IXYS
INTEGRATED CIRCUITS DIVISION




# CPC5603
## N-Channel Depletion Mode FET

| Parameter | Rating | Units |
|---|---|---|
| Drain-to-Source Voltage - $V_{DS}$ | 415 | V |
| Max On-Resistance - $R_{DS(on)}$ | 14 | Ω |
| Max Power | 2.5 | W |

## Features

- 415V Drain-to-Source Voltage
- Depletion Mode Device Offers Low $R_{DS(on)}$ at Cold Temperatures
- Low On-Resistance: 8Ω (Typical) @ 25°C
- Low $V_{GS(off)}$ Voltage: -2.0V to -3.6V
- High Input Impedance
- Low Input and Output Leakage
- Small Package Size SOT-223
- PC Card (PCMCIA) Compatible
- PCB Space and Cost Savings

## Applications

- Support Component for LITELINK™ Data Access Arrangement (DAA)
- Telecom
- Normally-On Switches
- Ignition Modules
- Converters
- Security
- Power Supplies

## Description

The CPC5603 is an N-channel, depletion mode Field Effect Transistor (FET) that utilizes IXYS Integrated Circuits Division's proprietary third-generation vertical DMOS process. The third generation process realizes world class, high voltage MOSFET performance in an economical silicon gate process. The vertical DMOS process yields a highly reliable device particularly in difficult application environments such as telecommunications, security, and power supplies.

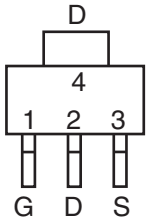
One of the primary applications for the CPC5603 is as a linear regulator/hook switch for the LITELINK™ family of Data Access Arrangements (DAA) Devices CPC5620A, CPC5621A, and CPC5622A.

The CPC5603 has a typical on-resistance of 8Ω, a drain-to-source voltage of 415V and is available in the SOT-223 package. As with all MOS devices, the FET structure prevents thermal runaway and thermal-induced secondary breakdown.

## Ordering Information

| Part # | Description |
|---|---|
| CPC5603CTR | N-Channel Depletion Mode FET, SOT-223 Pkg. Tape and Reel (1000/Reel) |

## Package Pinout




| Pin Number | Name |
|---|---|
| 1 | GATE |
| 2 | DRAIN |
| 3 | SOURCE |
| 4 | DRAIN |

Pb RoHS e3

## Absolute Maximum Ratings @ 25°C

| Parameter | Symbol | Ratings | Units |
|---|---|---|---|
| Drain-to-Source Voltage | $V_{DS}$ | 415 | V |
| Gate-to-Source Voltage | $V_{GS}$ | ±20 | V |
| Total Package Dissipation | P | 2.5 | W |
| Operational Temperature | $T_A$ | -40 to +85 | °C |
| Storage Temperature | $T_A$ | -40 to +125 | °C |

*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

## Electrical Characteristics @25ºC (Unless Otherwise Specified)

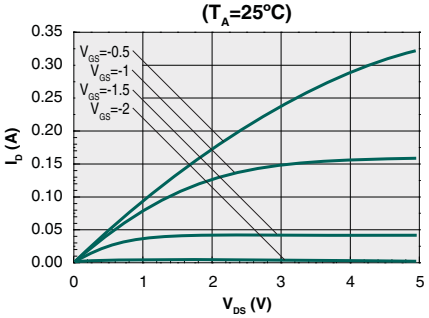
| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Gate-to-Source Off Voltage | $V_{GS(off)}$ | $I_D$= 2µA, $V_{DS}$=10V, $V_{DS}$=100V | -2 | | -3.6 | V |
| Drain-to-Source Leakage Current | $I_{DS(off)}$ | $V_{GS}$= -5V, $V_{DS}$=250V | - | - | 20 | nA |
| | | $V_{GS}$= -5V, $V_{DS}$=415V | - | - | 1 | µA |
| Drain Current | $I_D$ | $V_{GS}$= -2.7V, $V_{DS}$=5V, $V_{DS}$=50V | - | - | 5 | mA |
| | | $V_{GS}$= -0.57V, $V_{DS}$=5V | 130 | - | - | mA |
| On Resistance | $R_{DS(on)}$ | $V_{GS}$= -0.35V, $I_{DS}$=50mA | - | 8 | 14 | Ω |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$=10V, $V_{GS}$=-10V | - | - | 0.1 | µA |
| Gate Capacitance | $C_{ISS}$ | $V_{DS}$= $V_{GS}$=0V | - | - | 300 | pF |

