D	0.30	0.50	J	0.35	0.70
E	0	0.10	L	0.92	0.98
F	0.45	0.55	M	0°	10°

Maximum Ratings and Thermal Characteristics (TA = 25oC unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	-20	V
Gate-Source Voltage		V _{GS}	±12	
Continuous Drain Current		I _D	-4.1	A
Pulsed Drain Current ¹⁾		I _{DM}	-15	
Maximum Power Dissipation ²⁾	TA = 25 ^o	P _D	1.25	W
	TA = 75 ^o C		0.8	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150	°C
Junction-to-Ambient Thermal Resistance (PCB mounted) ²⁾		R _{thJA}	100	°C/W
Junction-to-Ambient Thermal Resistance (PCB mounted) ³⁾			166	

Notes

¹⁾ Pulse width limited by maximum junction temperature.

²⁾ Surface Mounted on FR4 Board, t ≤ 5 sec.

³⁾ Surface Mounted on FR4 Board.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250uA	-20			V
Drain-Source On-State Resistance ¹⁾	R _{DS(on)}	V _{GS} = -4.5V, I _D = -4.1A		46	52	mΩ
		V _{GS} = -2.5V, I _D = -3.0A		60	75	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250uA	0.4		1	V
Zero Gate Voltage Drain Current 0	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V			-1	uA
		V _{DS} = -20V, V _{GS} = 0V T _J =55 ^o C			-10	
Gate Body Leakage	I _{GSS}	V _{GS} = ± 12V, V _{DS} = 0V			±100	nA
Forward Transconductance ¹⁾	g _{fs}	V _{DS} = -5V, I _D = -3.5A		6.5	—	S
Dynamic						
Total Gate Charge	Q _g	V _{DS} = -6V, I _D ≅ -3.5A V _{GS} = -4.5V		5.8	10	nC
Gate-Source Charge	Q _{gs}			0.85		
Gate-Drain Charge	Q _{gd}			1.7		
Turn-On Delay Time	t _{d(on)}	V _{DD} = -6V, R _L =6Ω I _D ≅ -1.A, V _{GEN} = -4.5V R _G = 6Ω		13	25	ns
Turn-On Rise Time	t _r			36	60	
Turn-Off Delay Time	t _{d(off)}			42	70	
Turn-Off Fall Time	t _f			34	60	
Input Capacitance	C _{iss}	V _{DS} = -6V, V _{GS} = 0V f = 1.0 MHz		415		pF
Output Capacitance	C _{oss}			223		
Reverse Transfer Capacitance	C _{rss}			87		
Source-Drain Diode						
Max. Diode Forward Current	I _S				-1.6	A
Diode Forward Voltage	V _{SD}	I _S = -1.6A, V _{GS} = 0V		-0.8	-1.2	V

