

# ITC14415006D

## 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)

$V_{CES}$	600V
$I_{C(ONT)}$	150A
$V_{CE(sat)}$	2.3V

### RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
$V_{CES}$	Collector-emitter voltage	$V_{GE} = 0V$	600	V
$V_{GE}$	Gate-emitter voltage	-	±20	V
$I_{C(ONT)}$	Continuous collector current	-	150	A
$I_{C(PK)}$	Peak collector current	$t_p = 1ms$	300	A

### STATIC ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
I <sub>CES</sub>	Collector cut-off current	V <sub>GE</sub> = 0V, V <sub>CE</sub> = V <sub>CES</sub>		-	-	1	mA
I <sub>GES</sub>	Gate leakage current	V <sub>GE</sub> = ±20V		-	-	±500	nA
V <sub>GE(TH)</sub>	Gate threshold voltage	I <sub>C</sub> = 5mA, V <sub>CE</sub> = V <sub>GE</sub>		4.0	-	7.5	V
V <sub>CE(sat)</sub>	Collector-emitter saturation voltage	I <sub>C</sub> = 150A, V <sub>GE</sub> = 15V	T <sub>J</sub> = 25°C	-	2.3	3.0	V
			T <sub>J</sub> = 125°C	-	2.6	3.3	V
		I <sub>C</sub> = 300A, V <sub>GE</sub> = 15V	T <sub>J</sub> = 25°C	-	3.5	4.6	V
			T <sub>J</sub> = 125°C	-	4.3	5.5	V

All ratings given assuming suitable mountdown of chip.

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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	-	14500	-	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	-	2200	-	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	-	2100	-	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> = 150A  V <sub>CE</sub> = 50% V <sub>CES</sub> ,  V <sub>GE</sub> = ±15V,  R <sub>G</sub> = 6.6Ω	-	560	-	ns
t <sub>f</sub>	Fall time		-	430	-	ns
E <sub>OFF</sub>	Turn-off energy loss		-	14	-	mJ
t <sub>d(on)</sub>	Turn-on delay time		-	810	-	ns
t <sub>r</sub>	Rise time		-	290	-	ns
E <sub>ON</sub>	Turn-on energy loss		-	12	-	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

