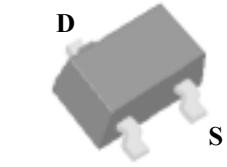
US2305

Unitpower

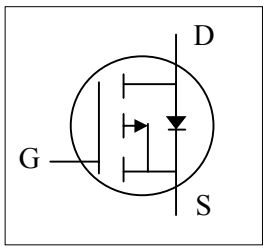
P-Channel Enhancement Mode MOSFET

- **Simple Drive Requirement**
- **Small Package Outline**
- **Surface Mount Device**



SOT-23

BV_{DSS}	-20V
$R_{DS(ON)}$	65mΩ
I_D	- 4.2A



The SOT-23 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	- 20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D@T_A=25℃	Continuous Drain Current[3]	-4.2	A
I_D@T_A=70℃	Continuous Drain Current[3]	-3.4	A
I_{DM}	Pulsed Drain Current[1,2]	-10	A
P_D@T_A=25℃	Total Power Dissipation	1.38	W
	Linear Derating Factor	0.01	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter		Value	Unit
Rthj-amb	Thermal Resistance Junction-ambient[3]	Max.	90	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-20	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=-1mA	-	-0.1	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-4.5A	-	-	53	mΩ
		V_{GS}=-4.5V, I_D=-4.2A	-	-	65	mΩ
		V_{GS}=-2.5V, I_D=-2.0A	-	-	100	mΩ
		V_{GS}=-1.8V, I_D=-1.0A	-	-	250	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.5	-	-	V
g_{fs}	Forward Transconductance	V_{DS}=-5V, I_D=-2.8A	-	9	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=-20V, V_{GS}=0V	-	-	-1	uA
	Drain-Source Leakage Current (T_j=55°C)	V_{DS}=-16V, V_{GS}=0V	-	-	-10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ± 12V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=-4.2A	-	10.6	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-16V	-	2.32	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	3.68	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=-15V	-	5.9	-	ns
t_r	Rise Time	I_D=-4.2A	-	3.6	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=6Ω,V_{GS}=-10V	-	32.4	-	ns
t_f	Fall Time	R_D=3.6Ω	-	2.6	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	740	-	pF
C_{oss}	Output Capacitance	V_{DS}=-15V	-	167	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	126	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=-1.2A, V_{GS}=0V	-	-	-1.2	V
trr	Reverse Recovery Time	I_S=-4.2A, V_{GS}=0V,	-	27.7	-	ns
Qrr	Reverse Recovery Charge	dI/dt=100A/μs	-	22	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse width ≤300us , duty cycle ≤2%.

3.Surface mounted on 1 in^2 copper pad of FR4 board ; 270℃/W when mounted on min. copper pad.

