

# ITC14407516D

## POWERLINE N-CHANNEL IGBT CHIP

### FEATURES

- n - Channel.
- Enhancement Mode.
- High Input Impedance.
- High Switching Speed.
- Latch-Free Operation.
- Low Forward Voltage Drop.
- Short Circuit Capability (10μs).

### TYPICAL KEY PARAMETERS (25°C)

$V_{CES}$	1600V
$I_{C(ONT)}$	75A
$V_{CE(sat)}$	3.3V

### RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
$V_{CES}$	Collector-emitter voltage	$V_{GE} = 0V$	1600	V
$V_{GE}$	Gate-emitter voltage	-	±20	V
$I_{C(ONT)}$	Continuous collector current	-	75	A
$I_{C(PK)}$	Peak collector current	$t_p = 1ms$	150	A

### STATIC ELECTRICAL CHARACTERISTICS

Measured under pulse conditions  $T_{case} = 25^{\circ}C$

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_{CES}$	Collector cut-off current	$V_{GE} = 0V, V_{CE} = V_{CES}$	-	-	2	mA
$I_{GES}$	Gate leakage current	$V_{GE} = \pm 20V$	-	-	±500	nA
$V_{GE(TH)}$	Gate threshold voltage	$I_C = 5mA, V_{CE} = V_{GE}$	4.0	-	7.5	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C = 75A, V_{GE} = 15V$	-	3.3	4.1	V
				4.1	5.1	V
		$I_C = 150A, V_{GE} = 15V$	-	4.5	5.6	V
				5.8	7.3	V

All ratings given assuming suitable mountdown of chip.

ITC14407516D

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
C <sub>ies</sub>	Input capacitance	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 25V, f = 1MHz, T <sub>case</sub> = 25°C	-	12000	-	pF
C <sub>oes</sub>	Output capacitance	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 25V, f = 1MHz, T <sub>case</sub> = 25°C	-	600	-	pF
C <sub>res</sub>	Reverse transfer capacitance	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 25V, f = 1MHz, T <sub>case</sub> = 25°C	-	600	-	pF

INDUCTIVE SWITCHING CHARACTERISTICS

T<sub>case</sub> = 125°C unless stated otherwise.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
t <sub>d(off)</sub>	Turn-off delay time	Inductive load  I <sub>C</sub> = 75A  V <sub>CE</sub> = 50% V <sub>CES</sub> ,  V <sub>GE</sub> = ±15V,  R <sub>G</sub> = 6.6Ω	-	550	-	ns
t <sub>f</sub>	Fall time		-	590	-	ns
E <sub>OFF</sub>	Turn-off energy loss		-	20	-	mJ
t <sub>d(on)</sub>	Turn-on delay time		-	790	-	ns
t <sub>r</sub>	Rise time		-	270	-	ns
E <sub>ON</sub>	Turn-on energy loss		-	43	-	mJ

THERMAL CHARACTERISTICS

Symbol	Parameter	Conditions	Max.	Units
T <sub>j</sub>	Junction temperature	-	150	°C
T <sub>stg</sub>	Storage temperature	-	-55 to +150	°C

All ratings given assuming suitable mountdown of chip.