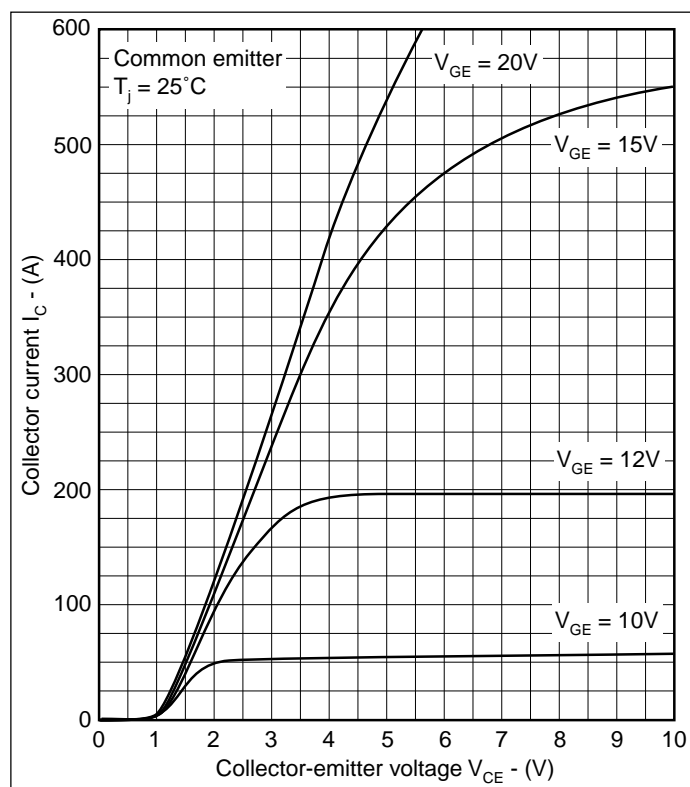


Fig.1 Typical output characteristics @ 25°C

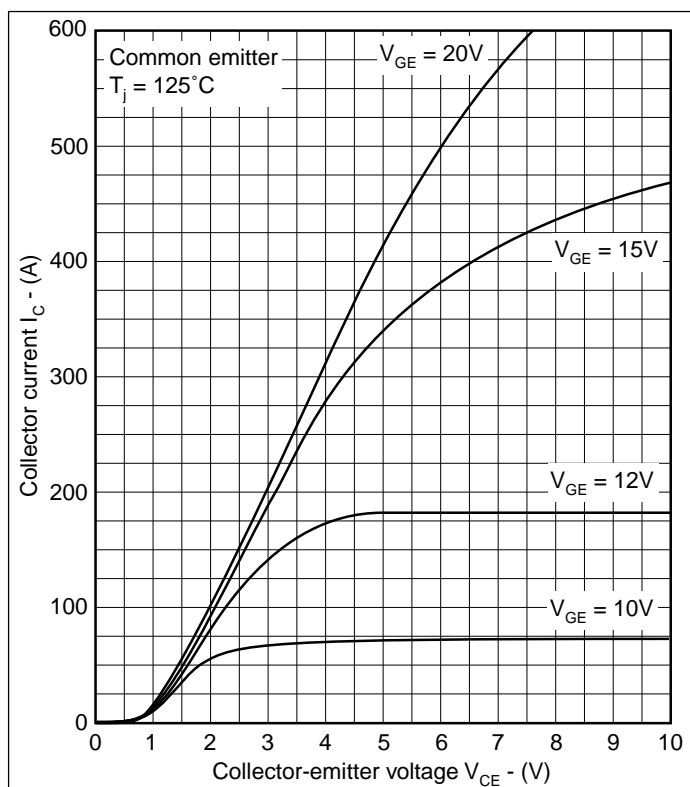


Fig.2 Typical output characteristics @ 125°C

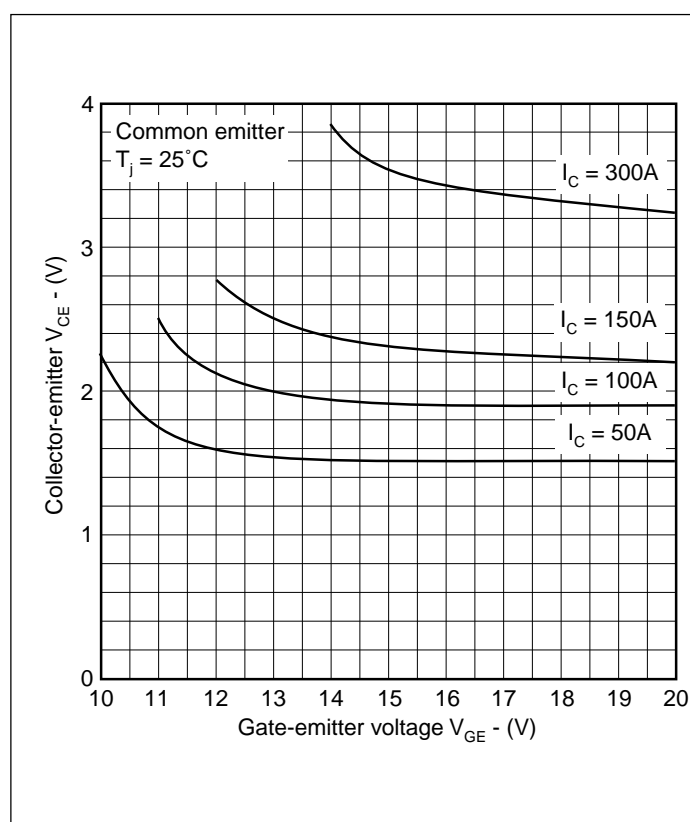


Fig.3 Typical transfer characteristics @ 25°C

