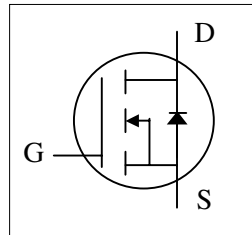


- ▼ Lead-Free Package
- ▼ Low Conductance Loss
- ▼ Low Profile ( < 0.7mm )
- ▼ Compatible with DirectFET® Package SQ  
Footprint and Outline



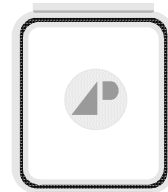
$BV_{DSS}$	30V
$R_{DS(ON)}$	3.8m $\Omega$
$I_D$	19A

## Description

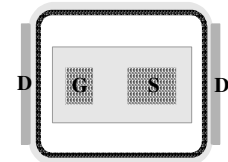
The AP1005BSQ used the latest APEC Power MOSFET silicon technology with the advanced technology packaging to provide the lowest on-resistance loss, low profile and dual sided cooling compatible.

The GreenFET™<sup>(A)</sup> 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	$\pm 20$	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 <sup>1</sup>	150	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation <sup>3</sup>	2.2	W
$P_D@T_A=70^\circ\text{C}$	Total Power Dissipation <sup>3</sup>	1.4	W
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	41.7	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>5</sup>	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

Rthj-c	Maximum Thermal Resistance, Junction-case <sup>4</sup>	3	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	58	$^\circ\text{C}/\text{W}$



**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =19A	-	2.6	3.8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	-	4.3	7.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	-	2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =15A	-	30	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	uA
	Drain-Source Leakage Current (T <sub>j</sub> =125°C)	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	150	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =15A V <sub>DS</sub> =13V V <sub>GS</sub> =4.5V	-	16.6	26.6	nC
Q <sub>gs1</sub>	Pre-V <sub>th</sub> Gate-Source Charge		-	3	-	nC
Q <sub>gs2</sub>	Post-V <sub>th</sub> Gate-Source Charge		-	0.8	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge		-	9.2	-	nC
Q <sub>godr</sub>	Gate Charge Overdrive		-	3.7	-	nC
Q <sub>sw</sub>	Switch Charge (Q <sub>gs2</sub> +Q <sub>gd</sub> )		-	10	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>		V <sub>DS</sub> =13V	-	11	-
t <sub>r</sub>	Rise Time	I <sub>D</sub> =12A	-	60	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> = 1.5 Ω	-	28	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> = 10 V	-	9	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1360	2180	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	570	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	210	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	3.3	-	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I <sub>S</sub>	Continuous Source Current ( Body Diode )		-	-	52	A
I <sub>SM</sub>	Pulsed Source Current ( Body Diode ) <sup>1</sup>		-	-	150	A
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =15A, V <sub>GS</sub> =0V	-	-	1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =15A, V <sub>GS</sub> =0V,	-	37	55	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	32	48	nC

**Notes:**

- 1.Pulse width limited by Max junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board.
- 4.T<sub>C</sub> measured with thermocouple mounted to top (Drain) of part.
- 5.Starting T<sub>j</sub>=25°C , L=0.1mH , R<sub>G</sub>=25Ω , I<sub>AS</sub>=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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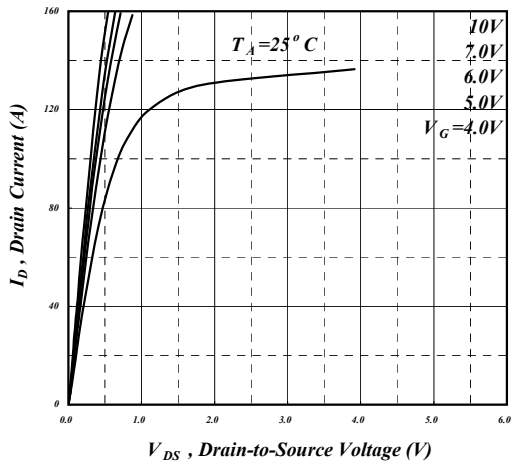


