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IXYS
INTEGRATED CIRCUITS DIVISION

CPC3703
250V N-Channel Depletion-Mode FET

$V_{(BR)DSX}$ / $V_{(BR)DGX}$	$R_{DS(on)}$ (max)	I_{DSS} (min)	Package
250V	4Ω	360mA	SOT-89

Features

- High Breakdown Voltage: 250V
- Low On-Resistance: 4Ω max. at 25ºC
- Low $V_{GS(off)}$ Voltage: -1.6 to -3.9V
- Depletion Mode Device Offers Low $R_{DS(on)}$ at Cold Temperatures
- High Input Impedance
- Small Package Size: SOT-89

Applications

- Ignition Modules
- Normally-On Switches
- Solid State Relays
- Converters
- Telecommunications
- Power Supply

Description

The CPC3703 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. Our vertical DMOS process yields a robust device, with high input impedance, for use in high-power applications. The CPC3703 is a highly reliable device that has been used extensively in our Solid State Relays for industrial and telecommunications applications.

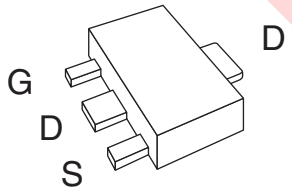
This device excels in power applications that require low drain-source resistance, particularly in cold environments such as automotive ignition modules. The CPC3703 offers a low, 4Ω maximum, on-state resistance at 25ºC.

The CPC3703 has a minimum breakdown voltage of 250V, and is available in an SOT-89 package. As with all MOS devices, the FET structure prevents thermal runaway and thermal-induced secondary breakdown.

Ordering Information

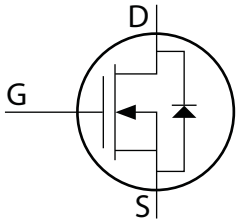
Part #	Description
CPC3703CTR	N-Channel Depletion Mode FET, SOT-89 Pkg. Tape and Reel (1000/Reel)

Package Pinout



(SOT-89)

Circuit Symbol



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Absolute Maximum Ratings @ 25°C (Unless Otherwise Noted)

Parameter	Ratings	Units
Drain-to-Source Voltage	250	V_P
Gate-to-Source Voltage	±15	V_P
Pulsed Drain Current	600	mA
Total Package Dissipation [1]	1.1	W
Junction Temperature	125	°C
Operational Temperature, Ambient	-55 to +125	°C
Storage Temperature	-55 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.

[1] Mounted on 1"x1"x0.062" FR4 board.

Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	$V_{(BR)DSX}$	V_{GS}= -5V, I_D=100µA	250	-	-	V
Gate-to-Source Off Voltage	$V_{GS(off)}$	V_{DS}= 5V, I_D=1mA	-1.6	-	-3.9	V
Change in $V_{GS(off)}$ with Temperature	$dV_{GS(off)}/dT$	V_{DS}= 5V, I_D=1µA	-	-	4.5	mV/°C
Gate Body Leakage Current	I_{GSS}	V_{GS}=±15V, V_{DS}=0V	-	-	100	nA
Drain-to-Source Leakage Current	$I_{D(off)}$	V_{GS}= -5V, V_{DS}=250V	-	-	1	µA
		V_{GS}= -5V, V_{DS}=200V, T_A=125°C	-	-	1	mA
Saturated Drain-to-Source Current	I_{DSS}	V_{GS}= 0V, V_{DS}=15V	360	-	-	mA
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	V_{GS}= 0V, I_D=200mA	-	-	4	Ω
Change in $R_{DS(on)}$ with Temperature	$dR_{DS(on)}/dT$		-	-	1.1	%/°C
Forward Transconductance	G_{FS}	I_D= 100mA, V_{DS} = 10V	225	-	-	m℧
Input Capacitance	C_{ISS}	V_{GS}= -5V	-	327	350	pF
Common Source Output Capacitance	C_{OSS}	V_{DS}= 25V		51	65	
Reverse Transfer Capacitance	C_{RSS}	f= 1MHz		27	35	
Turn-On Delay Time	$t_{d(on)}$	V_{DD}= 25V	-	23	35	ns
Rise Time	t_r	I_D= 150mA		8	20	
Turn-Off Delay Time	$t_{d(off)}$	V_{GS}= 0V to -10V		17	25	
Fall Time	t_f	R_{gen}= 50Ω		70	80	
Source-Drain Diode Voltage Drop	V_{SD}	V_{GS}= -5V, I_{SD}=150mA	-	0.6	1.8	V
Thermal Resistance (Junction to Ambient)	$R_{\theta JA}$	-	-	90	-	°C/W