## CURVES

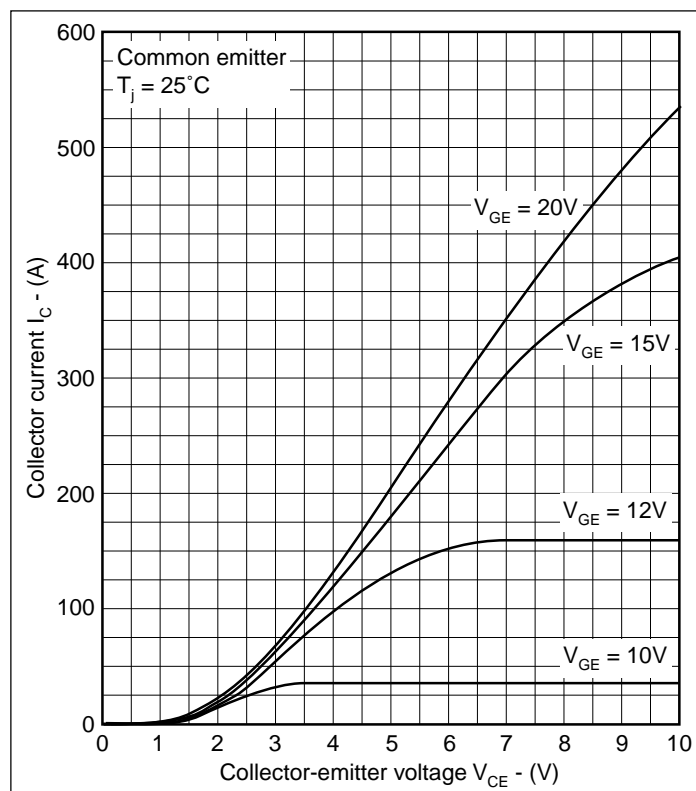


Fig.1 Typical output characteristics @ 25°C

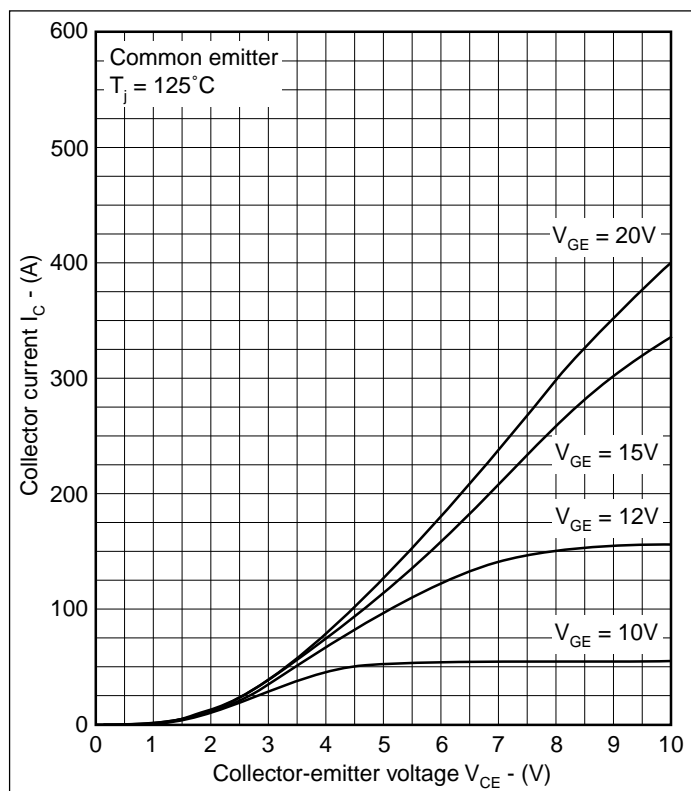


Fig.2 Typical output characteristics @ 125°C