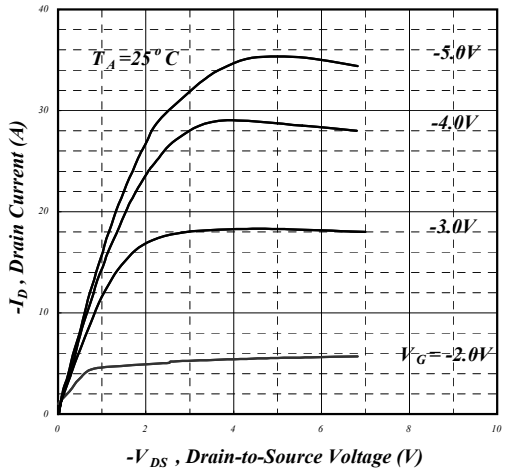


Fig 1. Typical Output Characteristics

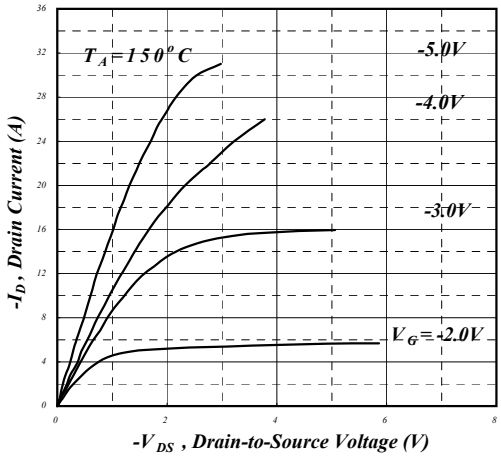


Fig 2. Typical Output Characteristics

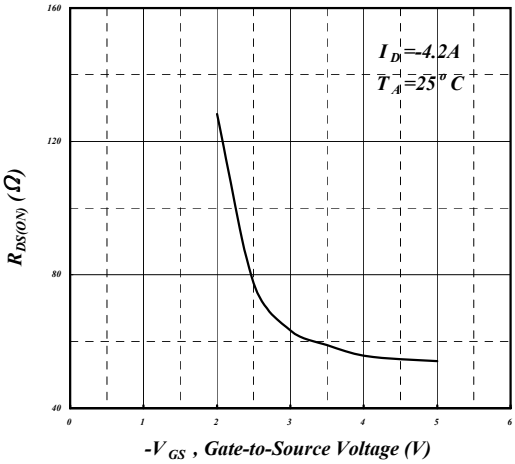


Fig 3. On-Resistance v.s. Gate Voltage

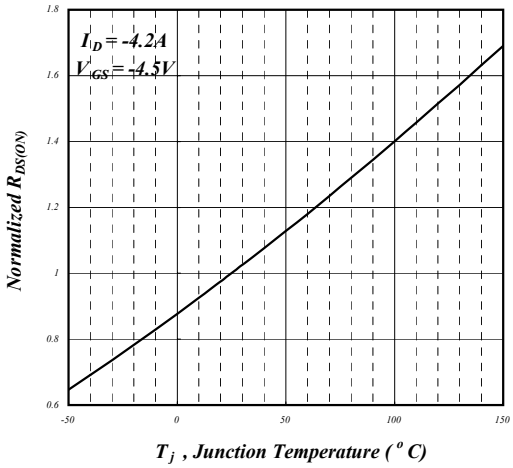


Fig 4. Normalized On-Resistance v.s. Junction Temperature

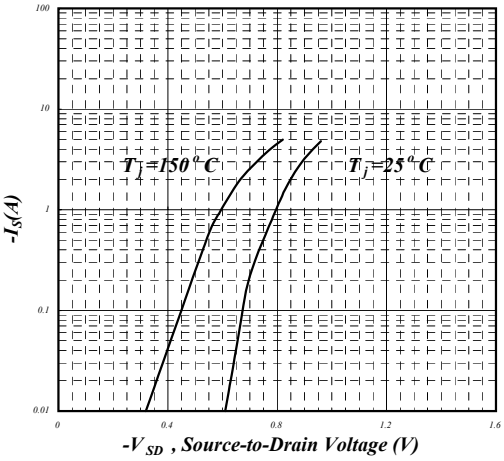


Fig 5. Forward Characteristic of Reverse Diode

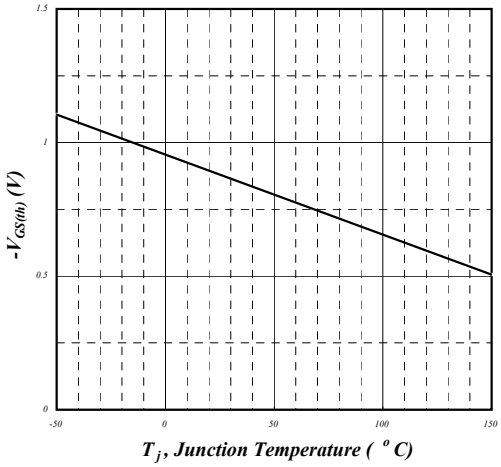


