

$BV_{DSX}/$ BV_{DGX}	$R_{DS(on)}$ (max)	I_{DSS} (min)	Package
250V	2.5Ω	400mA	SOT-89, SOT-223

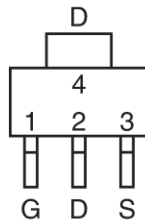
Features

- High Breakdown Voltage: 250V
- On-Resistance: 2.5Ω max. at 25°C
- Low $V_{GS(off)}$ Voltage: -1.4 to -3.1V
- High Input Impedance
- Small Package Sizes: SOT-89, SOT-223

Applications

- Current Regulator
- Normally-On Switches
- Solid State Relays
- Converters
- Telecommunications
- Power Supply

Package Pinout



Description

The CPC3902 is a 250V, N-channel, depletion-mode, metal oxide semiconductor field effect transistor (MOSFET) built upon a proprietary third generation vertical DMOS process that realizes world-class, high voltage performance in an economical silicon gate process. This vertical DMOS process yields a robust device with high input impedance for power applications.

As with all MOS devices, the FET structure prevents thermal runaway and thermal-induced secondary breakdown, which makes the CPC3902 ideal for use in high-power applications.

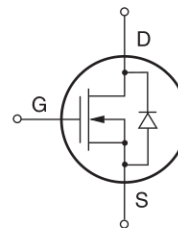
The CPC3902 is a highly reliable FET device that has been used extensively in IXYS Integrated Circuits Division's Solid State Relays for industrial and telecommunications applications.

The CPC3902 is available in the SOT-89 and the SOT-223 package.

Ordering Information

Part #	Description
CPC3902ZTR	SOT-223: Tape and Reel (1000/Reel)
CPC3902CTR	SOT-89: Tape and Reel (1000/Reel)

Circuit Symbol



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Drain-to-Source Voltage	250	V
Gate-to-Source Voltage	±15	V
Pulsed Drain Current	400	mA
Total Package Dissipation ¹	1.8	W
Operational Temperature	-55 to +110	°C
Junction Temperature, Maximum	+125	°C
Storage Temperature	-55 to +125	°C

¹ Mounted on 1"x1" 2 oz. Copper 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.

Thermal Characteristics

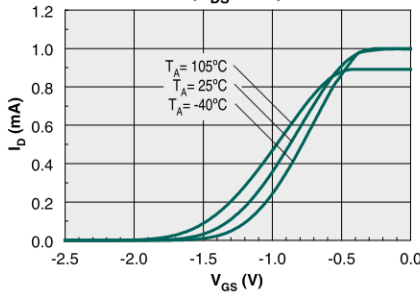
Device	Parameter	Symbol	Rating	Units
CPC3902C (SOT-89)	Junction to Case	θ_{JC}	50	°C/W
	Junction to Ambient	θ_{JA}	90	
CPC3902Z (SOT-223)	Junction to Case	θ_{JC}	14	
	Junction to Ambient	θ_{JA}	55	

Electrical Characteristics @ 25°C (Unless Otherwise Noted)

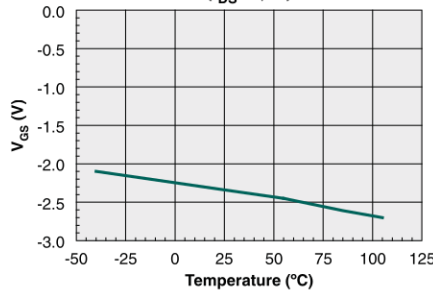
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	BV_{DSX}	$V_{GS} = -5.5V, I_D = 100\mu A$	250	-	-	V
Gate-to-Source Off Voltage	$V_{GS(off)}$	$V_{DS} = 15V, I_D = 1\mu A$	-1.4	-	-3.1	V
Change in $V_{GS(off)}$ with Temperature	$dV_{GS(off)}/dT$	$V_{DS} = 15V, I_D = 1\mu A$	-	-	4.5	mV/°C
Gate Body Leakage Current	I_{GSS}	$V_{GS} = \pm 15V, V_{DS} = 0V$	-	-	100	nA
Drain-to-Source Leakage Current	$I_{D(off)}$	$V_{GS} = -5.5V, V_{DS} = 250V$	-	-	1	μA
Saturated Drain-to-Source Current	I_{DSS}	$V_{GS} = 0V, V_{DS} = 15V$	400	-	-	mA
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 0V, I_D = 300mA, V_{DS} = 10V$	-	-	2.5	Ω
Change in $R_{DS(on)}$ with Temperature	$dR_{DS(on)}/dT$		-	-	2.5	%/°C
Forward Transconductance	G_{fs}	$I_D = 200mA, V_{DS} = 10V$	400	-	-	m Ω
Input Capacitance	C_{ISS}	$V_{GS} = -3.5V$ $V_{DS} = 20V$ $f = 1MHz$	-	230	-	pF
Common Source Output Capacitance	C_{OSS}		-	16	-	
Reverse Transfer Capacitance	C_{RSS}		-	9.5	-	
Source-Drain Diode Voltage Drop	V_{SD}	$V_{GS} = -5V, I_{SD} = 150mA$	-	0.72	1	V