¹⁾ Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

Typical Electrical and Thermal Characteristics

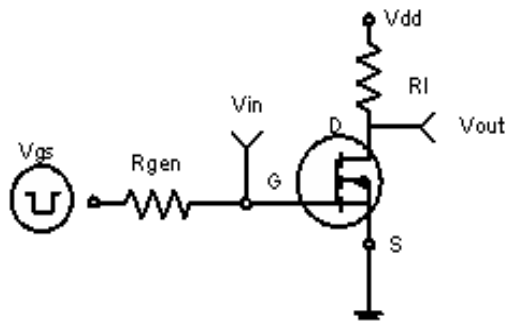


Figure 1: Switching Test Circuit

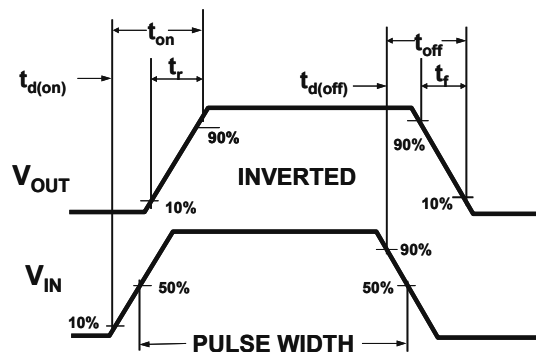
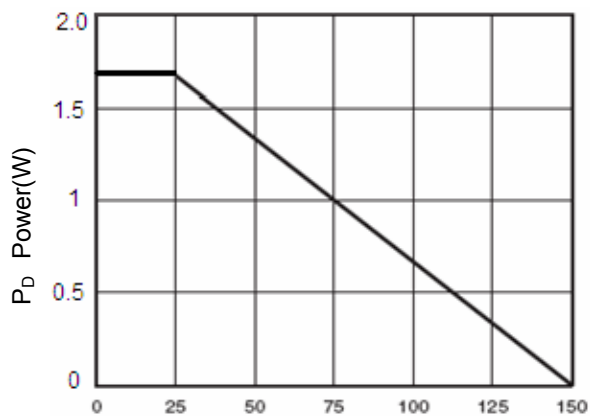
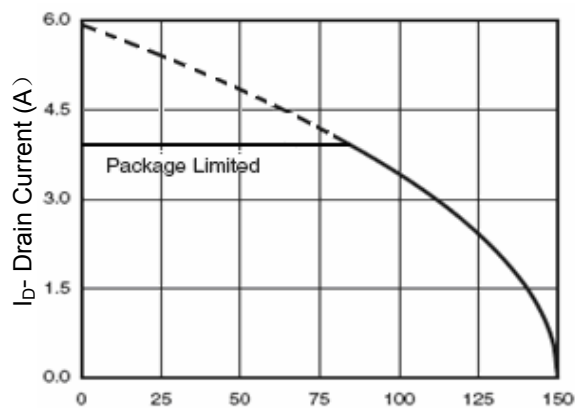


Figure 2: Switching Waveforms



T_J -Junction Temperature($^{\circ}\text{C}$)

Figure 3 Power Dissipation



T_J -Junction Temperature($^{\circ}\text{C}$)