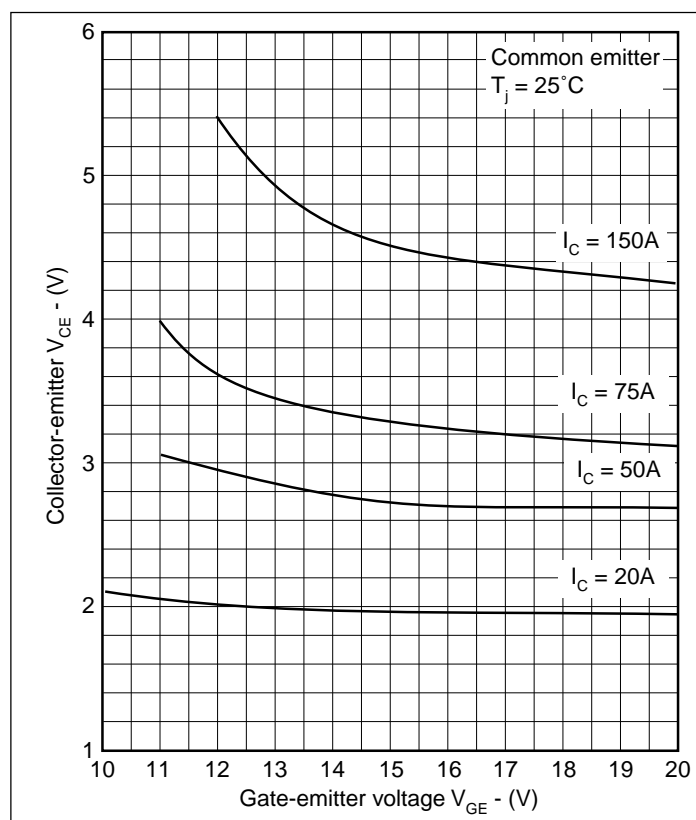


Fig.3 Typical transfer characteristics @ 25°C

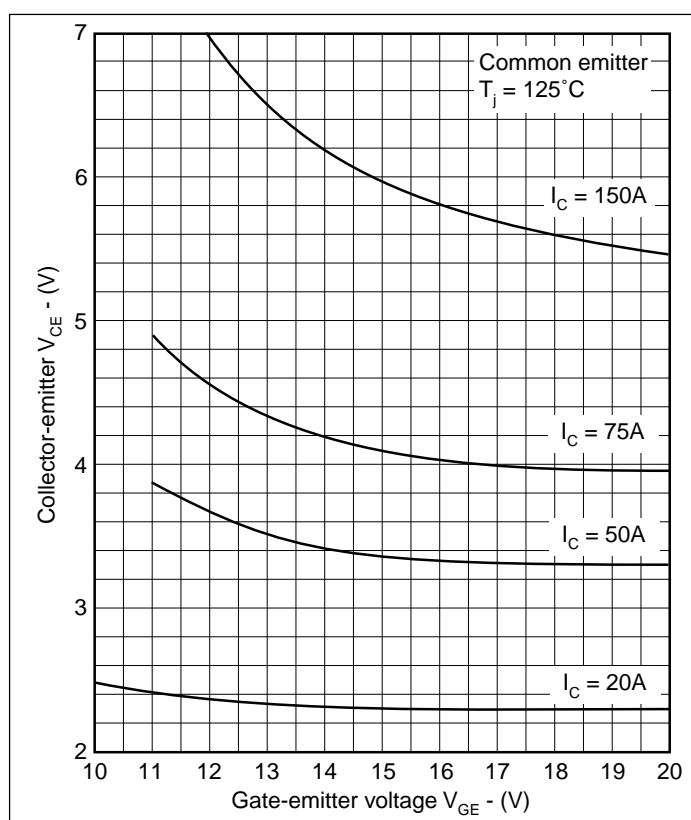


Fig.4 Typical transfer characteristics @ 125°C