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

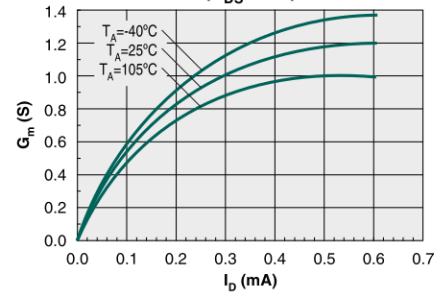
Instantaneous Transfer Characteristics
($V_{DS}=10V$)



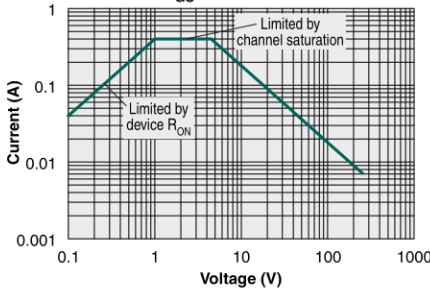
Threshold Voltage
($I_D=1\mu A$)



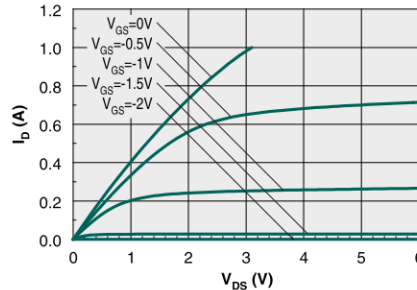
Transconductance vs. Drain Current
($V_{DS}=10V$)



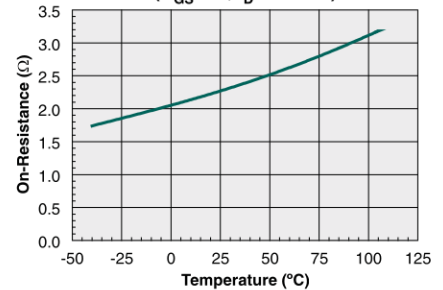
Forward Safe Operating Bias
($V_{GS}=0V$, DC Load)



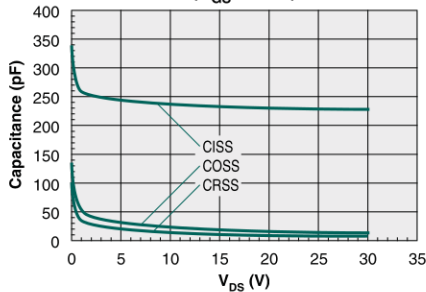
Output Characteristics



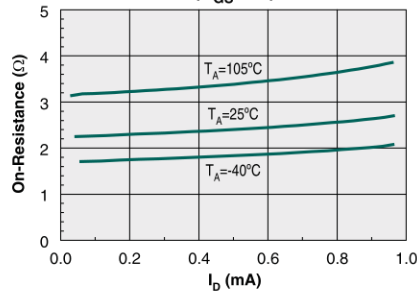
On-Resistance vs. Temperature
($V_{GS}=0V$, $I_D=300mA$)



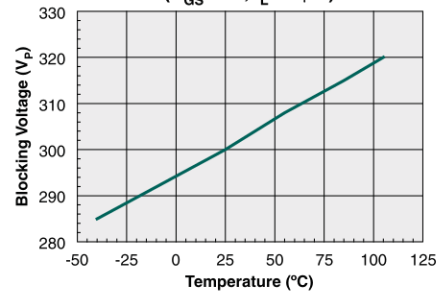
Capacitance vs. Drain-Source Voltage
($V_{GS}=-3.5V$)