Figure 4 Drain Current

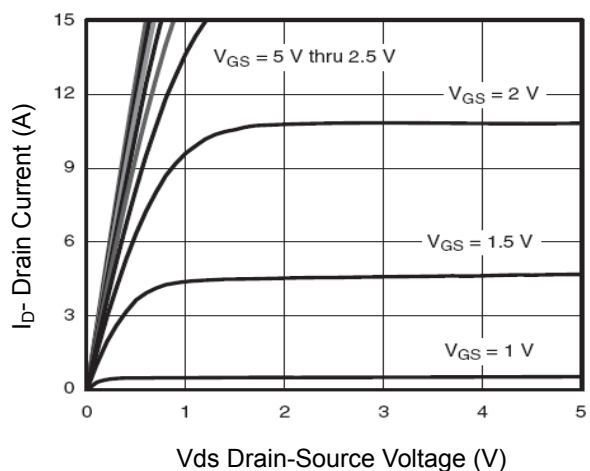


Figure 5 Output Characteristics

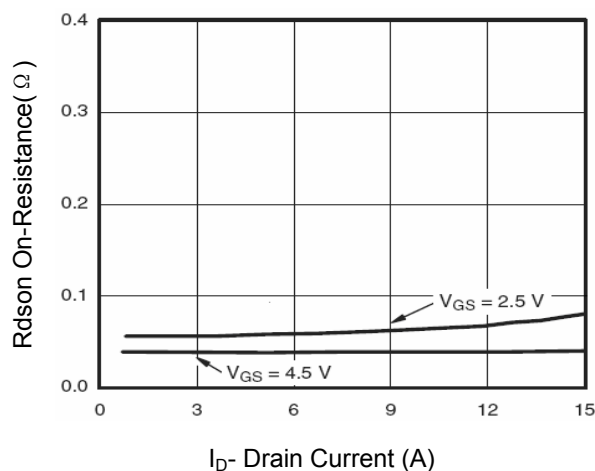


Figure 6 Drain-Source On-Resistance

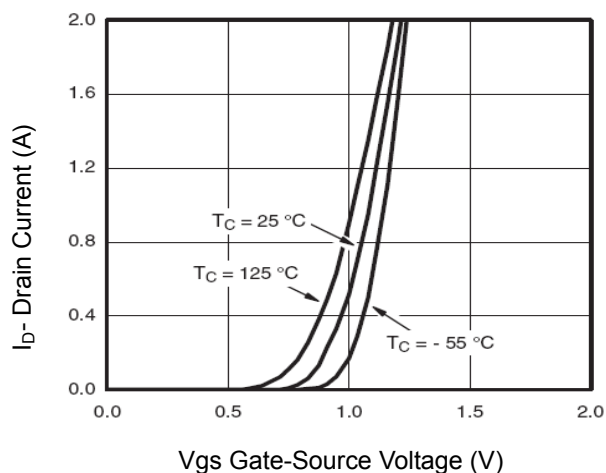


Figure 7 Transfer Characteristics

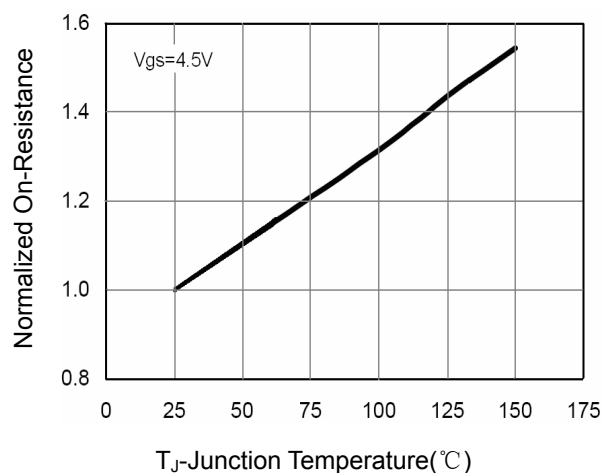


Figure 8 Drain-Source On-Resistance

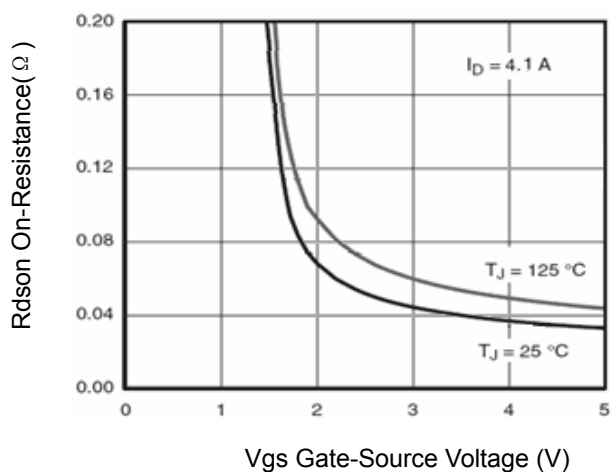


Figure 9 Rdson vs Vgs

