International Rectifier

IRG4PC30UPbF

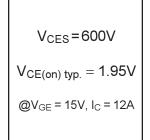
INSULATED GATE BIPOLAR TRANSISTOR

UltraFast Speed IGBT

Features

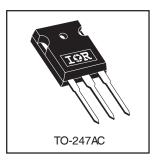
- UltraFast: Optimized for high operating frequencies 8-40 kHz in hard switching, >200 kHz in resonant mode
- Generation 4 IGBT design provides tighter parameter distribution and higher efficiency than Generation 3
- Industry standard TO-247AC package
- Lead-Free

G C E n-channel



Benefits

- Generation 4 IGBT's offer highest efficiency available
- · IGBT's optimized for specified application conditions
- Designed to be a "drop-in" replacement for equivalent industry-standard Generation 3 IR IGBT's



Absolute Maximum Ratings

	Parameter	Max.	Units	
V _{CES}	Collector-to-Emitter Breakdown Voltage	600	V	
I _C @ T _C = 25°C	Continuous Collector Current	23		
I _C @ T _C = 100°C	Continuous Collector Current	12	A	
I _{CM}	Pulsed Collector Current ①	92		
I _{LM}	Clamped Inductive Load Current ②	92		
V _{GE}	Gate-to-Emitter Voltage	± 20	V	
E _{ARV}	Reverse Voltage Avalanche Energy ③	10	mJ	
P _D @ T _C = 25°C	Maximum Power Dissipation	100	W	
P _D @ T _C = 100°C	Maximum Power Dissipation	42	¬	
T _J	Operating Junction and	-55 to + 150		
T _{STG}	Storage Temperature Range		°C	
	Soldering Temperature, for 10 seconds	300 (0.063 in. (1.6mm from case)]	
	Mounting torque, 6-32 or M3 screw.	10 lbf•in (1.1N•m)		

Thermal Resistance

	Parameter	Тур.	Max.	Units
$R_{\theta JC}$	Junction-to-Case		1.2	
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24		°C/W
$R_{\theta JA}$	Junction-to-Ambient, typical socket mount		40	
VVt	Weight	6 (0.21)		g (oz)

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Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

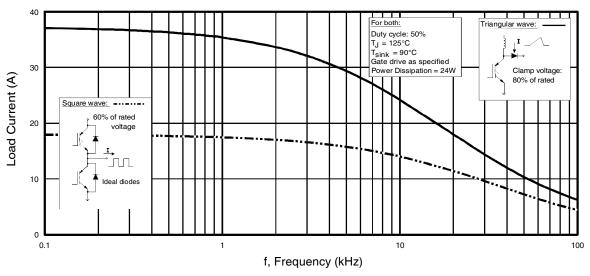
	Parameter	Min.	Тур.	Max.	Units	Conditions	
V _{(BR)CES}	Collector-to-Emitter Breakdown Voltage	600	_	_	V	$V_{GE} = 0V, I_{C} = 250\mu A$	
V _{(BR)ECS}	Emitter-to-Collector Breakdown Voltage ④	18	_	_	V	$V_{GE} = 0V, I_{C} = 1.0A$	
$\Delta V_{(BR)CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	_	0.63	_	V/°C	$V_{GE} = 0V, I_{C} = 1.0mA$	
V _{CE(ON)}	Collector-to-Emitter Saturation Voltage	_	1.95	2.1	V	I _C = 12A	V _{GE} = 15V
		_	2.52	_		I _C = 23A	See Fig.2, 5
		_	2.09	_		I _C = 12A , T _J = 150°C	
V _{GE(th)}	Gate Threshold Voltage	3.0	—	6.0		V_{CE} = V_{GE} , I_C = 250 μ A	
$\Delta V_{GE(th)}/\Delta T_{J}$	Temperature Coeff. of Threshold Voltage	_	-13	_	mV/°C	$V_{CE} = V_{GE}$, $I_C = 250\mu A$	
9 _{fe}	Forward Transconductance ⑤	3.1	8.6	_	S	$V_{CE} = 100 \text{ V}, I_{C} = 12 \text{A}$	
I _{CES}	Zero Gate Voltage Collector Current	_	_	250	μA	V _{GE} = 0V, V _{CE} = 600V	
		_	_	2.0		V _{GE} = 0V, V _{CE} = 10V, T	j = 25°C
		_	_	1000		V _{GE} = 0V, V _{CE} = 600V, 7	Г _Ј = 150°С
IGES	Gate-to-Emitter Leakage Current	_	_	±100	nΑ	$V_{GE} = \pm 20V$	