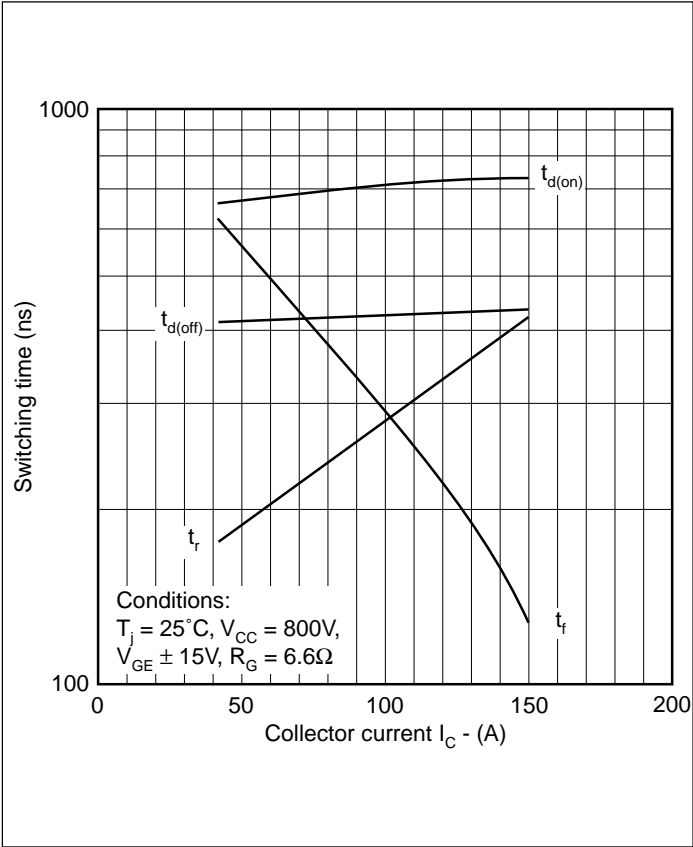


Fig.5 Typical switching time vs  $I_C$  @  $25^\circ\text{C}$

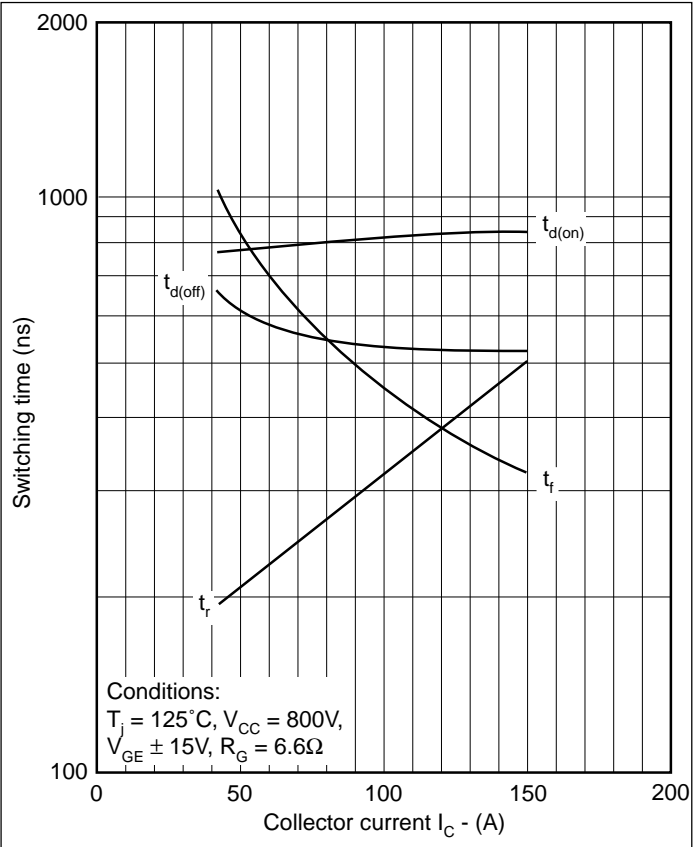


Fig.6 Typical switching time vs  $I_C$  @  $125^\circ\text{C}$

