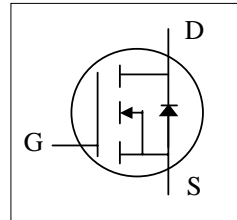


- ▼ Lead-Free Package
- ▼ Low Conductance Loss
- ▼ Low Profile (< 0.7mm)
- ▼ Compatible with DirectFET® Package SQ
Footprint and Outline



BV_{DSS}	30V
$R_{DS(ON)}$	3.8m Ω
I_D	19A

Description

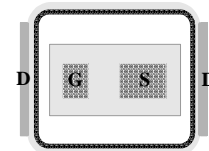
The AP1005BSQ used the latest APEC Power MOSFET silicon technology with the advanced technology packaging to provide the lowest on-resistance loss, low profile and dual sided cooling compatible.

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

(A) GreenFET™ products use DirectFET® technology licensed from International Rectifier Corporation. DirectFET® is a registered trademark of International Rectifier Corporation.



GreenFET™



SQ

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^3$	19	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^3$	15	A
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^4$	84	A
I_{DM}	Pulsed Drain Current ¹	150	A
$P_D @ T_A = 25^\circ\text{C}$	Total Power Dissipation ³	2.2	W
$P_D @ T_A = 70^\circ\text{C}$	Total Power Dissipation ³	1.4	W
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation ⁴	41.7	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	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-40 to 150	$^\circ\text{C}$

Thermal Data

R_{thj-c}	Maximum Thermal Resistance, Junction-case ⁴	3	$^\circ\text{C}/\text{W}$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	58	$^\circ\text{C}/\text{W}$



Electrical Characteristics @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=19A$	-	2.6	3.8	m Ω
		$V_{GS}=4.5V, I_D=15A$	-	4.3	7.5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	2.5	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=15A$	-	30	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
	Drain-Source Leakage Current ($T_j=125^\circ\text{C}$)	$V_{DS}=20V, V_{GS}=0V$	-	-	150	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D=15A$	-	16.6	26.6	nC
Q_{gs1}	Pre- V_{th} Gate-Source Charge	$V_{DS}=13V$	-	3	-	nC
Q_{gs2}	Post- V_{th} Gate-Source Charge	$V_{GS}=4.5V$	-	0.8	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge		-	9.2	-	nC
Q_{godr}	Gate Charge Overdrive		-	3.7	-	nC
Q_{sw}	Switch Charge ($Q_{gs2}+Q_{gd}$)		-	10	-	nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}=13V$	-	11	-	ns
t_r	Rise Time	$I_D=12A$	-	60	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=1.5\ \Omega$	-	28	-	ns
t_f	Fall Time	$V_{GS}=10V$	-	9	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	1360	2180	pF
C_{oss}	Output Capacitance	$V_{DS}=25V$	-	570	-	pF
C_{riss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	210	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	3.3	-	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)		-	-	52	A
I_{SM}	Pulsed Source Current (Body Diode) ¹		-	-	150	A
V_{SD}	Forward On Voltage ²	$I_S=15A, V_{GS}=0V$	-	-	1	V
t_{rr}	Reverse Recovery Time	$I_S=15A, V_{GS}=0V,$	-	37	55	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	32	48	nC

Notes:

1. Pulse width limited by Max junction temperature.
2. Pulse test
3. Surface mounted on 1 in² copper pad of FR4 board.
4. T_C measured with thermocouple mounted to top (Drain) of part.
5. Starting $T_j=25^\circ\text{C}$, $L=0.1\text{mH}$, $R_G=25\ \Omega$, $I_{AS}=24A$

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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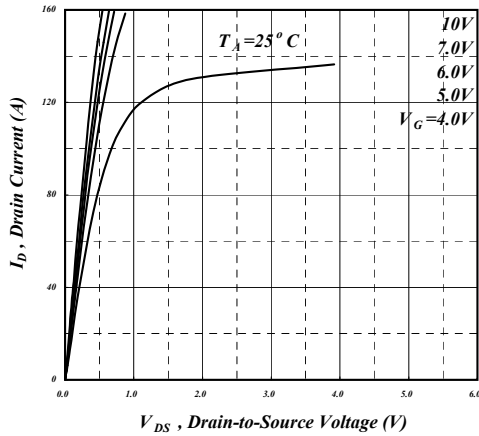