Switching Characteristics @ T_J = 25°C (unless otherwise specified)

Parameter	Min.	Тур.	Max.	Units	Conditions
Total Gate Charge (turn-on)	_	50	75		I _C = 12A
Gate - Emitter Charge (turn-on)	_	8.1	12	nC	V _{CC} = 400V See Fig.8
Gate - Collector Charge (turn-on)	_	18	27		V _{GE} = 15V
Turn-On Delay Time	_	17	_		
Rise Time	_	9.6	_	ne	T _J = 25°C
Turn-Off Delay Time	_	78	120	115	I _C = 12A, V _{CC} = 480V
Fall Time	_	97	150		V_{GE} = 15V, R_G = 23 Ω
Turn-On Switching Loss	_	0.16	_		Energy losses include "tail"
Turn-Off Switching Loss	_	0.20	_	mJ	See Fig. 10, 11, 13, 14
Total Switching Loss	_	0.36	0.50		
Turn-On Delay Time	_	20	_		T _J = 150°C,
Rise Time	_	13	_	ne	$I_C = 12A$, $V_{CC} = 480V$
Turn-Off Delay Time	_	180	_	115	V_{GE} = 15V, R_G = 23 Ω
Fall Time	_	140	_		Energy losses include "tail"
Total Switching Loss	_	0.73	_	mJ	See Fig. 13, 14
Internal Emitter Inductance	_	13	—	nΗ	Measured 5mm from package
Input Capacitance	_	1100	_		V _{GE} = 0V
Output Capacitance	_	73	_	рF	V _{CC} = 30V See Fig. 7
Reverse Transfer Capacitance	_	14	_		f = 1.0MHz
	Total Gate Charge (turn-on) Gate - Emitter Charge (turn-on) Gate - Collector Charge (turn-on) Turn-On Delay Time Rise Time Turn-Off Delay Time Fall Time Turn-On Switching Loss Turn-Off Switching Loss Total Switching Loss Turn-On Delay Time Rise Time Turn-Off Delay Time Rise Time Turn-Off Delay Time Rise Time Turn-Off Delay Time Fall Time Total Switching Loss Internal Emitter Inductance Input Capacitance Output Capacitance	Total Gate Charge (turn-on) — Gate - Emitter Charge (turn-on) — Gate - Collector Charge (turn-on) — Turn-On Delay Time — Rise Time — Turn-Off Delay Time — Fall Time — Turn-On Switching Loss — Turn-Off Switching Loss — Total Switching Loss — Turn-On Delay Time — Rise Time — Turn-On Delay Time — Rise Time — Turn-Off Delay Time — Internal Emitter Inductance — Input Capacitance — Output Capacitance	Total Gate Charge (turn-on) — 50 Gate - Emitter Charge (turn-on) — 8.1 Gate - Collector Charge (turn-on) — 18 Turn-On Delay Time — 17 Rise Time — 9.6 Turn-Off Delay Time — 78 Fall Time — 97 Turn-On Switching Loss — 0.16 Turn-Off Switching Loss — 0.20 Total Switching Loss — 0.36 Turn-On Delay Time — 20 Rise Time — 13 Turn-Off Delay Time — 180 Fall Time — 140 Total Switching Loss — 0.73 Internal Emitter Inductance — 13 Input Capacitance — 1100 Output Capacitance — 73	Total Gate Charge (turn-on) — 50 75 Gate - Emitter Charge (turn-on) — 8.1 12 Gate - Collector Charge (turn-on) — 18 27 Turn-On Delay Time — 17 — Rise Time — 9.6 — Turn-Off Delay Time — 78 120 Fall Time — 97 150 Turn-On Switching Loss — 0.16 — Turn-Off Switching Loss — 0.20 — Total Switching Loss — 0.36 0.50 Turn-On Delay Time — 20 — Rise Time — 13 — Turn-Off Delay Time — 180 — Fall Time — 140 — Total Switching Loss — 0.73 — Internal Emitter Inductance — 13 — Input Capacitance — 73 —	Total Gate Charge (turn-on) — 50 75 Gate - Emitter Charge (turn-on) — 8.1 12 Gate - Collector Charge (turn-on) — 18 27 Turn-On Delay Time — 17 — Rise Time — 9.6 — Turn-Off Delay Time — 78 120 Fall Time — 97 150 Turn-On Switching Loss — 0.16 — Turn-Off Switching Loss — 0.20 — Total Switching Loss — 0.36 0.50 Turn-On Delay Time — 20 — Rise Time — 13 — Turn-Off Delay Time — 180 — Fall Time — 140 — Total Switching Loss — 0.73 — mJ Internal Emitter Inductance — 13 — nH Input Capacitance — 1100 — Output Capacitance — 73 — pF

