



PRELIMINARY

$BV_{DSX}/$ $BV_{DGX}$	$R_{DS(ON)}$ (max)	$I_{DSS}$ (min)	Package
350V <sub>P</sub>	30Ω	140mA	SOT-89

### Features

- Low  $R_{DS(ON)}$  at Cold Temperatures
- $R_{DS(on)}$  30Ω max. at 25°C
- High Input Impedance
- High Breakdown Voltage: 350V<sub>P</sub>
- Low  $V_{GS(off)}$  Voltage: -1.6 to -3.9V
- Small Package Size: SOT-89

### Applications

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

### Description

The CPC3730 is an N-channel, depletion mode, field effect transistor (FET) that utilizes Clare'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 CPC3730 is a highly reliable FET device that has been used extensively in Clare's solid state relays for industrial and telecommunications applications.

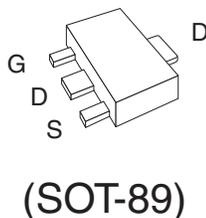
This device excels in power applications requiring low drain-source resistance, particularly in cold environments such as automotive ignition modules. The CPC3730 offers a low, 30Ω maximum, on-state resistance at 25°C.

The CPC3730 has a minimum breakdown voltage of 350V<sub>P</sub>, and is available in an SOT-89 package. As with all MOS devices, the FET structure prevents thermal runaway and thermal-induced secondary breakdown.

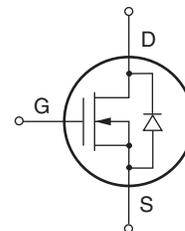
### Ordering Information

Part #	Description
CPC3730CTR	SOT-89 (1000/Reel)

### Package Pinout



### Circuit Symbol



### Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Drain-to-Source Voltage	350	V <sub>P</sub>
Gate-to-Source Voltage	±20	V <sub>P</sub>
Total Package Dissipation	1.6 <sup>1</sup>	W
Operational Temperature	-55 to +125	°C
Storage Temperature	-55 to +125	°C

<sup>1</sup> Mounted on FR4 board 1"x1"x0.062"

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 @ 25°C (Unless Otherwise Noted)

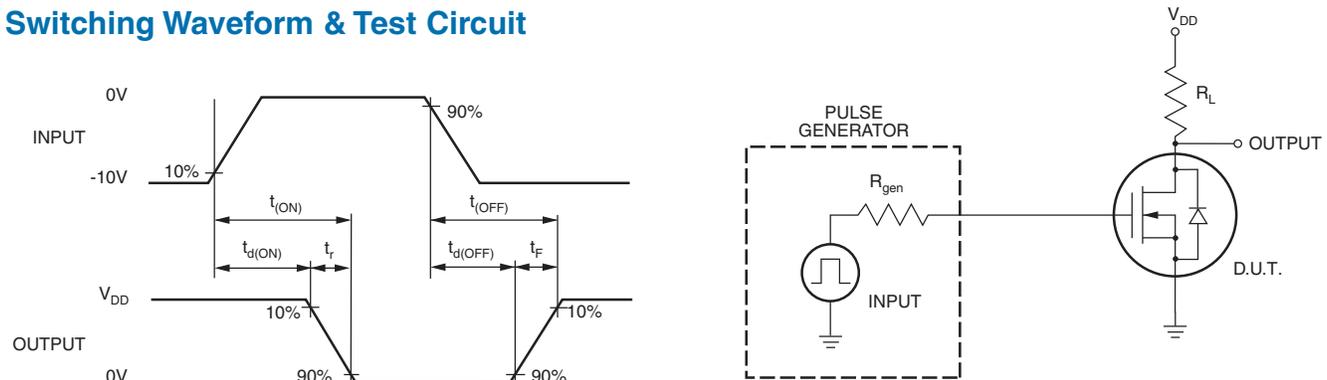
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	BV <sub>DSX</sub>	V <sub>GS</sub> = -5V, I <sub>D</sub> = 100μA	350	-	-	V <sub>P</sub>
Gate-to-Source Off Voltage	V <sub>GS(off)</sub>	I <sub>DS</sub> = 15V, I <sub>D</sub> = 1mA	-1.6	-	-3.9	V
Change in V <sub>GS(off)</sub> with Temperatures	dV <sub>GS(off)</sub> /dT	V <sub>DS</sub> = 15V, I <sub>D</sub> = 1mA	-	-	4.5	mV/°C
Gate Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	100	nA
Drain-to-Source Leakage Current	I <sub>D(off)</sub>	V <sub>GS</sub> = -5V, V <sub>DS</sub> = Max Rating	-	-	1	μA
		V <sub>GS</sub> = -5V, V <sub>DS</sub> = 280V, T <sub>A</sub> = 125°C	-	-	1	mA
Saturated Drain-to-Source Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V	140mA	-	-	mA
Static Drain-to-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 140mA	-	-	30	Ω
Change in R <sub>DS(on)</sub> with Temperatures	dR <sub>DS(on)</sub> /dT	V <sub>GS</sub> = 0V, I <sub>D</sub> = 140mA	-	-	1.1	%/°C
Forward Transconductance	G <sub>FSS</sub>	I <sub>D</sub> = 100mA, V <sub>DS</sub> = 10V	150	-	-	mΩ
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = -5V	-	100	200	pF
Common Source Output Capacitance	C <sub>OSS</sub>	V <sub>DS</sub> = 25V	-	20	100	
Reverse Transfer Capacitance	C <sub>RSS</sub>	f = 1MHz	-	5	80	
Turn-ON Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 25V I <sub>D</sub> = 150mA V <sub>GS</sub> = 0V to -10V R <sub>GEN</sub> = 50Ω	-	20	-	ns
Rise Time	t <sub>r</sub>		10			
Turn-OFF Delay Time	t <sub>d(off)</sub>		20			
Fall time	t <sub>f</sub>		50			
Source-Drain Diode Voltage Drop	V <sub>SD</sub>	V <sub>GS</sub> = -5V, I <sub>SD</sub> = 150mA	-	0.6	1.8	V

