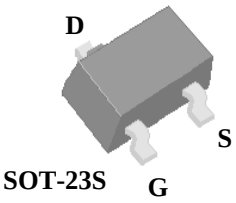
AP2301EN-HF

Halogen-Free Product

Advanced Power Electronics Corp.

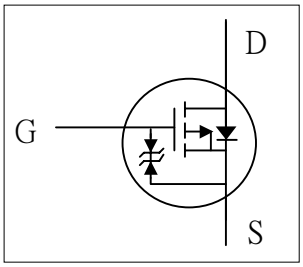
P-CHANNEL ENHANCEMENT MODE POWER MOSFET

- **Capable of 2.5V Gate Drive**
- **Small Package Outline**
- **Surface Mount Device**
- **RoHS Compliant & Halogen-Free**



SOT-23S

BV_{DSS}	-20V
$R_{DS(ON)}$	130mΩ
I_D	-2.3A



Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching,low on-resistance and cost-effectiveness.

The SOT-23S package is widely preferred for 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], V_{GS} @ 4.5V	-2.3	A
I_D@T_A=70℃	Continuous Drain Current[3], V_{GS} @ 4.5V	-1.8	A
I_{DM}	Pulsed Drain Current[1]	-10	A
P_D@T_A=25℃	Total Power Dissipation	1	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-a	Maximum Thermal Resistance, Junction-ambient[3]	125	℃/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
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V, I_D=-2A	-	-	130	mΩ
		V_{GS}=-2.5V, I_D=-1A	-	-	190	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-0.3	-0.7	-1.2	V
g_{fs}	Forward Transconductance	V_{DS}=-5V, I_D=-2A	-	7	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V, V_{GS}=0V	-	-	-10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±12V, V_{DS}=0V	-	-	±30	uA
Q_g	Total Gate Charge	I_D=-2A	-	6	9.6	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-10V	-	1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=-4.5V	-	1.7	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=-10V	-	7	-	ns
t_r	Rise Time	I_D=-1A	-	16	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	21	-	ns
t_f	Fall Time	V_{GS}=-5V	-	5	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	520	830	pF
C_{oss}	Output Capacitance	V_{DS}=-10V	-	70		pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	55	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=-0.83A, V_{GS}=0V	-	-	-1.2	V
t_{rr}	Reverse Recovery Time	I_S=-2A, V_{GS}=0V,	-	14	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	6	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 in^2 copper pad of FR4 board, t ≤ 5s ; 350℃/W when mounted on min. copper pad.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.