## Thermal Characteristics

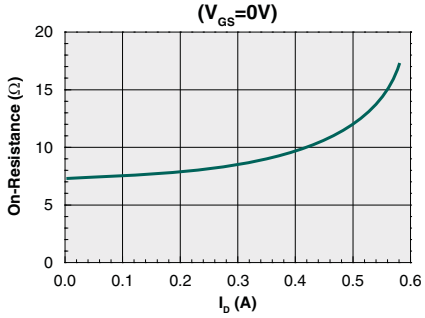
| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Thermal Resistance | $R_{\theta JC}$ | - | - | - | 14 | °C/W |

## Performance Data*

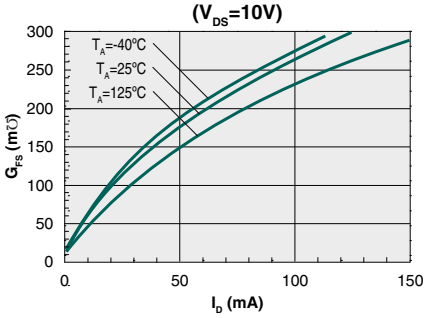
**Output Characteristics ($T_A$=25°C)**



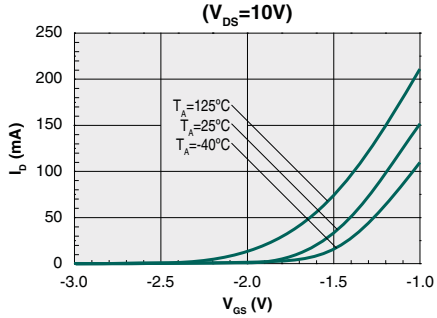

**On-Resistance vs. Drain Current ($V_{GS}$=0V)**



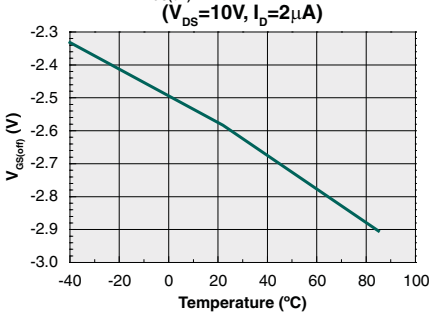

**Transconductance vs Drain Current ($V_{DS}$=10V)**



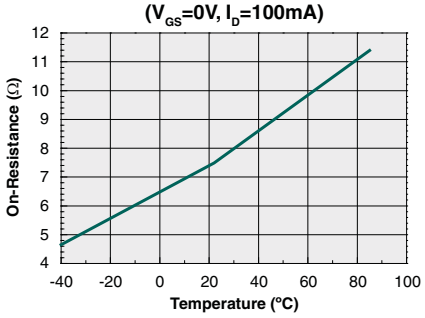

**Transfer Characteristics ($V_{DS}$=10V)**



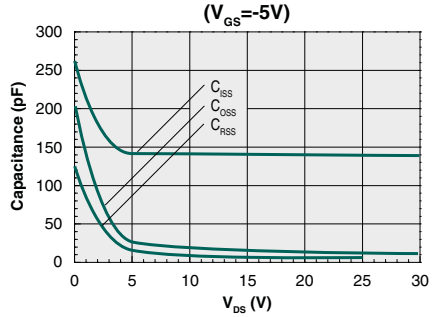

**$V_{GS(off)}$ vs. Temperature ($V_{DS}$=10V, $I_D$=2μA)**



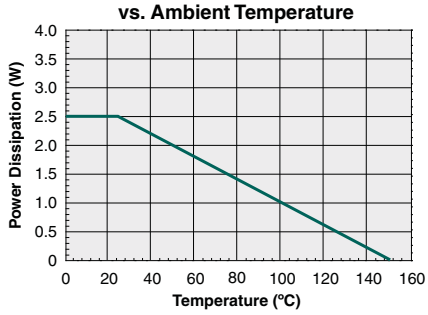

**On-Resistance vs. Temperature ($V_{GS}$=0V, $I_D$=100mA)**



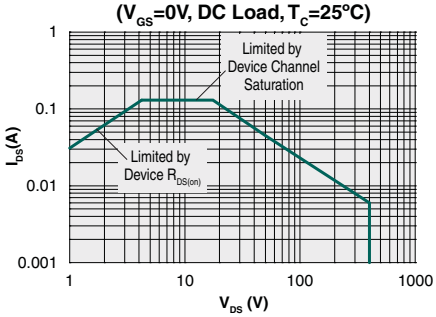

**Capacitance vs. Drain-Source Voltage ($V_{GS}$=-5V)**




**Power Dissipation vs. Ambient Temperature**




**Forward Safe Operating Bias ($V_{GS}$=0V, DC Load, $T_C$=25°C)**




*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits Division classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