Fig 1. Typical Output Characteristics

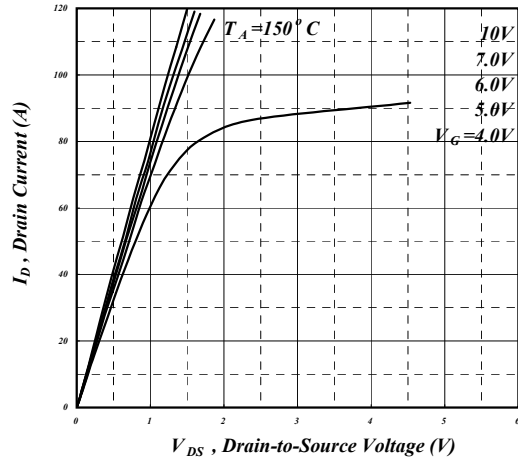


Fig 2. Typical Output Characteristics

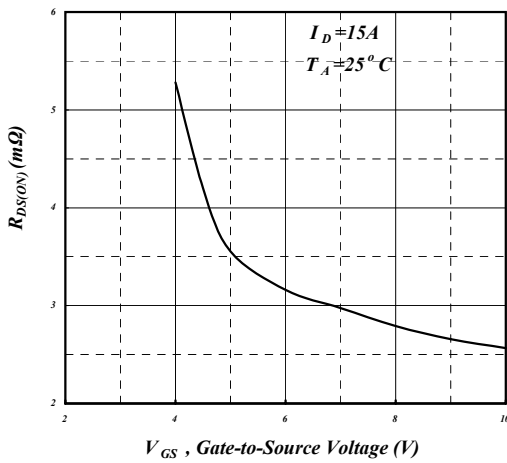


Fig 3. On-Resistance v.s. Gate Voltage

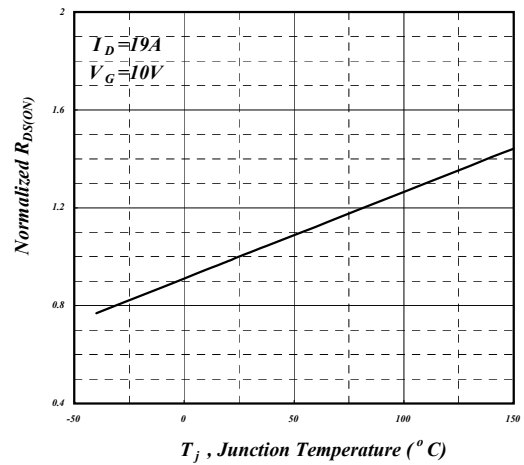


Fig 4. Normalized On-Resistance v.s. Junction Temperature

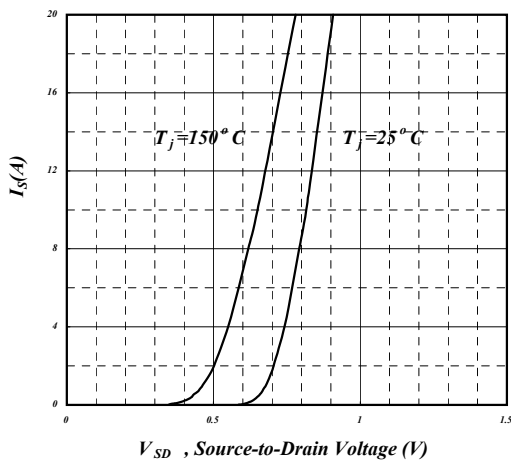


Fig 5. Forward Characteristic of Reverse Diode

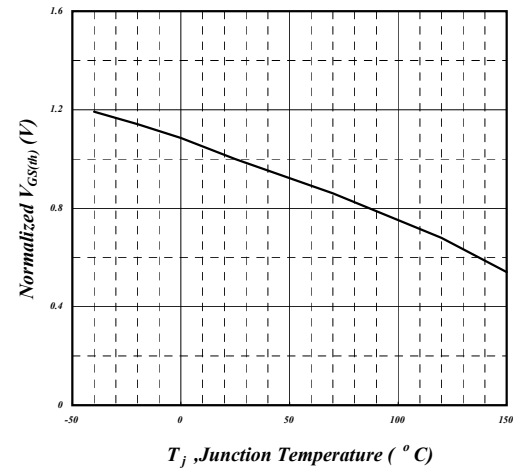


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

