



PRELIMINARY

Parameter	Rating	Units
Drain-to-Source Voltage - $V_{(BR)DSX}$	400	V
Max On-Resistance - $R_{DS(on)}$	6	$\Omega$
Max Power		
SOT-89 Package	1.1	W
SOT-223 Package	2.5	

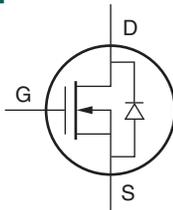
### Features

- 400V Drain-to-Source Voltage
- Depletion Mode Device Offers Low  $R_{DS(on)}$  at Cold Temperatures
- Low On-Resistance: 4.5 $\Omega$  (Typical) @ 25°C
- Low  $V_{GS(off)}$  Voltage
- High Input Impedance
- Low Input and Output Leakage
- Small Package Size SOT-89 and SOT-223
- PC Card (PCMCIA) Compatible
- PCB Space and Cost Savings

### Applications

- LED Drive Circuits
- Telecommunications
- Normally On Switches
- Ignition Modules
- Converters
- Security
- Power Supplies
- Regulators

### Circuit Symbol



### Description

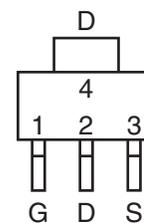
The CPC3909 is an N-channel, depletion mode Field Effect Transistor (FET) that is available in an SOT-223 package (CPC3909Z) and an SOT-89 package (CPC3909C). Both utilize IXYS Integrated Circuits Division's proprietary vertical DMOS process that realizes world class, high voltage MOSFET performance in an economical silicon gate process. The vertical DMOS process yields a highly reliable device, particularly for use in difficult application environments such as telecommunications, security, and power supplies.

CPC3909Z and the CPC3909C have a typical on-resistance of 4.5 $\Omega$  and a drain-to-source voltage of 400V. As with all MOS devices, the FET structure prevents thermal runaway and thermally induced secondary breakdown.

### Ordering Information

Part Number	Description
CPC3909CTR	SOT-89: Tape and Reel (1000/Reel)
CPC3909ZTR	SOT-223: Tape and Reel (1000/Reel)

### Package Pinout:



Pin Number	Name
1	GATE
2	DRAIN
3	SOURCE
4	DRAIN



### Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Drain-to-Source Voltage ( $V_{(BR)DSX}$ )	400	V
Gate-to-Source Voltage ( $V_{GS}$ )	15	V
Total Package Dissipation <sup>1</sup>		
SOT-89	1.1	W
SOT-223	2.5	
Operational Temperature	-40 to +110	°C
Storage Temperature	-40 to +125	°C

<sup>1</sup> Mounted on 1"x1" FR4 board.

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.

Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

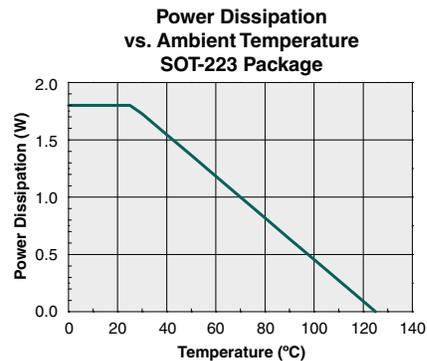
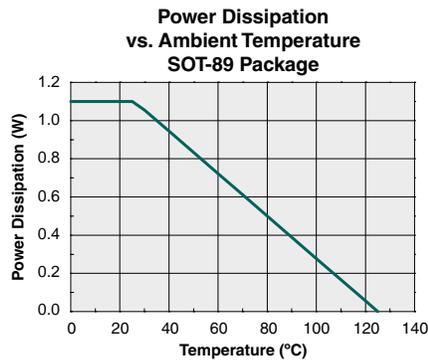
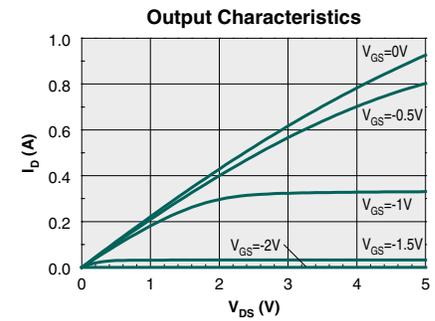
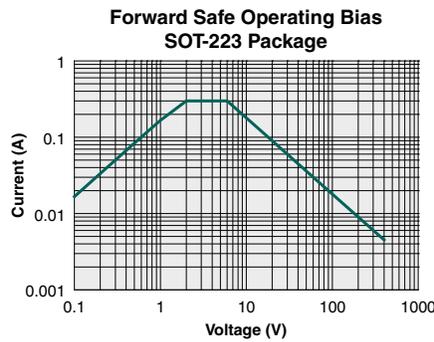
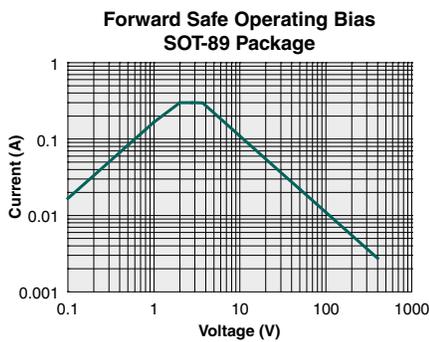
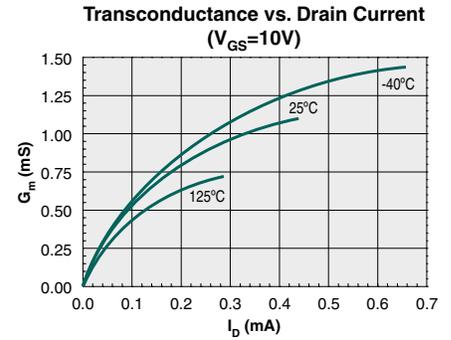
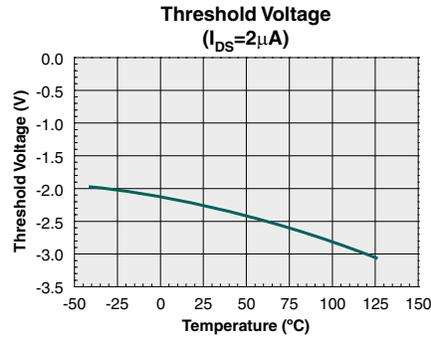
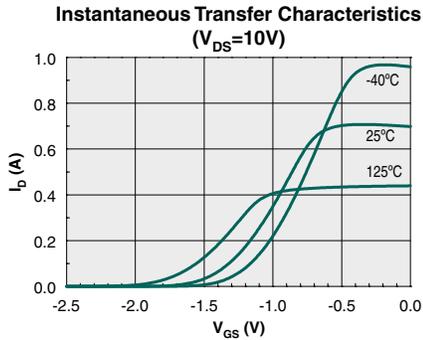
### Electrical Characteristics @25°C (Unless Otherwise Specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Gate-to-Source Off Voltage	$V_{GS(off)}$	$I_D=1\mu A, V_{DS}=5V$	-1.4	-	-3.1	V
Drain-to-Source Leakage Current	$I_{DS(off)}$	$V_{GS} = -5.5V, V_{DS}=240V$	-	-	20	nA
		$V_{GS} = -5.5V, V_{DS}=400V$	-	-	1	μA
Drain Current	$I_D$	$V_{GS} = 0V, V_{DS}=5V$	300	-	-	mA
On-Resistance	$R_{DS(on)}$	$V_{GS} = 0V, I_{DS}=300mA$	-	4.5	6	Ω
Gate Leakage Current	$I_{GSS}$	$V_{GS}=15V$	-	-	100	nA
Gate Capacitance	$C_{ISS}$	$V_{DS} = V_{GS}=0V$	-	-	275	pF

### Thermal Resistance

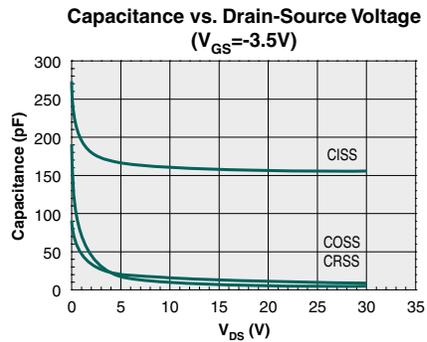
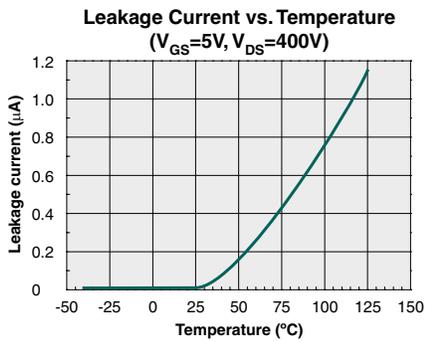
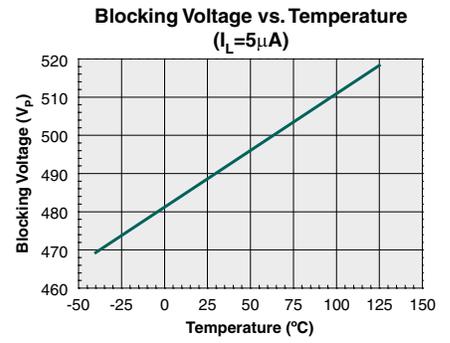
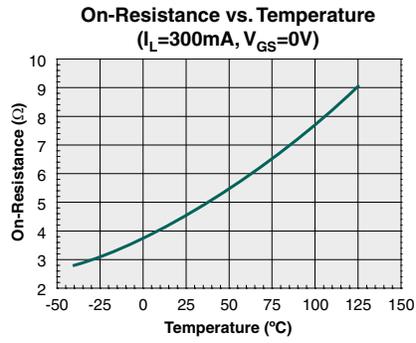
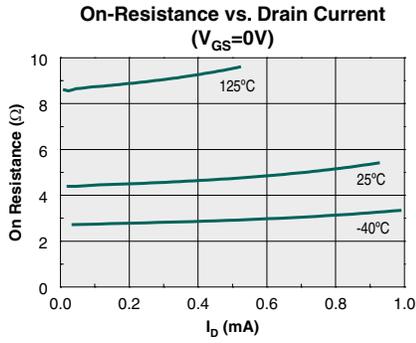
Device	Parameter	Symbol	Conditions	Min	Typ	Max	Units
SOT-89 (CPC3909C)	Junction to Case	$R_{\theta JC}$	-	-	-	50	°C/W
	Junction to Ambient	$R_{\theta JA}$				90	
SOT-223 (CPC3909Z)	Junction to Case	$R_{\theta JC}$	-	-	-	14	
	Junction to Ambient	$R_{\theta JA}$				55	