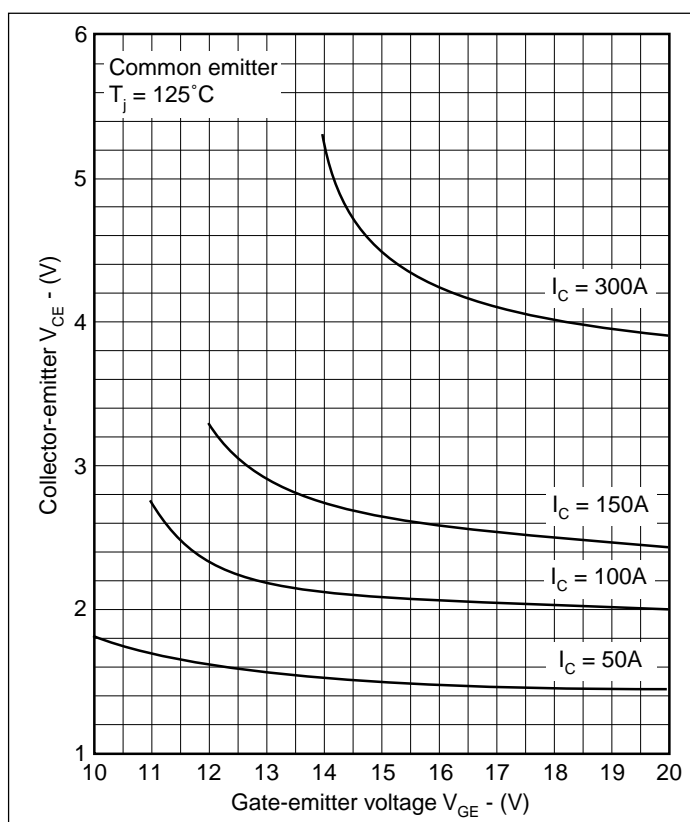


Fig.4 Typical transfer characteristics @ 125°C

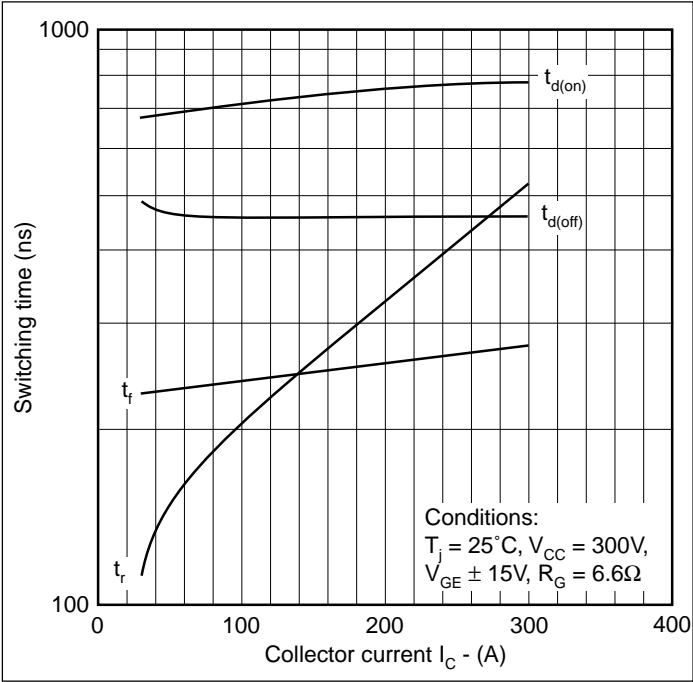


Fig.5 Typical switching time vs  $I_C$  @  $25^\circ\text{C}$

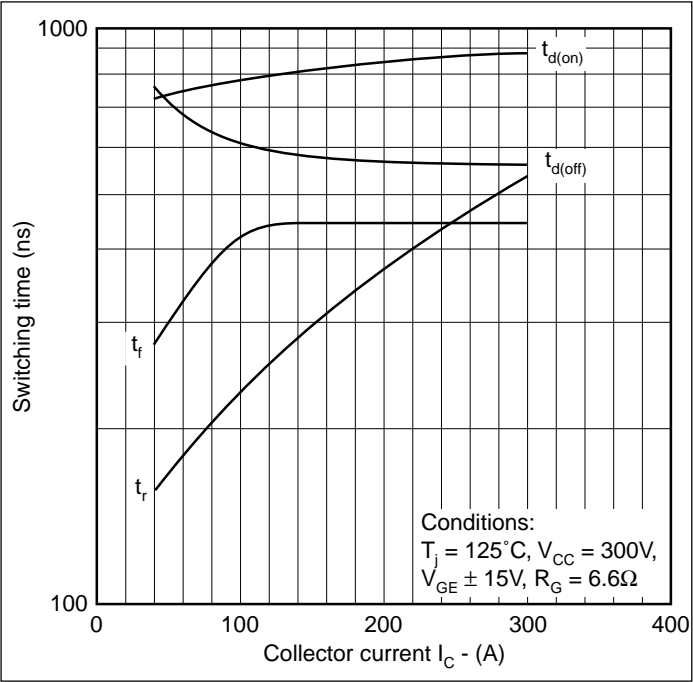


Fig.6 Typical switching time vs  $I_C$  @  $125^\circ\text{C}$