Fig 1. Typical Output Characteristics

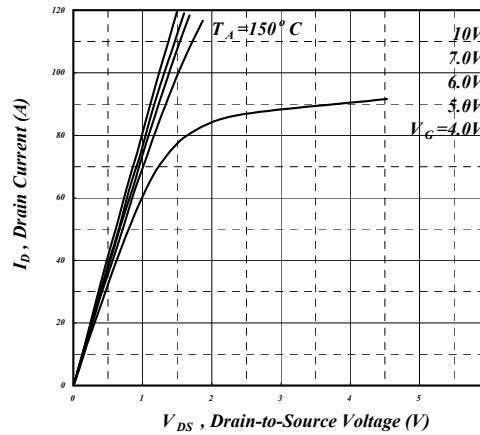


Fig 2. Typical Output Characteristics

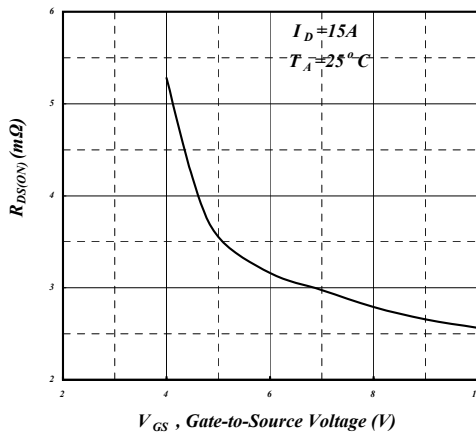


Fig 3. On-Resistance v.s. Gate Voltage

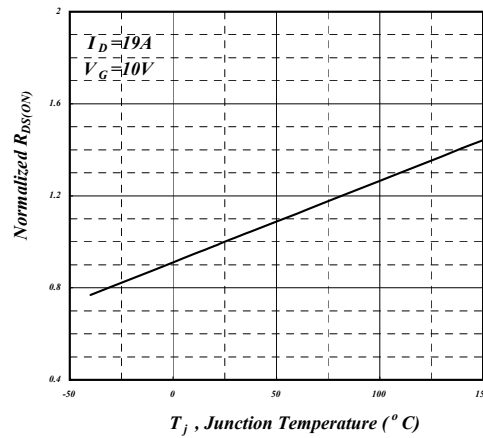


Fig 4. Normalized On-Resistance v.s. Junction Temperature

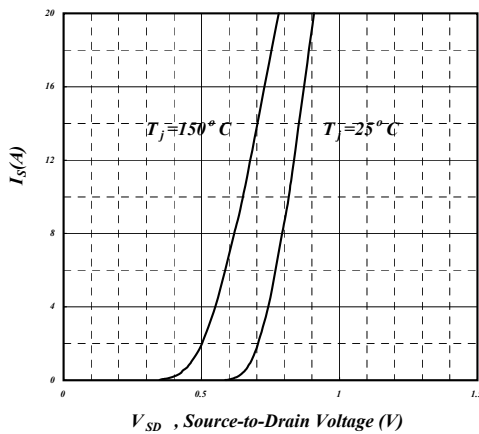


Fig 5. Forward Characteristic of Reverse Diode

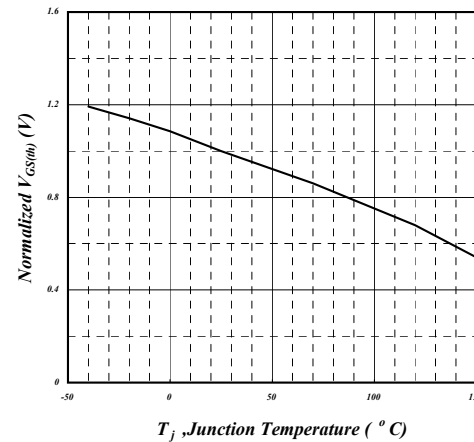


Fig 6. Gate Thresh. Voltage v.s. Junction Temperature