### Thermal Characteristics

Package	I <sub>D</sub> (continuous)	I <sub>D</sub> (pulsed)	Power Dissipation @ T <sub>A</sub> = 25°C	θ <sub>jc</sub> °C/W	I <sub>DR</sub>	I <sub>DRM</sub>
SOT-89	140mA	600mA	1.6W <sup>1</sup>	15	140mA	600mA

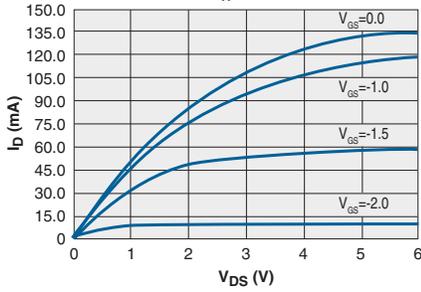
<sup>1</sup> Mounted on FR4 board 1"x1"x0.062"

### Switching Waveform & Test Circuit

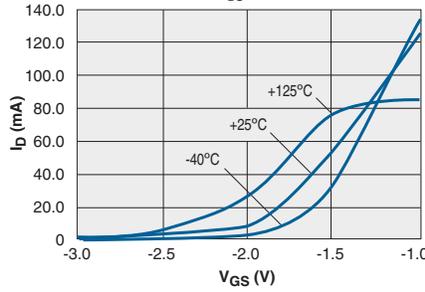


**PERFORMANCE DATA\***

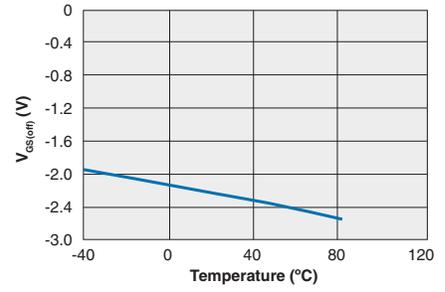
**Output Characteristics**  
( $T_A=25^\circ\text{C}$ )



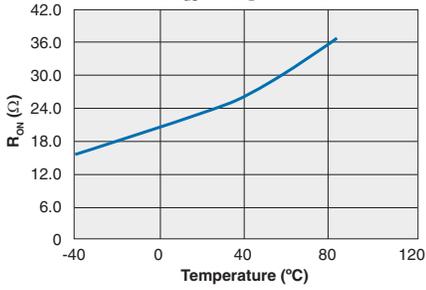
**Transfer Characteristics**  
( $V_{DS}=5\text{V}$ )



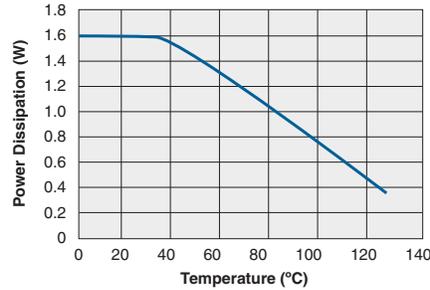
**$V_{GS(off)}$  vs. Temperature**  
( $V_{DS}=10\text{V}$ ,  $I_D=1\text{mA}$ )



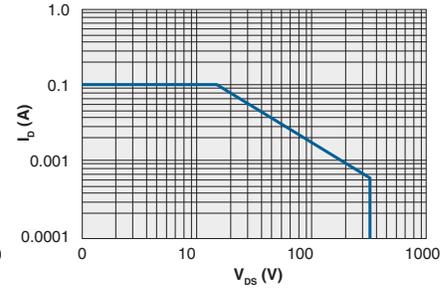
**$R_{ON}$  vs. Temperature**  
( $V_{GS}=0\text{V}$ ,  $I_D=80\text{mA}$ )