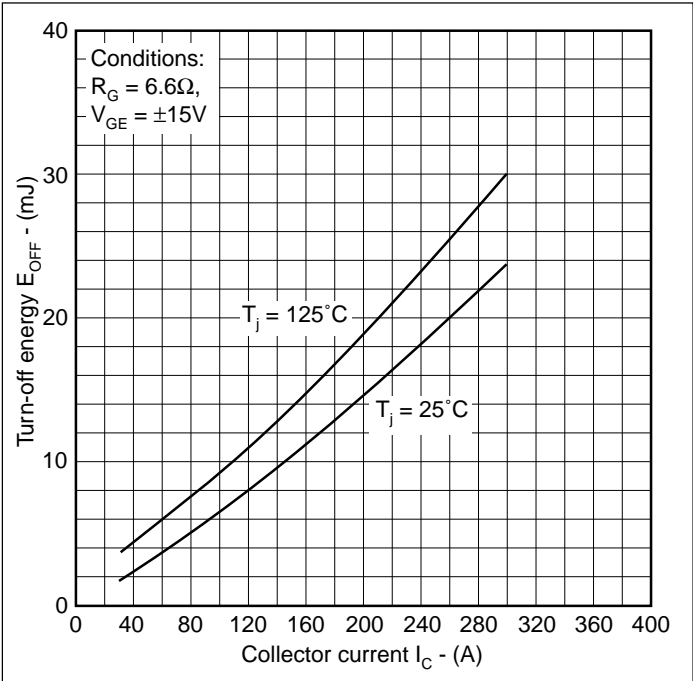


Fig.7 Typical turn-off losses

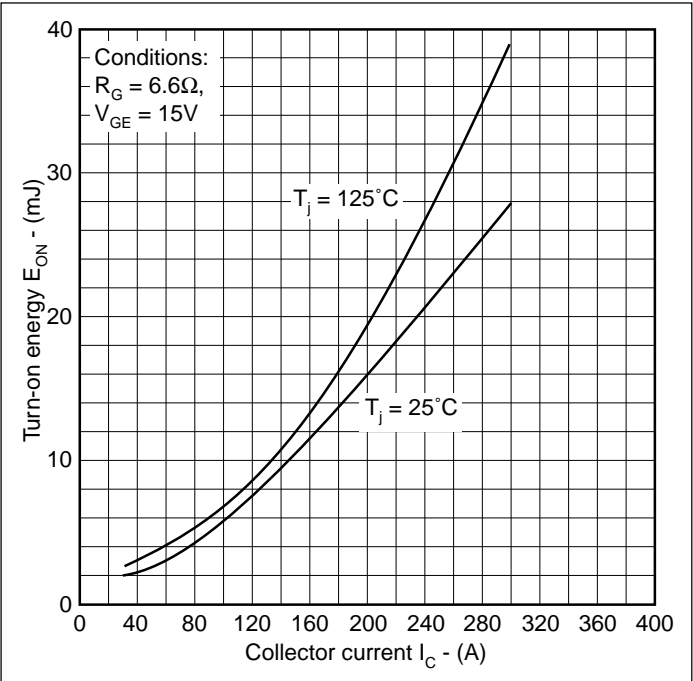


Fig.8 Typical turn-on losses

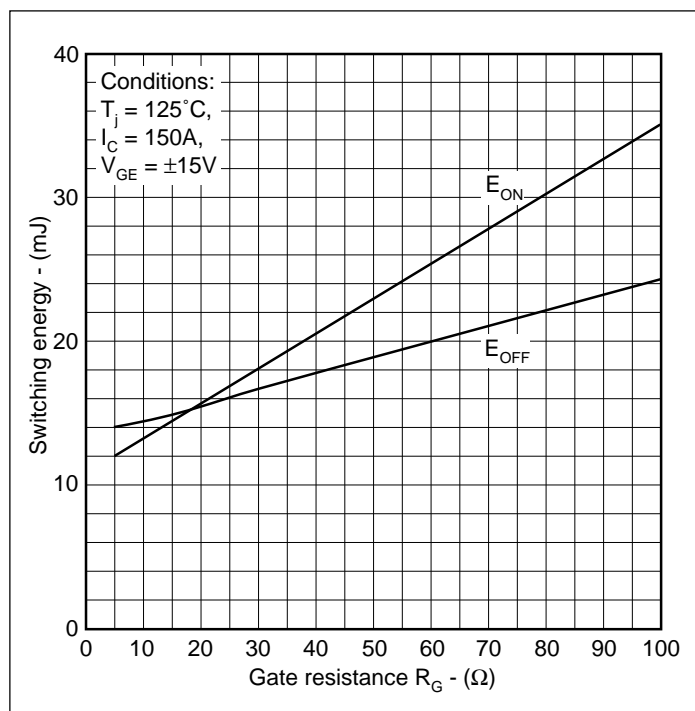


Fig.9 Typical switching energy

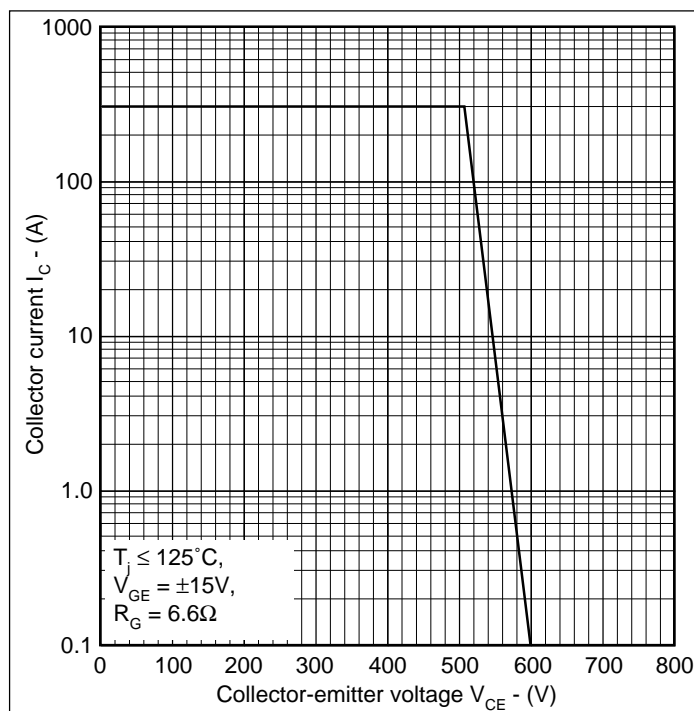