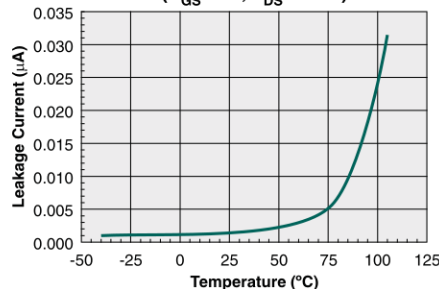
On-Resistance vs. Drain Current
($V_{GS}=0V$)



Blocking Voltage
($V_{GS}=-5V$, $I_L=10\mu A$)



Leakage Current vs. Temperature
($V_{GS}=-5V$, $V_{DS}=250V$)



*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
CPC3902C, CPC3902Z	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
CPC3902C, CPC3902Z	260°C for 30 seconds	3

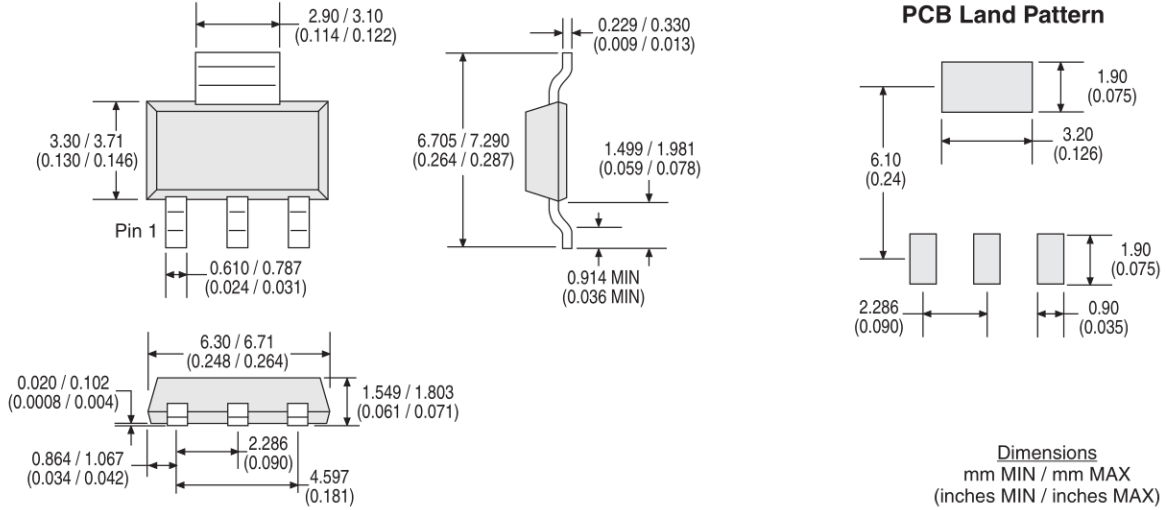
Board Wash

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.