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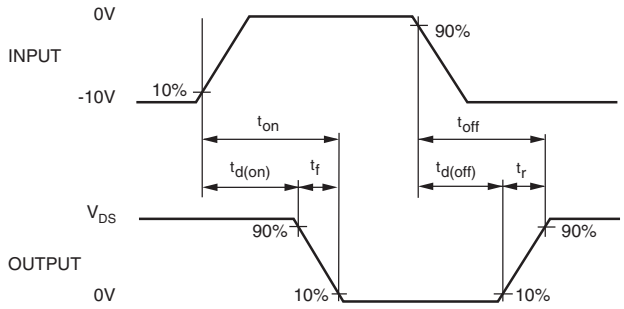
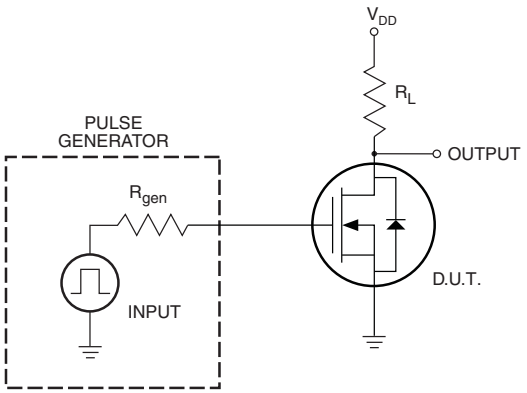
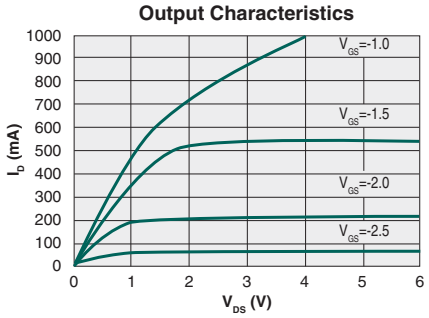
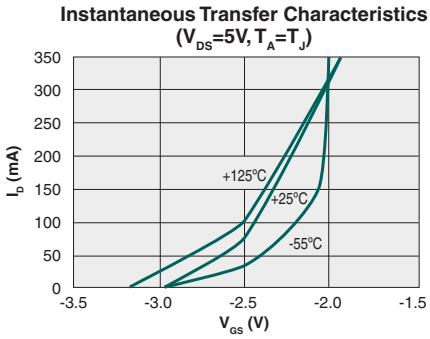
Switching Waveform & Test Circuit

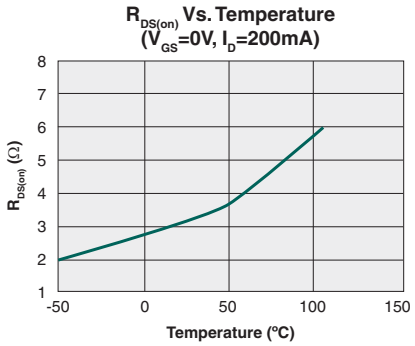


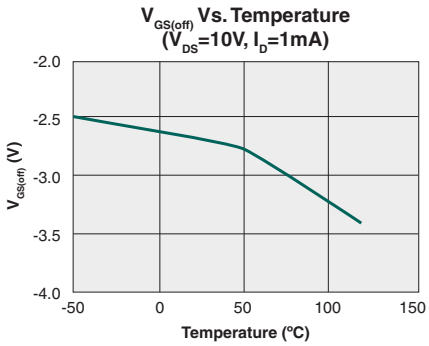


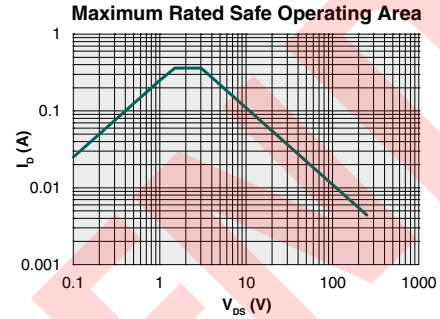
PERFORMANCE DATA (@25°C Unless Otherwise Noted)*