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

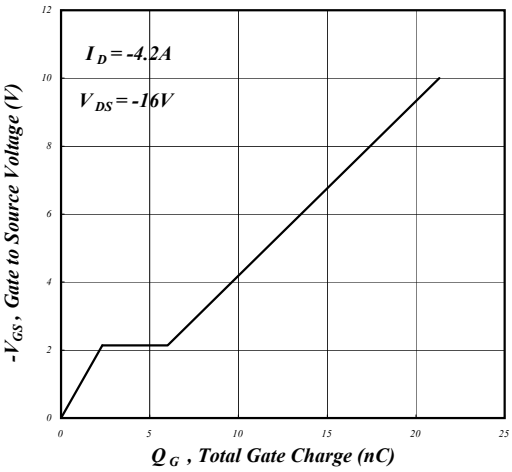


Fig 7. Gate Charge Characteristics

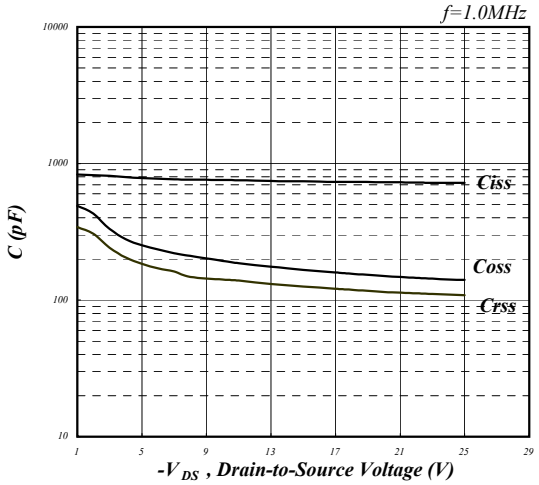


Fig 8. Typical Capacitance Characteristics

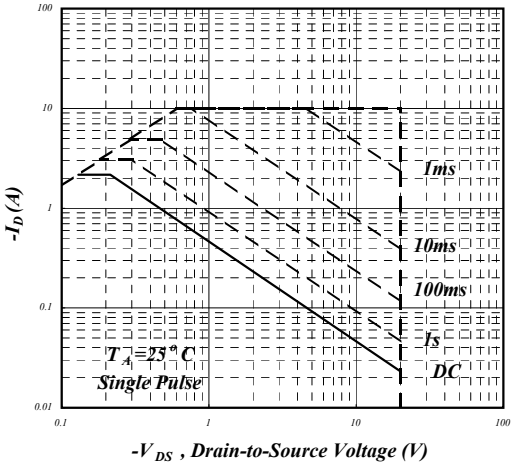


Fig 9. Maximum Safe Operating Area

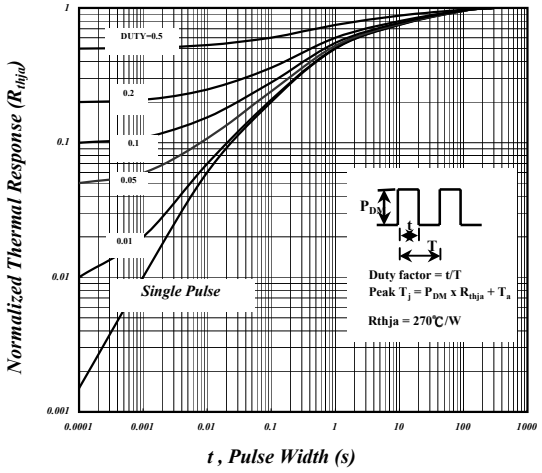


Fig 10. Effective Transient Thermal Impedance

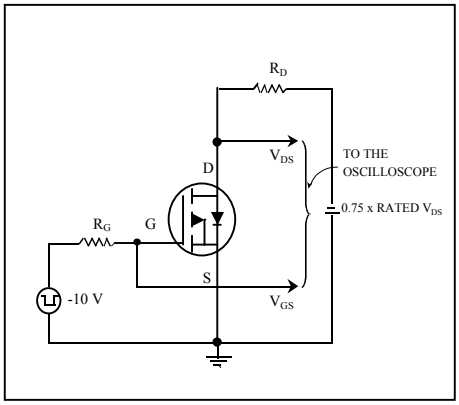


Fig 11. Switching Time Circuit

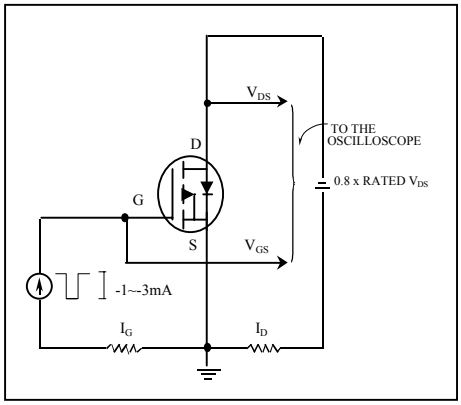


Fig 12. Gate Charge Circuit