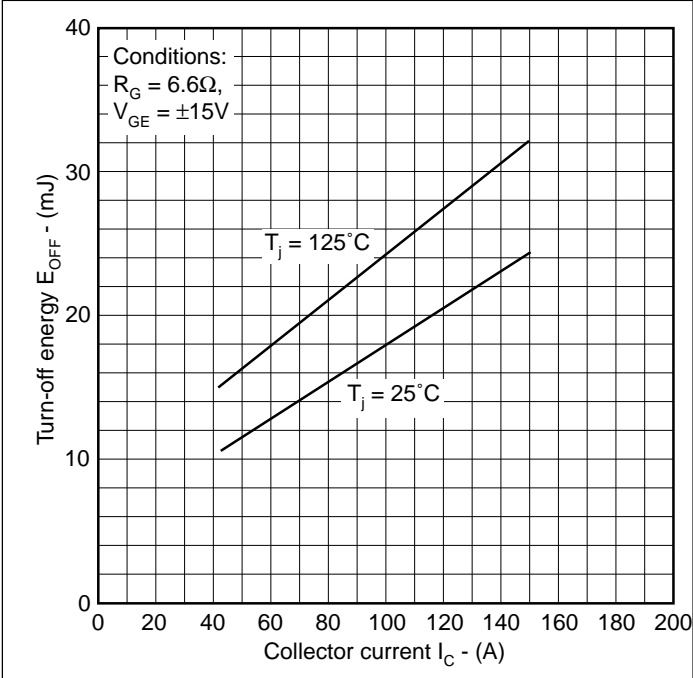


Fig.7 Typical turn-off losses

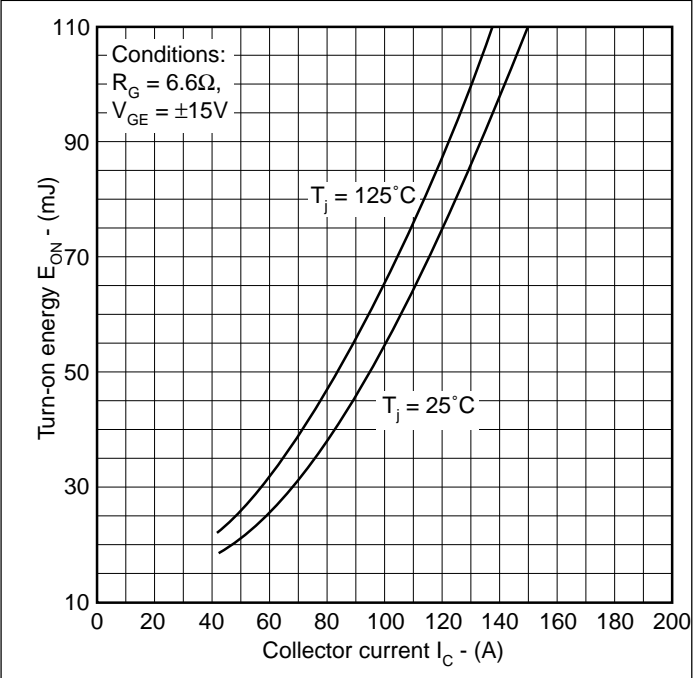


Fig.8 Typical turn-on losses

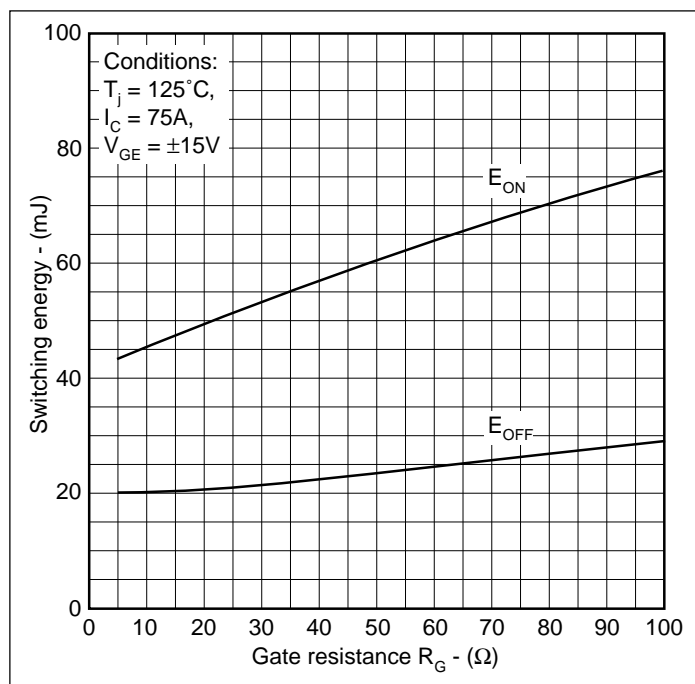