**PERFORMANCE DATA @ 25°C (Unless Otherwise Noted)\***



\*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.

**PERFORMANCE DATA @ 25°C (Unless Otherwise Noted)\***



\*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 ingress. 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
CPC3909C / CPC3909Z	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	Maximum Reflow Cycles
CPC3909C / CPC3909Z	260°C for 30 seconds	3

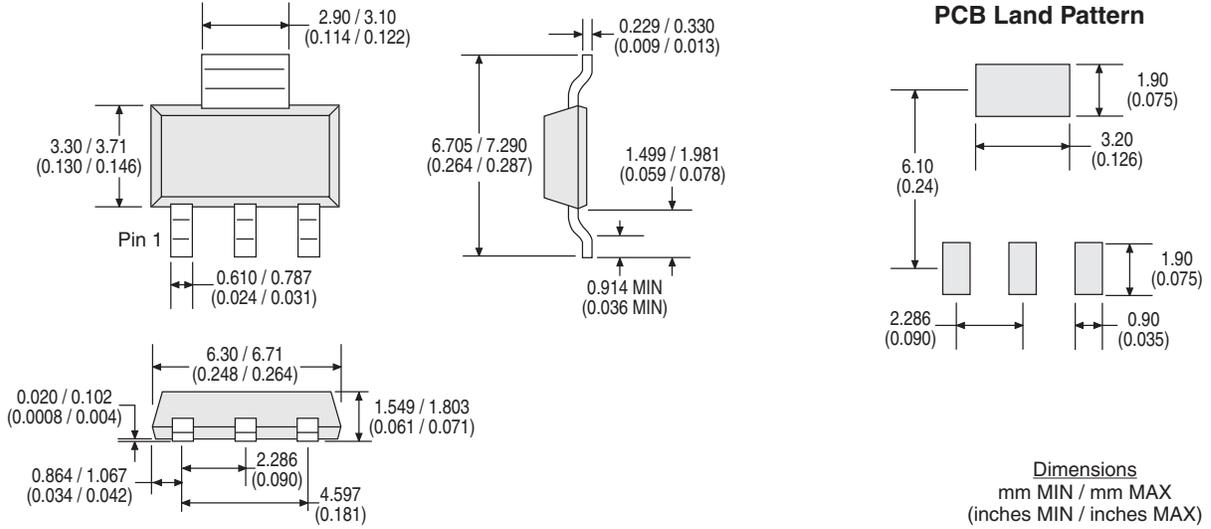
### Board Wash

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.