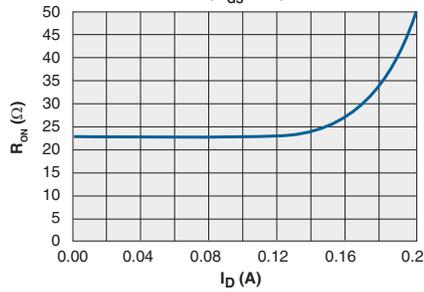
**Power Dissipation vs. Ambient Temperature**



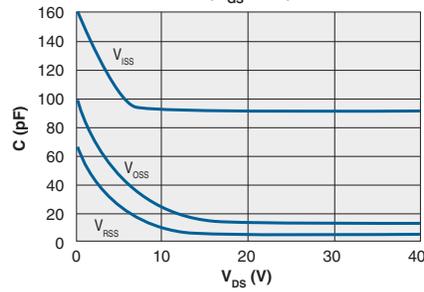
**Maximum Rated Safe Operating Area at 25°C**



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



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



\*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. Clare 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
CPC3730C	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
CPC3730C	260°C for 30 seconds

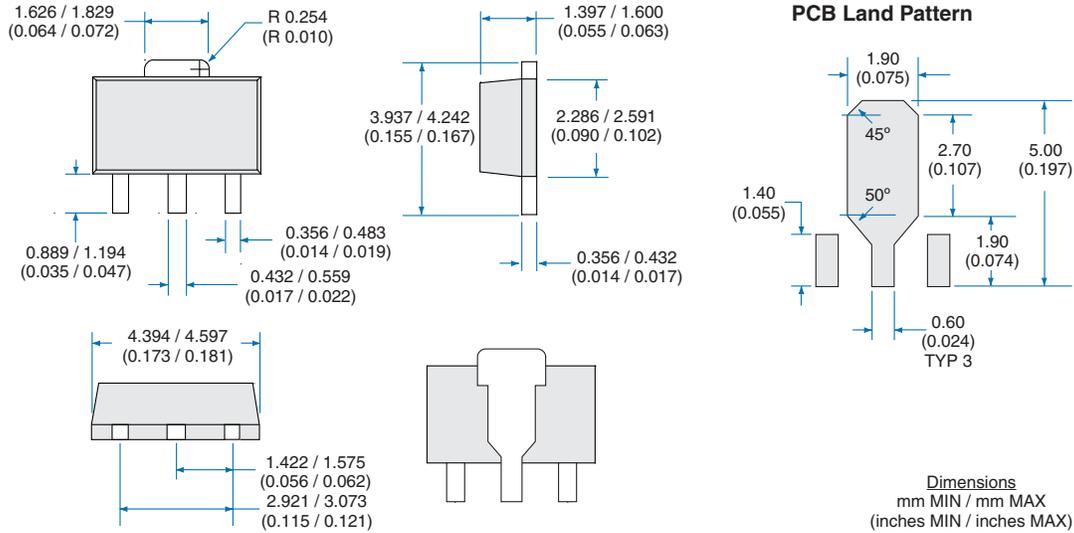
### Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake may be necessary if a wash is used after solder reflow processes. Chlorine-based or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

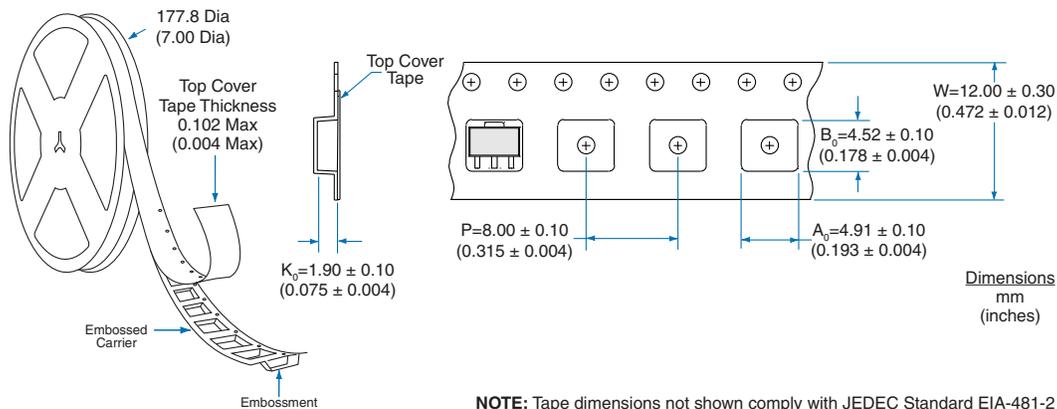


**MECHANICAL DIMENSIONS**

**CPC3730C**



**CPC3730C Tape & Reel**



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

Clare, Inc. 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 Clare's Standard Terms and Conditions of Sale, Clare, Inc. 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 Clare's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. Clare, Inc. reserves the right to discontinue or make changes to its products at any time without notice.