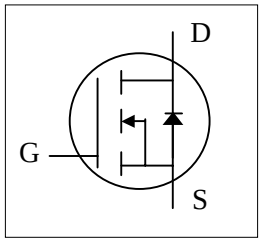
AP1001BSQ

Halogen-Free Product

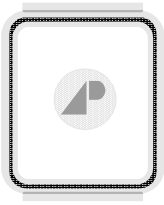
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

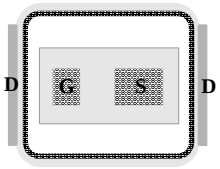
- ▼ **Lead-Free Package**
- ▼ **Low Conductance Loss**
- ▼ **Low Profile (< 0.7mm)**



BV_{DSS}	30V
$R_{DS(ON)}$	6mΩ
I_D	15A



GreenFET™



SQ

Description

The AP1001BSQ used the latest APEC Power MOSFET silicon technology with the advanced technology packaging to provide the lowest on-resistance loss, low profile and dual sided cooling compatible.

The GreenFET™ package is compatible with existing soldering techniques and is ideal for power application, especially for high frequency / high efficiency DC-DC converters.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[3]	15	A
I_D@T_A=100℃	Continuous Drain Current, V_{GS} @ 10V[3]	12	A
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[4]	59	A
I_{DM}	Pulsed Drain Current[1]	120	A
P_D@T_A=25℃	Total Power Dissipation[3]	2.2	W
P_D@T_A=70℃	Total Power Dissipation[3]	1.4	W
P_D@T_C=25℃	Total Power Dissipation[4]	34	W
E_{AS}	Single Pulse Avalanche Energy[5]	28.8	mJ
I_{AR}	Avalanche Current	24	A
T_{STG}	Storage Temperature Range	-40 to 150	℃
T_J	Operating Junction Temperature Range	-40 to 150	℃

Thermal Data

Rthj-c	Maximum Thermal Resistance, Junction-case[4]	3.7	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	58	℃/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	30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=15A	-	4.5	6	mΩ
		V_{GS}=4.5V, I_D=12A	-	7.4	10	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	2.5	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=12A	12	22	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=125°C)	V_{DS}=20V ,V_{GS}=0V	-	-	150	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ±20V, V_{DS}=0V	-	-	±100	nA
Q_g	Total Gate Charge[2]	I_D=12A	-	9	14.4	nC
Q_{gs}	Gate-Source Charge	V_{DS}=13V	-	2.5	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	5	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=13V	-	9	-	ns
t_r	Rise Time	I_D=12A	-	55	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G= 3.3 Ω,V_{GS}= 10 V	-	20	-	ns
t_f	Fall Time	R_D= 1.08 Ω	-	5.6	-	ns
	Input Capacitance	V_{GS}=0V	-	810	1300	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	295	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	150	-	pF
R_g	Gate Resistance	f=1.0MHz	-	2	3.2	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)		-	-	2.7	A
I_{SM}	Pulsed Source Current (Body Diode)[1]		-	-	120	A
V_{SD}	Forward On Voltage[2]	I_S=12A, V_{GS}=0V	-	-	1	V
t_{rr}	Reverse Recovery Time	I_S=12A, V_{GS}=0V,	-	28	42	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	20	30	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.

4.T_C measured with thermocouple mounted to top (Drain) of part.

5.Starting T_j=25°C , L=0.1mH , R_G=25Ω

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.

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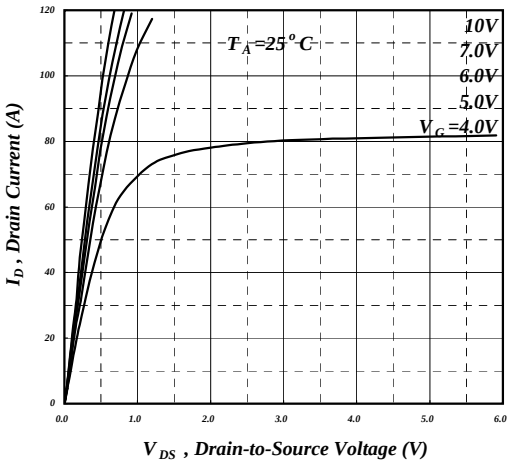