Notes:

- 1 Repetitive rating; V_{GE} = 20V, pulse width limited by max. junction temperature. (See fig. 13b)
- $@~V_{CC}$ = 80%(V_{CES}), V_{GE} = 20V, L = 10µH, R $_{G}$ = 23 $\!\Omega_{\rm t}$ (See fig. 13a)
- ③ Repetitive rating; pulse width limited by maximum junction temperature.
- 4 Pulse width $\leq 80\mu s$; duty factor $\leq 0.1\%$.
- ⑤ Pulse width 5.0µs, single shot.



 $\label{eq:Fig. 1-Typical Load Current vs. Frequency} Fig. 1 - Typical Load Current vs. Frequency (For square wave, <math>|=|_{PK}$) of fundamental; for triangular wave, $|=|_{PK}$)

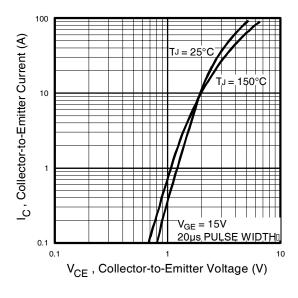


Fig. 2 - Typical Output Characteristics

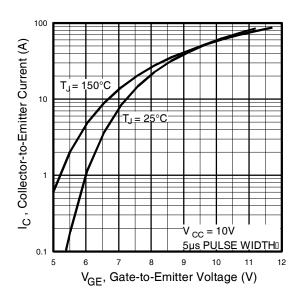
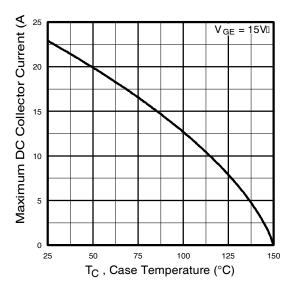


Fig. 3 - Typical Transfer Characteristics

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3.0 IV_{GE} = 15V IC = 24A IC = 24A IC = 24A IC = 12A IC = 6.0A IC = 12A IC = 6.0A IC = 1.5 -60 -40 -20 0 20 40 60 80 100 120 140 160 T_J, Junction Temperature (°C)

Fig. 4 - Maximum Collector Current vs. Case Temperature

Fig. 5 - Collector-to-Emitter Voltage vs. Junction Temperature

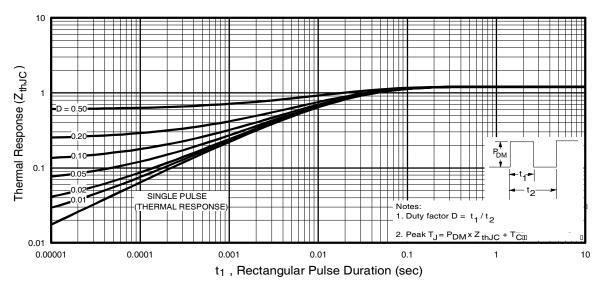


Fig. 6 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

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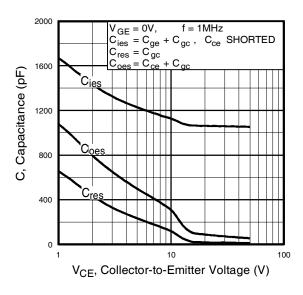