Fig.9 Typical switching energy

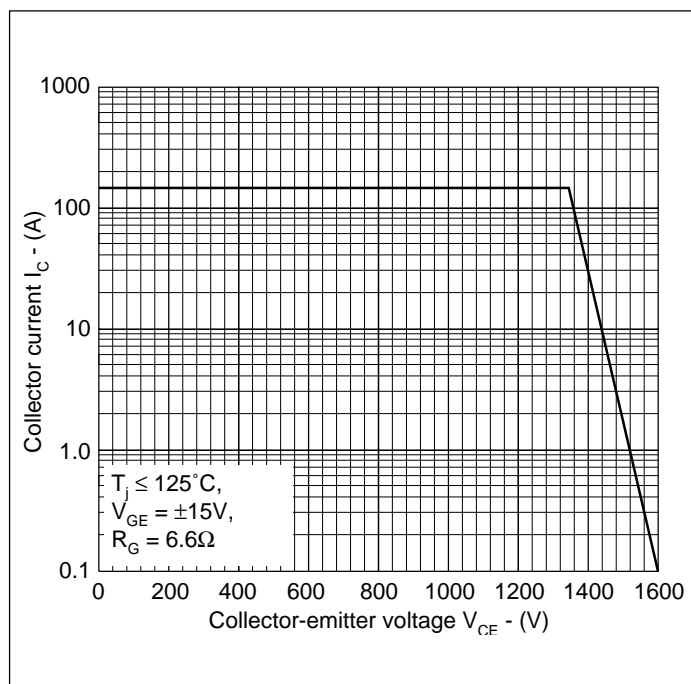


Fig.10 Reverse bias safe operating area

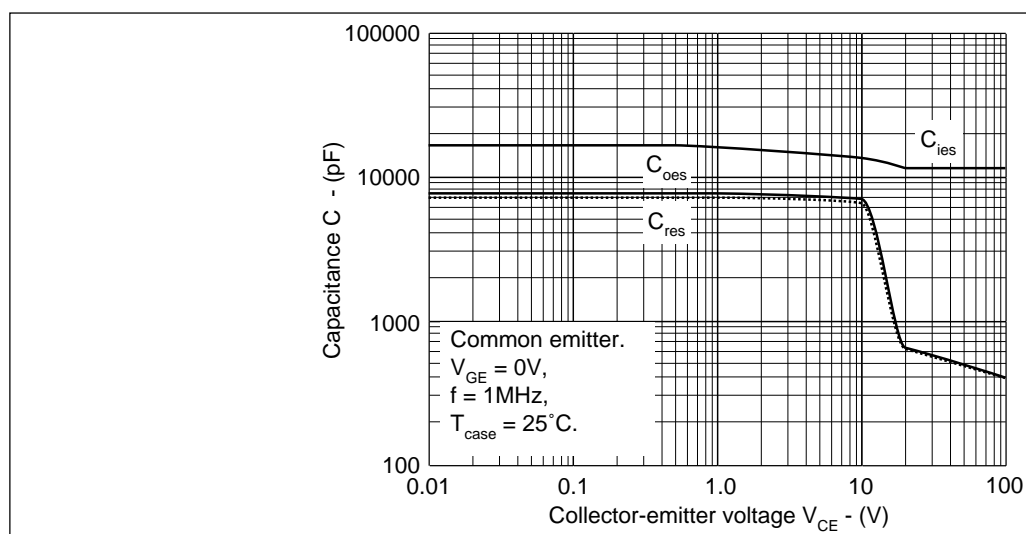
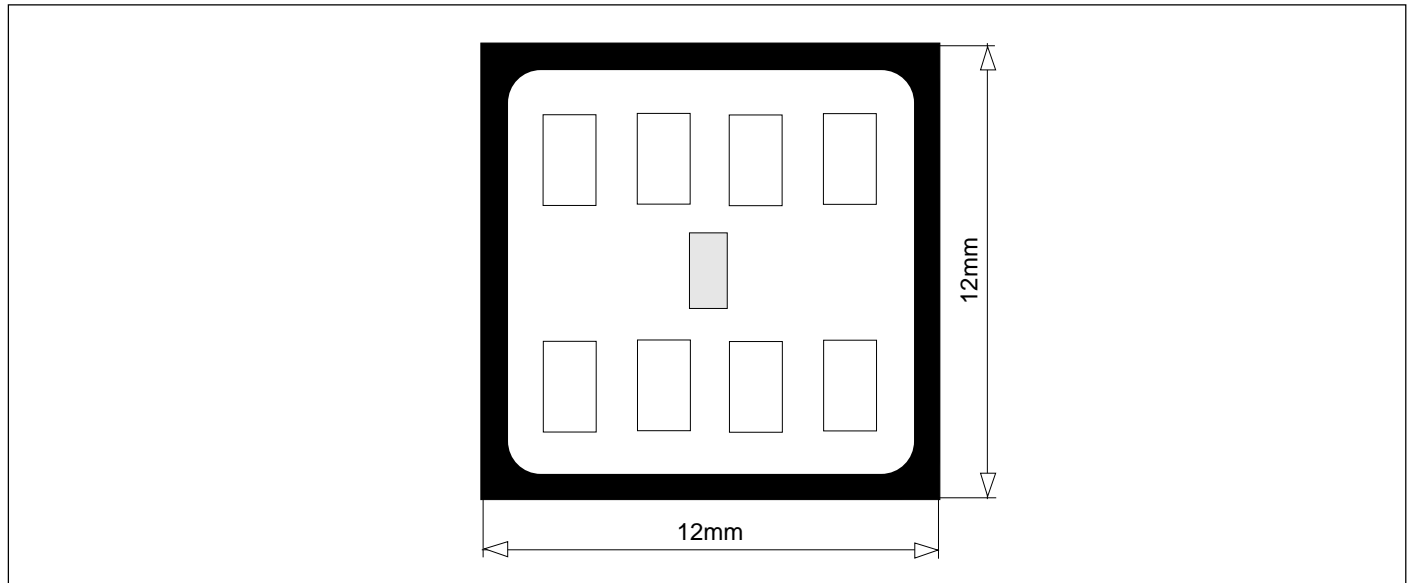