Fig 1. Typical Output Characteristics

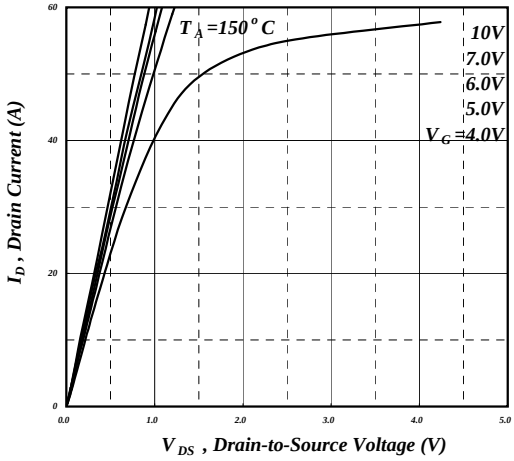


Fig 2. Typical Output Characteristics

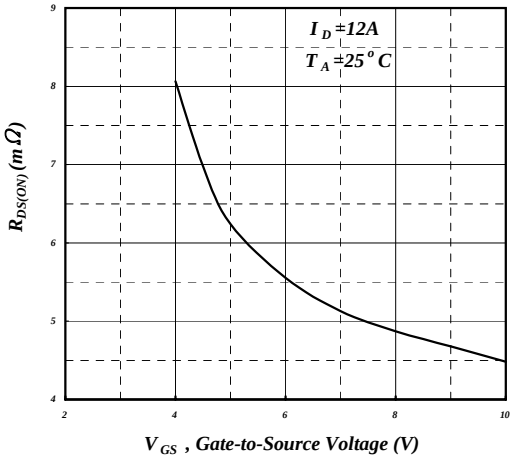


Fig 3. On-Resistance v.s. Gate Voltage

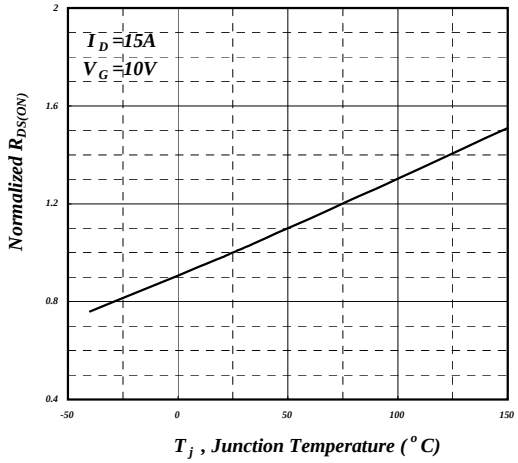


Fig 4. Normalized On-Resistance v.s. Junction Temperature

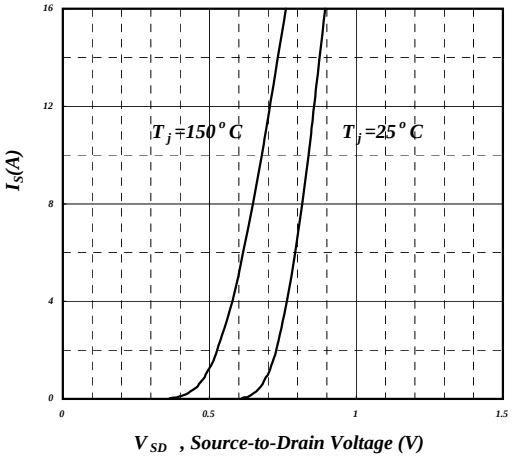


Fig 5. Forward Characteristic of Reverse Diode

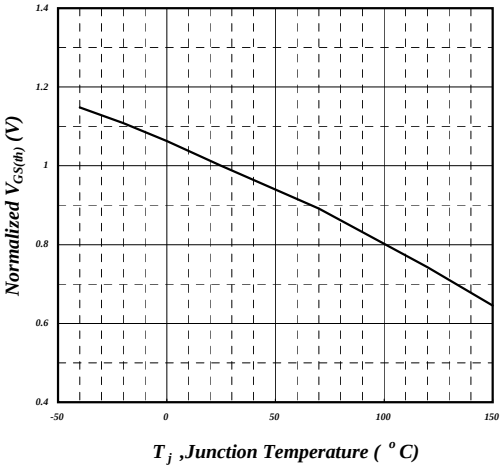


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