| Device | Moisture Sensitivity Level (MSL) Rating |
|---|---|
| CPC5603C | MSL 1 |

### ESD Sensitivity



This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

### Soldering Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

| Device | Maximum Temperature x Time |
|---|---|
| CPC5603C | 260°C for 30 seconds |

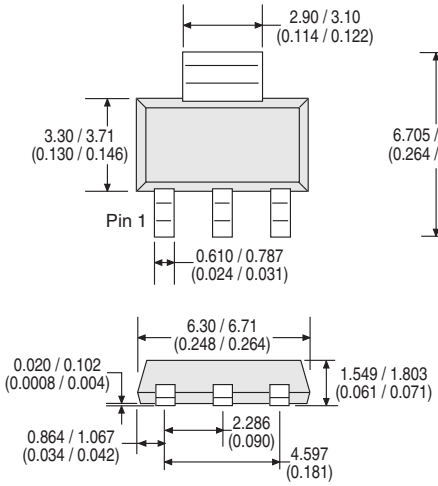
### Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable, and the use of a short drying bake may be necessary. Chlorine-based or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

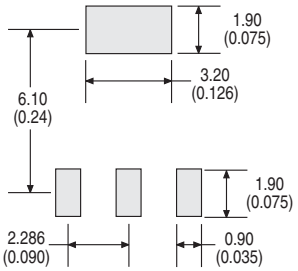


# MECHANICAL DIMENSIONS

## CPC5603C

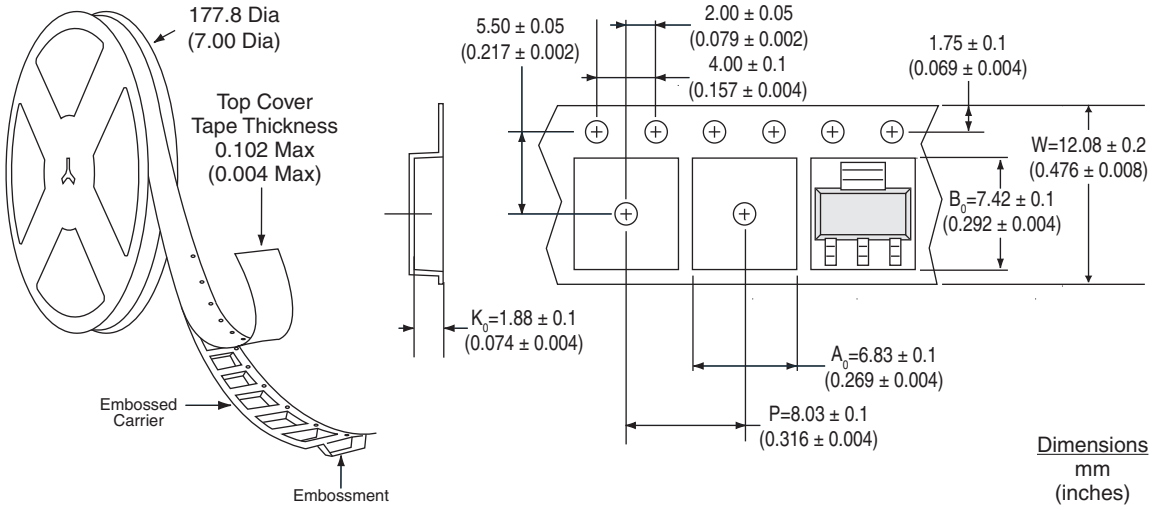



**PCB Land Pattern**




Dimensions
mm MIN / mm MAX
(inches MIN / inches MAX)

## CPC5603CTR Tape & Reel




Dimensions
mm
(inches)

## For additional information please visit our website at: www.ixysic.com

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