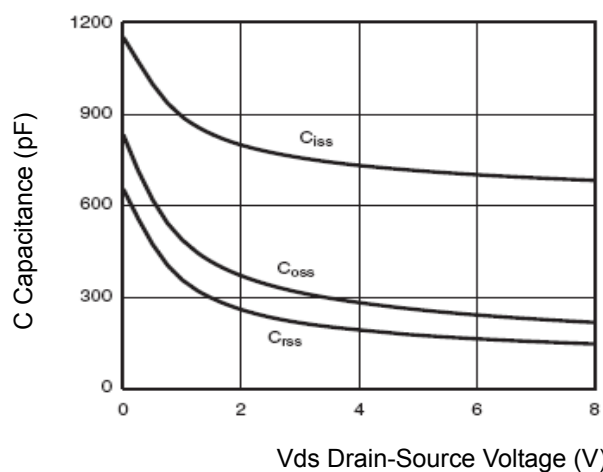


Figure 10 Capacitance vs Vds

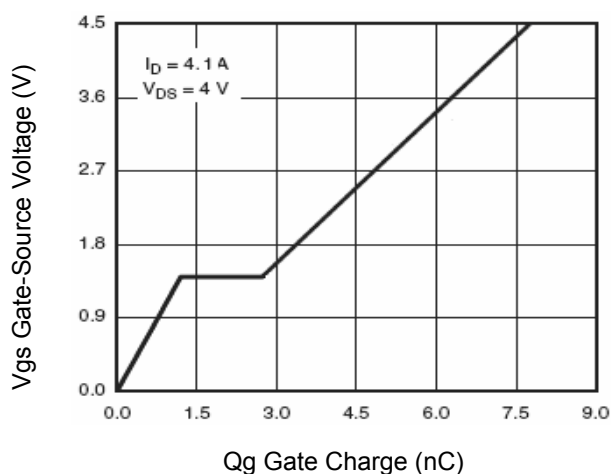


Figure 11 Gate Charge

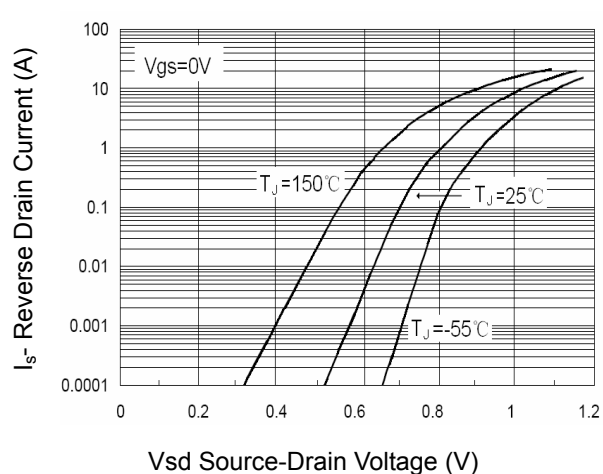


Figure 12 Source- Drain Diode Forward

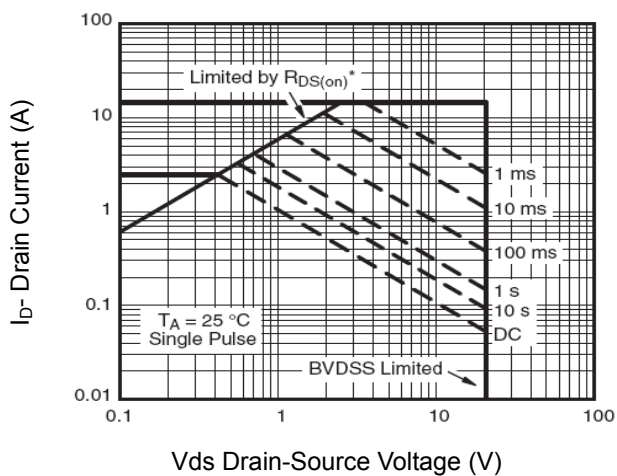


Figure 13 Safe Operation Area

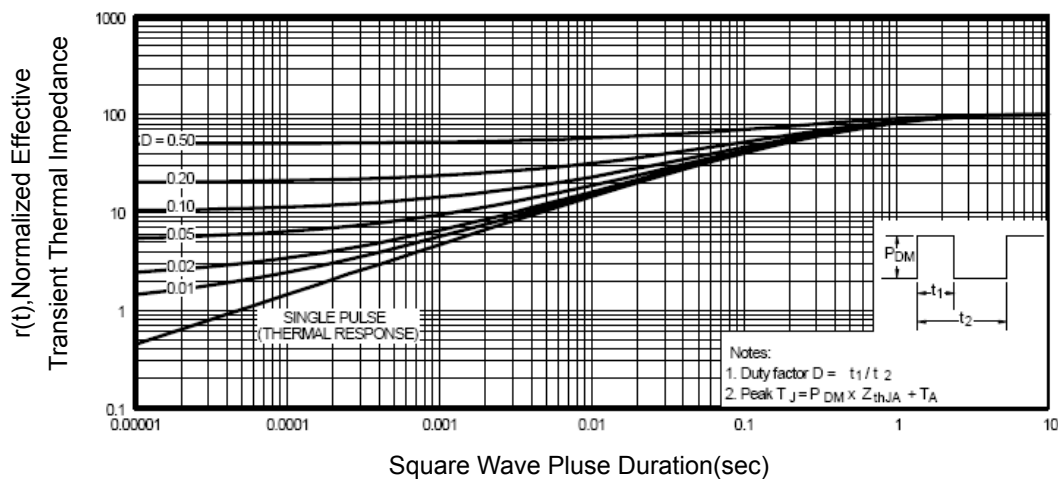


Figure 14 Normalized Maximum Transient Thermal Impedance