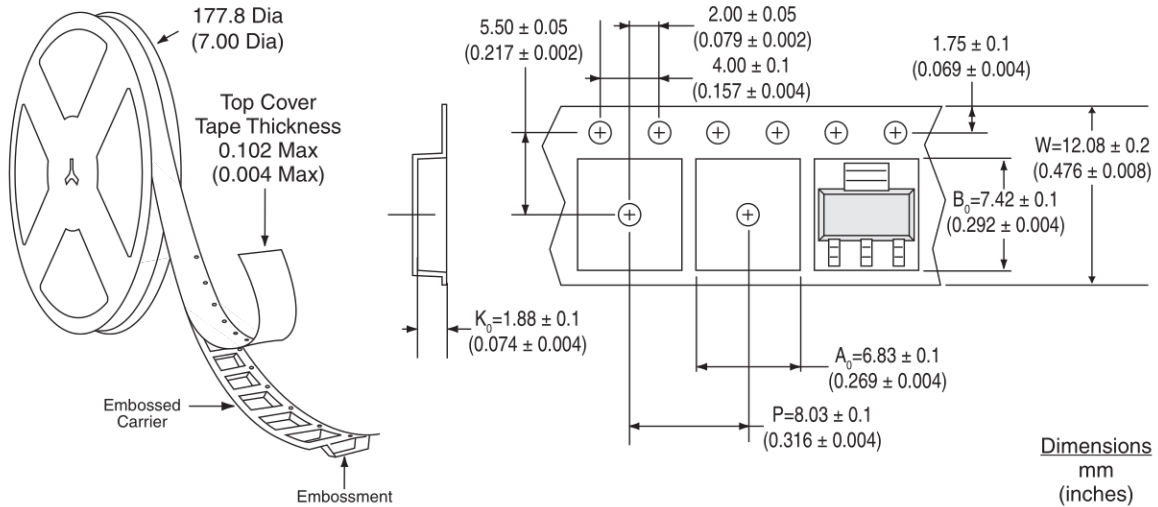


Mechanical Dimensions

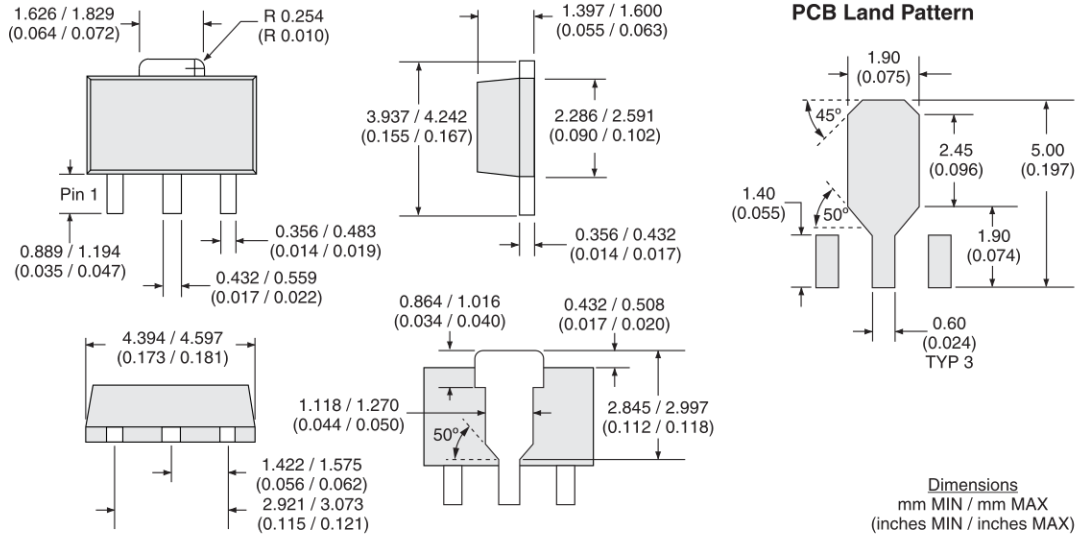
CPC3902Z



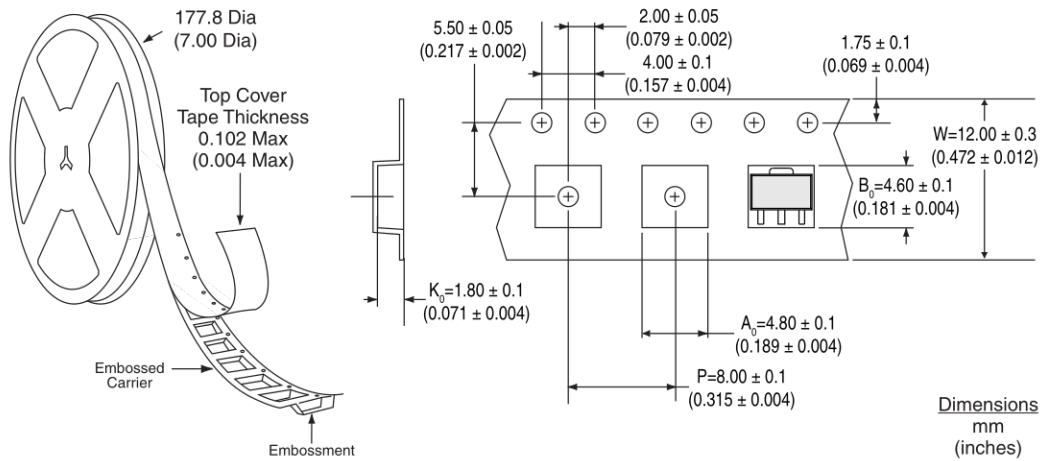
CPC3902ZTR Tape & Reel



CPC3902C



CPC3902CTR Tape & Reel



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