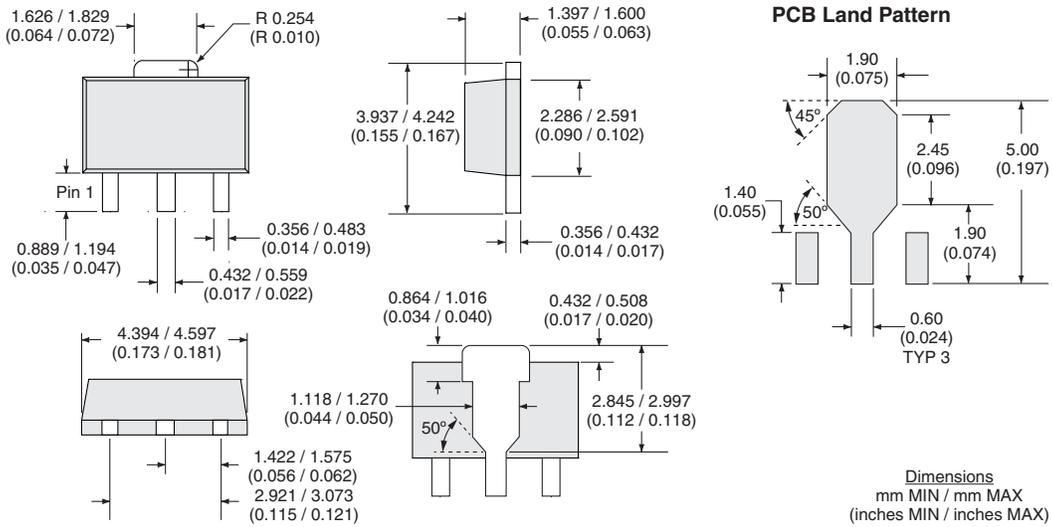


**MECHANICAL DIMENSIONS**

**CPC3909Z**

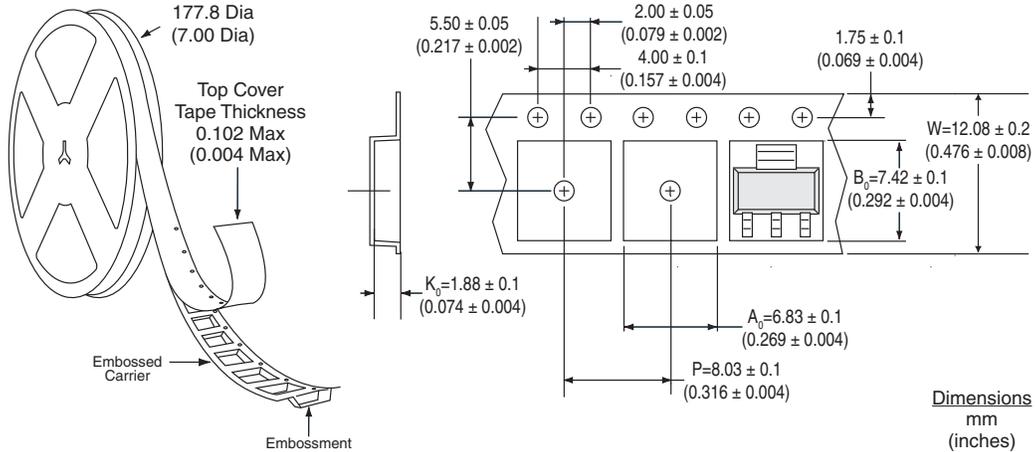


**CPC3909C**

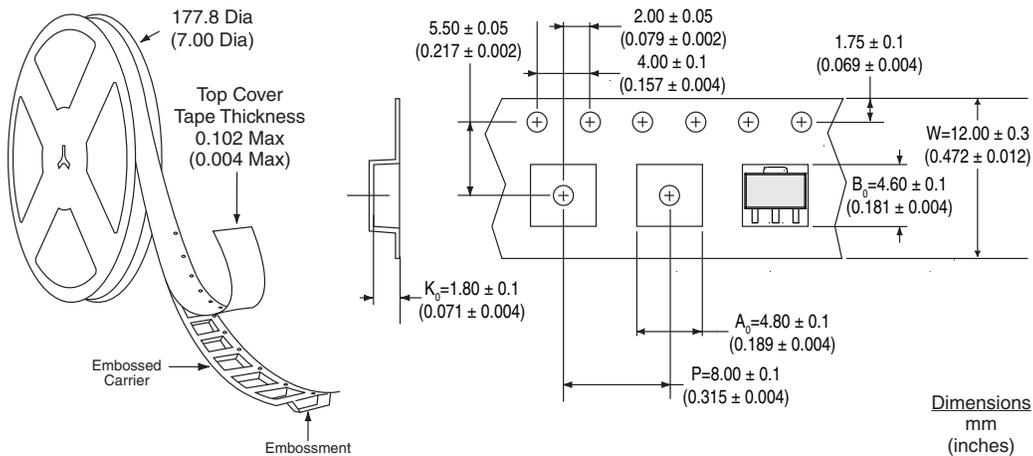


### MECHANICAL DIMENSIONS

#### CPC3909ZTR Tape & Reel



#### CPC3909CTR Tape & Reel



For additional information please visit our website at: [www.ixysic.com](http://www.ixysic.com)

IXYS Integrated Circuits Division makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. Neither circuit patent licenses nor indemnity are expressed or implied. Except as set forth in IXYS Integrated Circuits Division's Standard Terms and Conditions of Sale, IXYS Integrated Circuits Division assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

The products described in this document are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or where malfunction of IXYS Integrated Circuits Division's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. IXYS Integrated Circuits Division reserves the right to discontinue or make changes to its products at any time without notice.