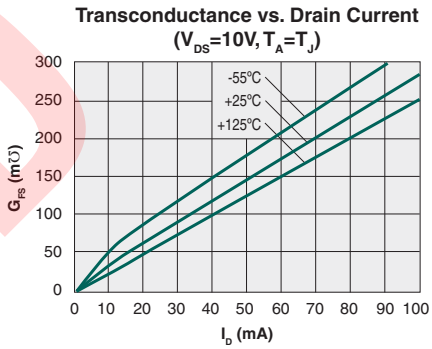


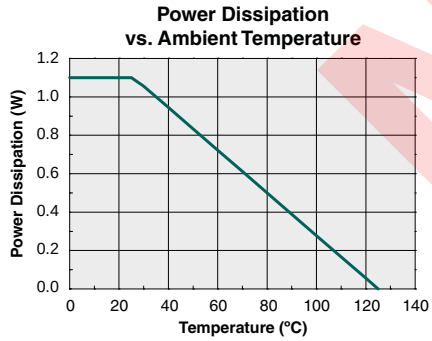


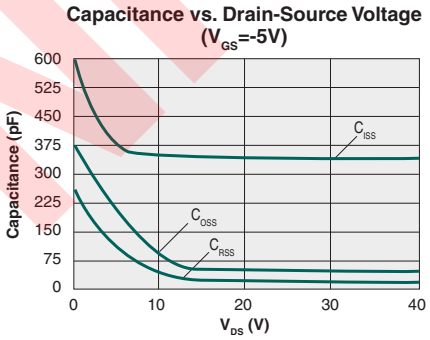


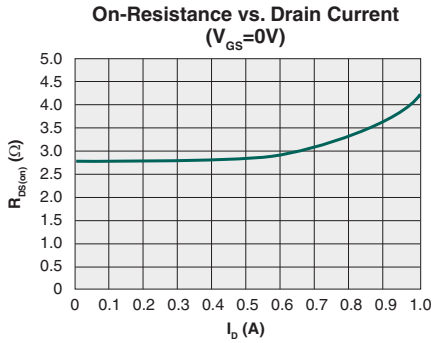












*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

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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
CPC3703C	MSL 1

ESD Sensitivity

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

Reflow 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
CPC3703C	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.

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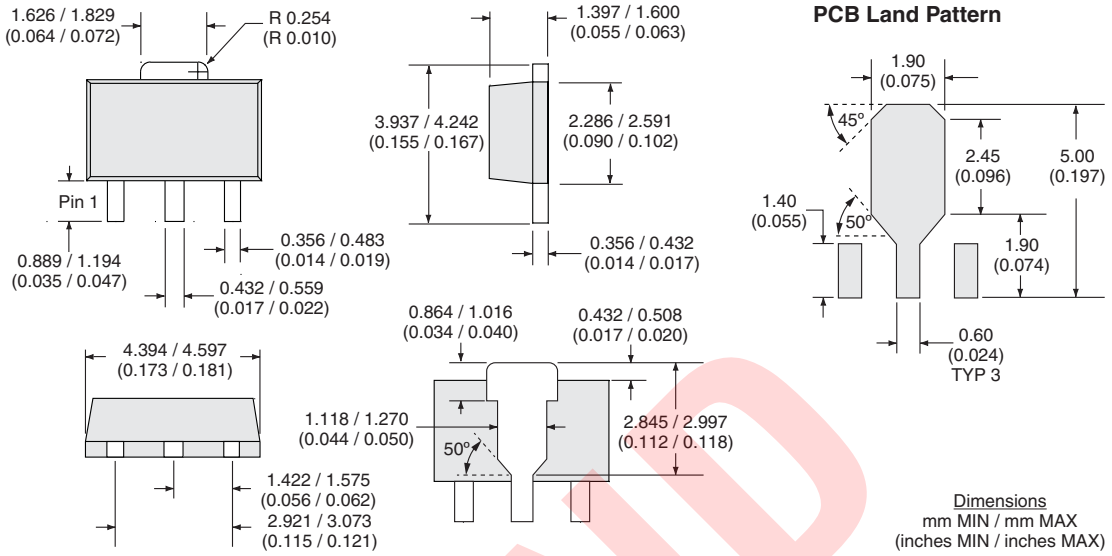
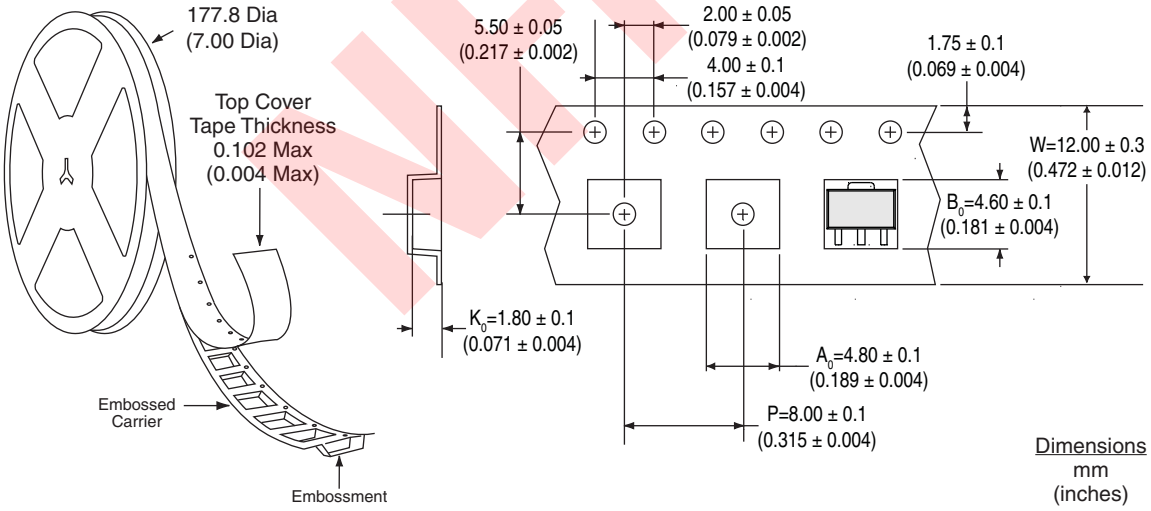
Mechanical Dimensions

CPC3703C



CPC3703CTR Tape & Reel



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Specification: DS-CPC3703-R07
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The information below supercedes any previously presented material.

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