Fig.11 Typical capacitance

## ITC14407516D

### CHIP DETAILS

All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Typical chip thickness: 600µm.

Wire sizes: 8 bondwires  $\geq 300\mu\text{m}$ .

Composition of wire: 99.999% Aluminium.

Back metal: Aluminium, Titanium, Nickel, Silver.

$T_{\text{max}}$  for chip **NOT** to exceed 275°C for more than 15 minutes during soldering, using 96S solder.

Packing for shipment is either membrane or waffle tray.

Static sensitive device - observe static handling precautions.



#### HEADQUARTERS OPERATIONS

##### GEC PLESSEY SEMICONDUCTORS

Cheney Manor, Swindon,  
Wiltshire, SN2 2QW, United Kingdom.  
Tel: + 44 (0)1793 518000  
Fax: + 44 (0)1793 518411

##### GEC PLESSEY SEMICONDUCTORS

P.O. Box 660017  
1500 Green Hills Road,  
Scotts Valley, California 95067-0017,  
United States of America.  
Tel: + 1 (408) 438 2900  
Fax: + 1 (408) 438 5576

#### POWER PRODUCT CUSTOMER SERVICE CENTRES

- **FRANCE.** 2 rue Henri-Bergson, 92665 Asnieres Cedex.  
Tel: + 33 1 40 80 54 00. Fax: + 33 1 40 80 55 87.
- **GERMANY.** Ungererstrasse 129, 80505 München.  
Tel: + 49 (0)89 36 09 060. Fax: + 49 (0)89 36 09 06 55.
- **NORTH AMERICA.** At Dedham Place, Suite 125, 3 Allied Drive, Dedham. MA 02026.  
Tel: + 1 617 251 0126. Fax: + 1 617 251 0106.
- **UNITED KINGDOM.** Doddington Road, Lincoln. LN6 3LF.  
Tel: + 44 (0)1522 500500. Fax: + 44 (0)1522 500550.

These are supported by Agents and Distributors in major countries world-wide.

© GEC Plessey Semiconductors 1996 Publication No. DS4580-1 Issue No. 1.4 July 1996

TECHNICAL DOCUMENTATION - NOT FOR RESALE. PRINTED IN UNITED KINGDOM.

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior notice the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.