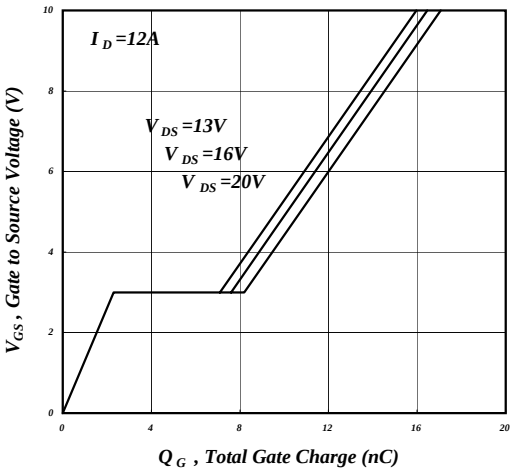


Fig 7. Gate Charge Characteristics

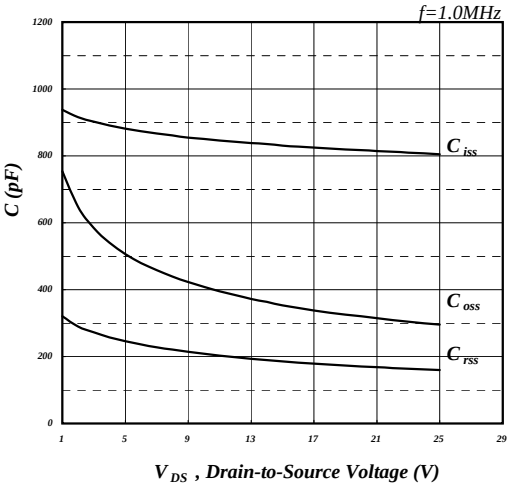


Fig 8. Typical Capacitance Characteristics

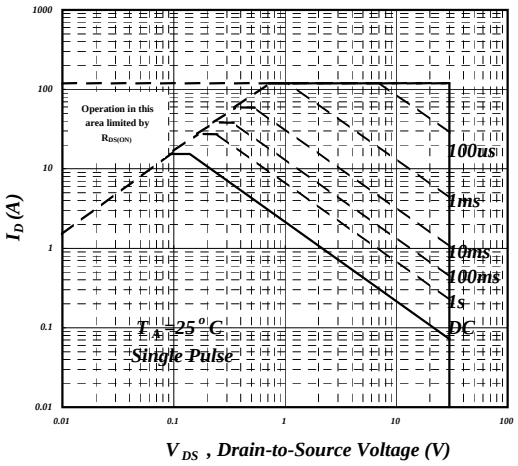


Fig 9. Maximum Safe Operating Area

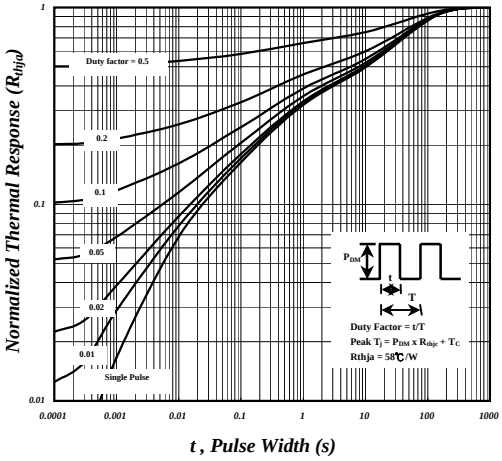


Fig10. Effective Transient Thermal Impedance

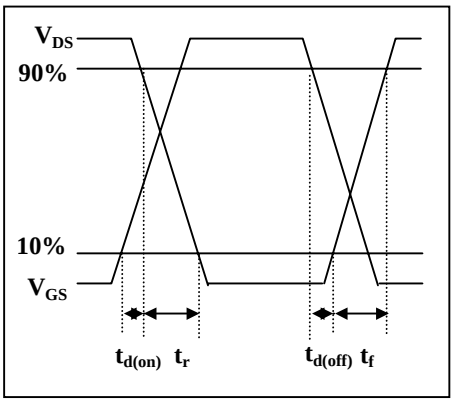


Fig 11. Switching Time Waveform

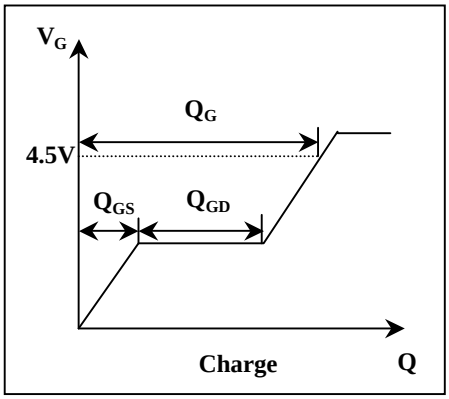


Fig 12. Gate Charge Waveform