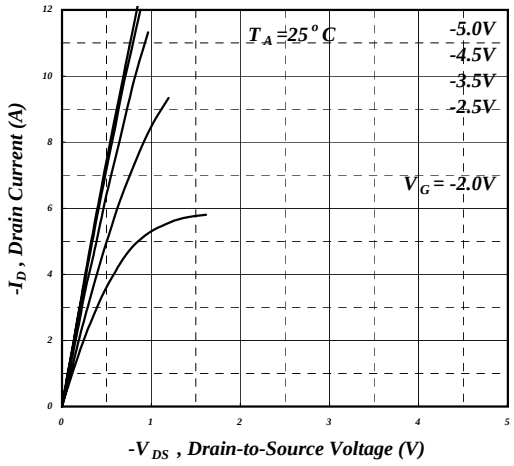


Fig 1. Typical Output Characteristics

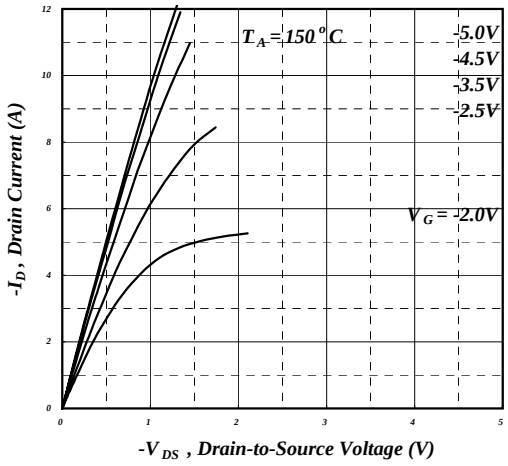


Fig 2. Typical Output Characteristics

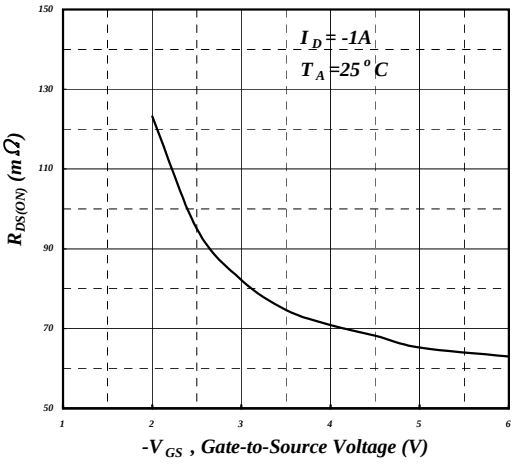


Fig 3. On-Resistance v.s. Gate Voltage

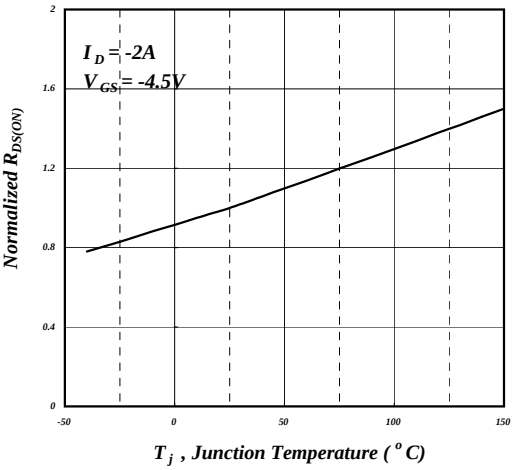


Fig 4. Normalized On-Resistance v.s. Junction Temperature

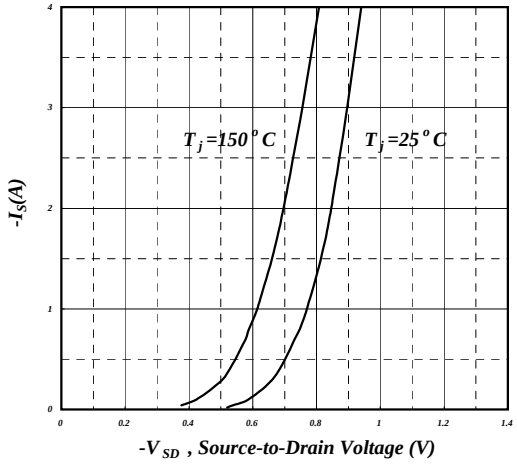


Fig 5. Forward Characteristic of Reverse Diode

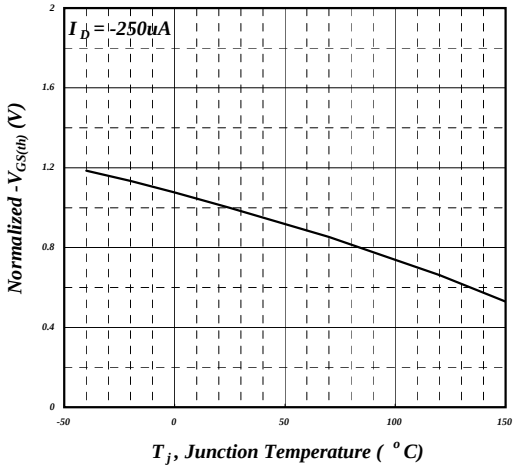


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