Fig. 7 - Typical Capacitance vs. Collector-to-Emitter Voltage

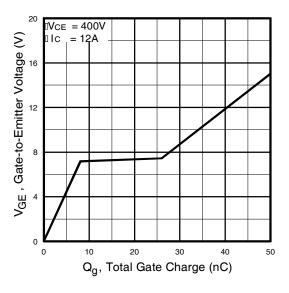


Fig. 8 - Typical Gate Charge vs. Gate-to-Emitter Voltage

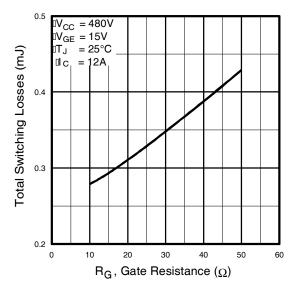


Fig. 9 - Typical Switching Losses vs. Gate Resistance

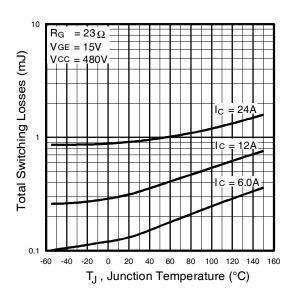
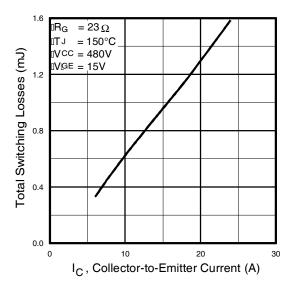


Fig. 10 - Typical Switching Losses vs. Junction Temperature

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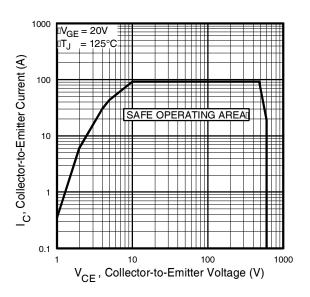
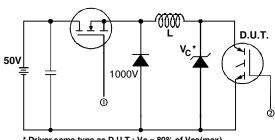


Fig. 11 - Typical Switching Losses vs. Collector-to-Emitter Current

Fig. 12 - Turn-Off SOA

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* Driver same type as D.U.T.; Vc = 80% of Vce(max)

* Note: Due to the 50V power supply, pulse width and inductor will increase to obtain rated ld.

Fig. 13a - Clamped Inductive Load Test Circuit

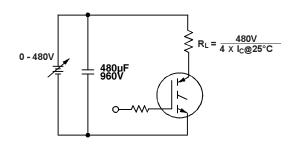


Fig. 13b - Pulsed Collector Current Test Circuit

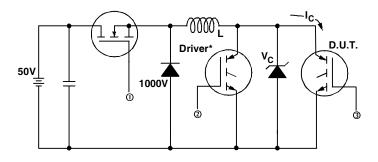


Fig. 14a - Switching Loss Test Circuit

* Driver same type as D.U.T., VC = 480V

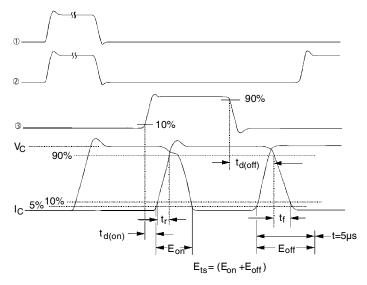
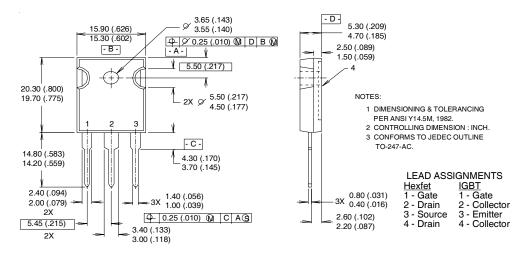


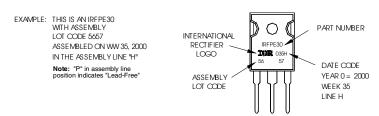
Fig. 14b - Switching Loss Waveforms

TO-247AC Package Outline

Dimensions are shown in millimeters (inches)



TO-247AC Part Marking Information



Data and specifications subject to change without notice.



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Note: For the most current drawings please refer to the IR website at: http://www.irf.com/package/



OOO «ЛайфЭлектроникс" "LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 P/C 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 3010181090000000703 БИК 044030703

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

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- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
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- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
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- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
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- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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