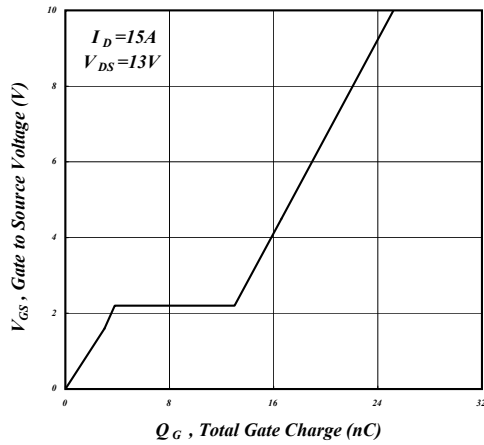


Fig 7. Gate Charge Characteristics

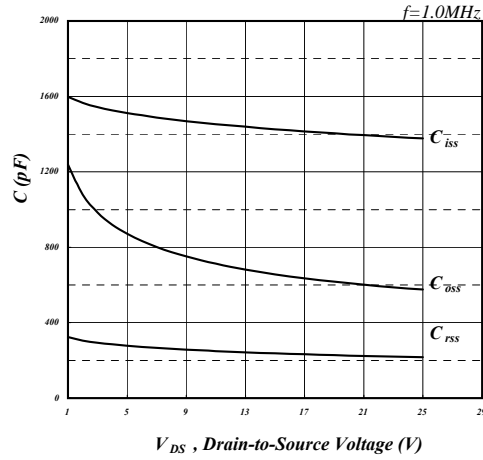


Fig 8. Typical Capacitance Characteristics

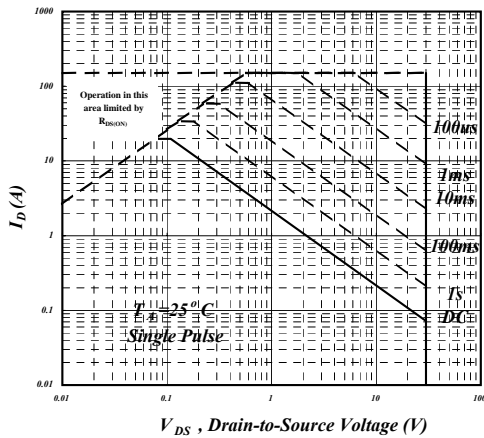


Fig 9. Maximum Safe Operating Area

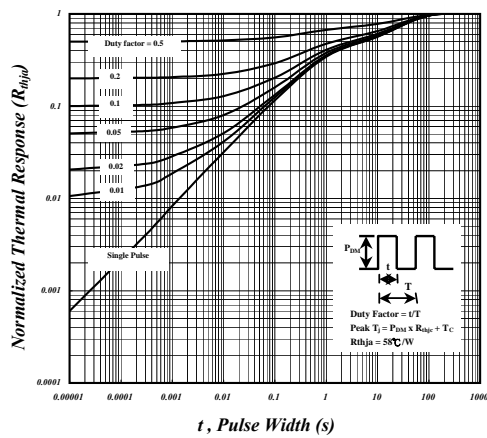


Fig 10. Effective Transient Thermal Impedance

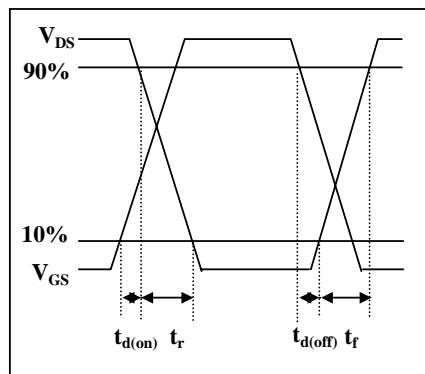


Fig 11. Switching Time Waveform

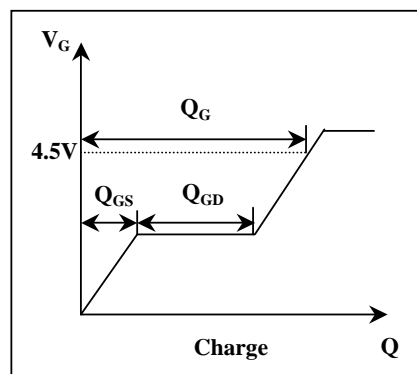


Fig 12. Gate Charge Waveform