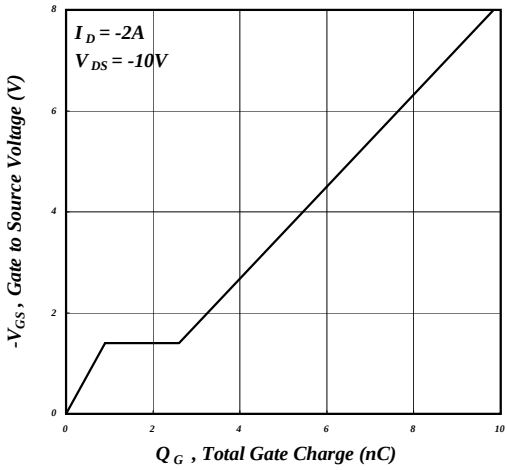


Fig 7. Gate Charge Characteristics

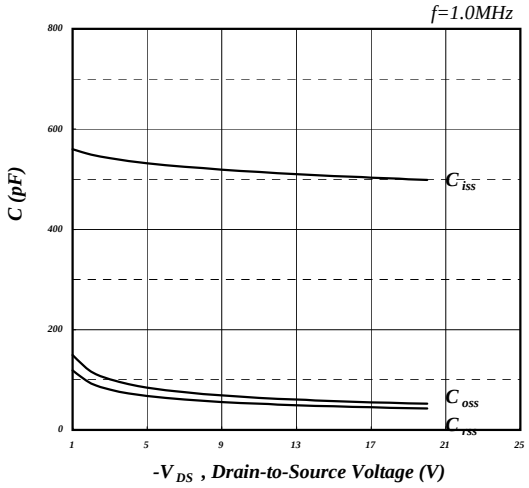


Fig 8. Typical Capacitance Characteristics

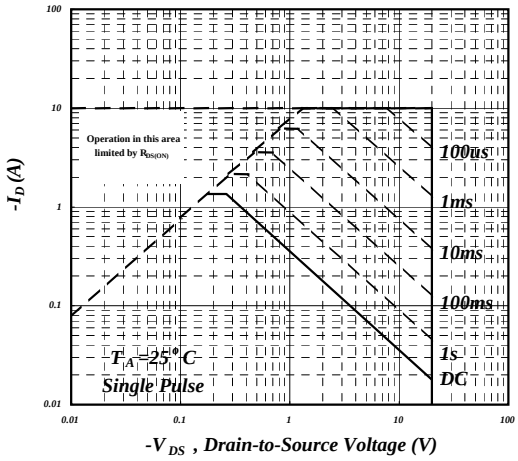


Fig 9. Maximum Safe Operating Area

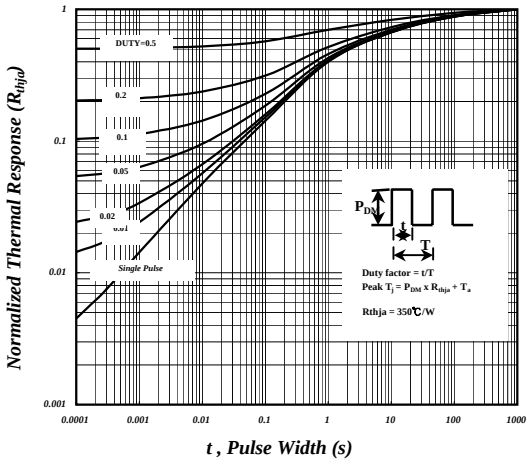


Fig 10. Effective Transient Thermal Impedance

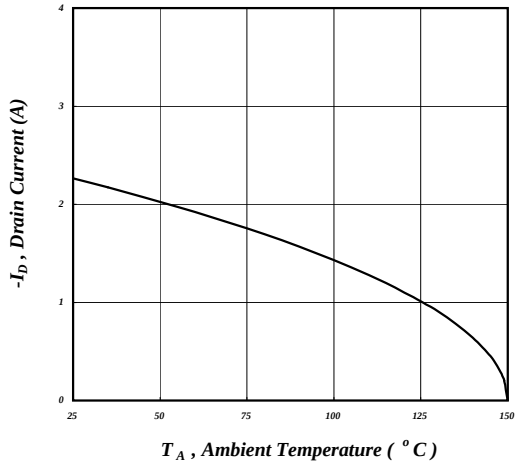


Fig 11. Maximum Continuous Drain Current v.s. Ambient Temperature

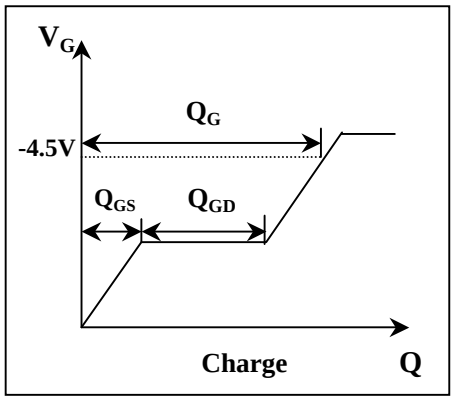


Fig 12. Gate Charge Waveform