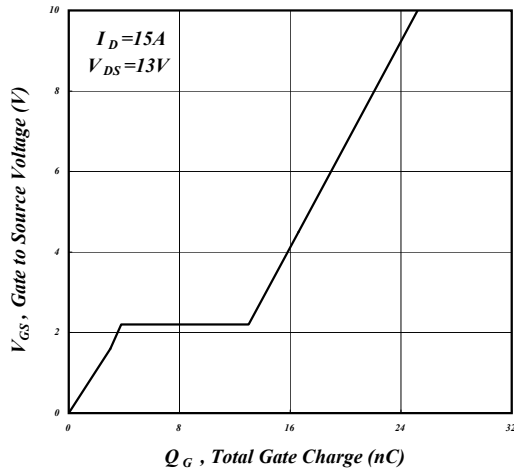


Fig 7. Gate Charge Characteristics

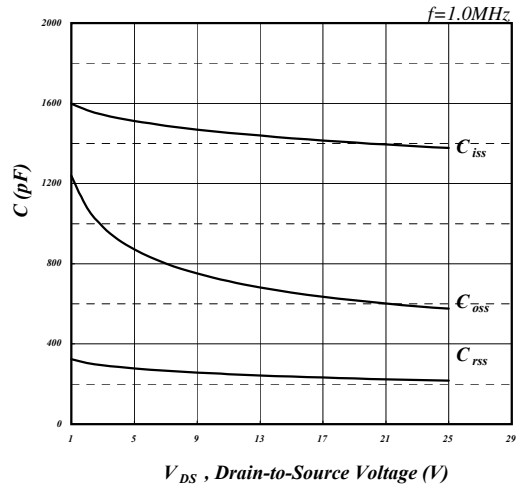


Fig 8. Typical Capacitance Characteristics

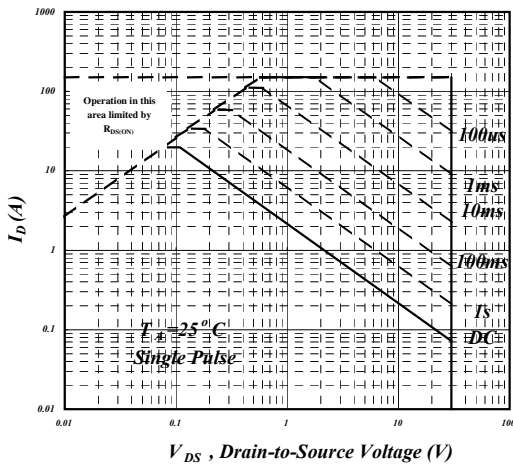


Fig 9. Maximum Safe Operating Area

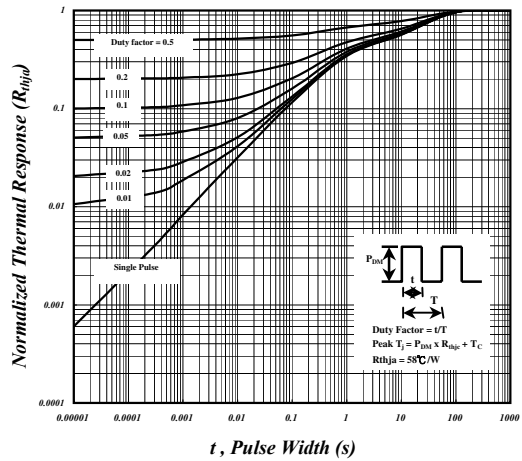


Fig 10. Effective Transient Thermal Impedance

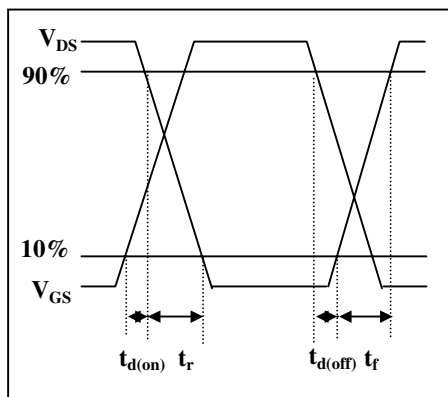


Fig 11. Switching Time Waveform

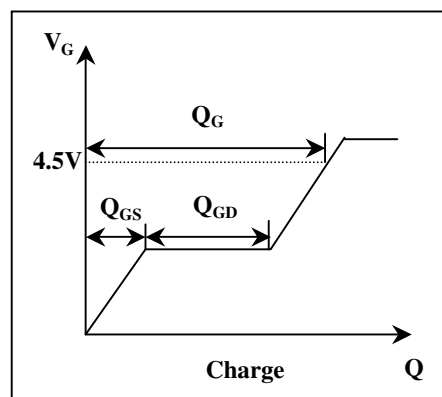


Fig 12. Gate Charge Waveform