Fig.10 Reverse bias safe operating area

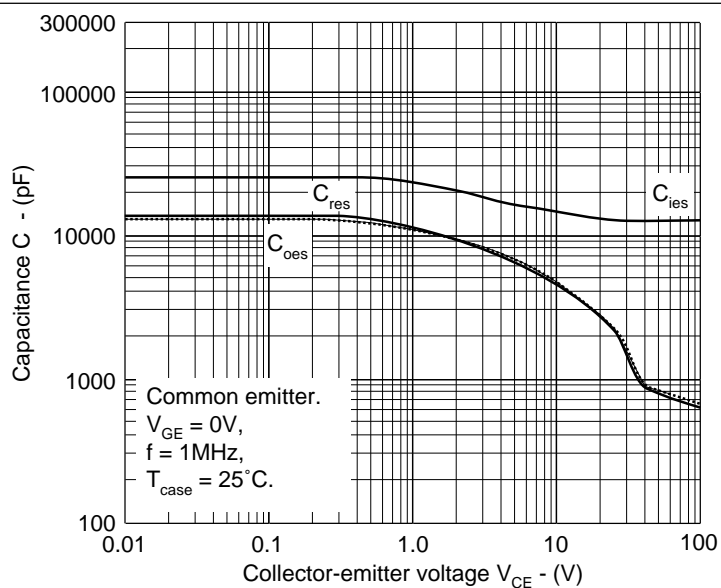
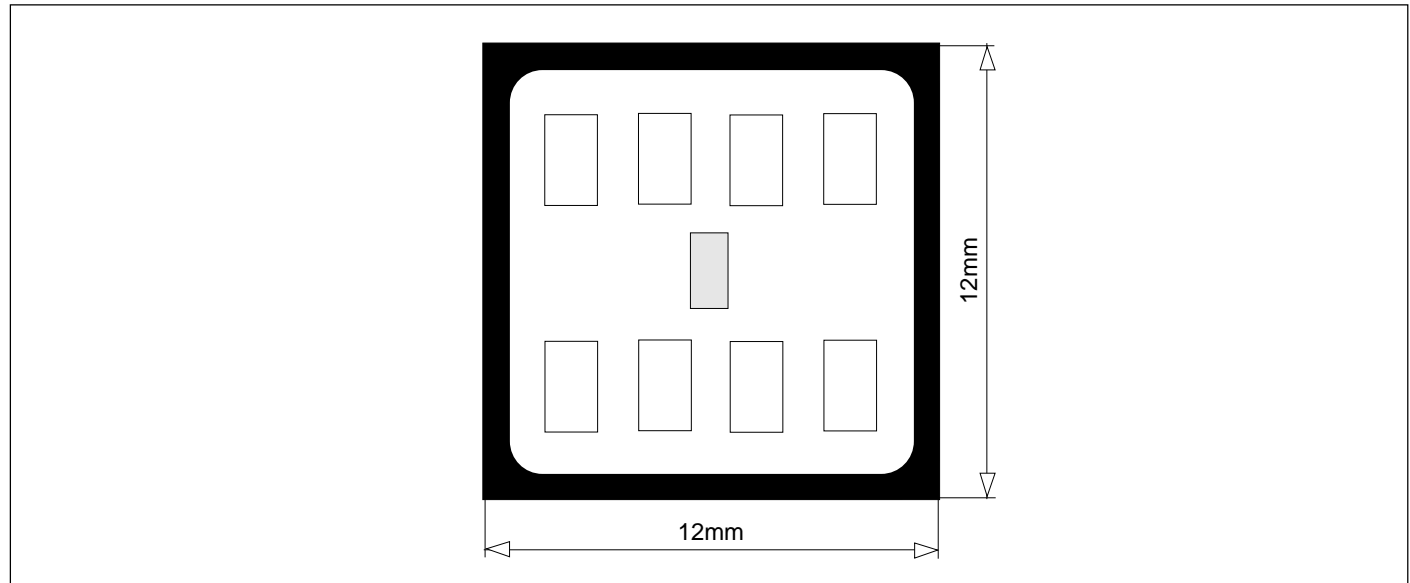


Fig.11 Typical capacitance

## CHIP DETAILS

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



Typical chip thickness: 537 $\mu$ m.

Wire sizes: 10 bondwires  $\geq$  300 $\mu$ m  $\varnothing$ .

Composition of wire: 99.999% Aluminium.

Back metal: Aluminium, Titanium, Nickel, Silver.

T<sub>max</sub> 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.



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