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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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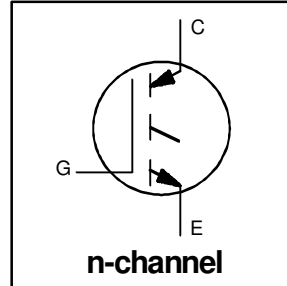
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Features

- Switching-loss rating includes all "tail" losses
- Optimized for medium operating frequency (1 to 10kHz) See Fig. 1 for Current vs. Frequency curve



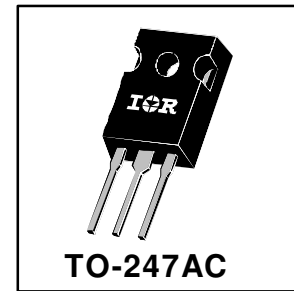
$V_{CES} = 900V$

$V_{CE(sat)} \leq 2.7V$

@ $V_{GE} = 15V, I_C = 28A$

Description

Insulated Gate Bipolar Transistors (IGBTs) from International Rectifier have higher usable current densities than comparable bipolar transistors, while at the same time having simpler gate-drive requirements of the familiar power MOSFET. They provide substantial benefits to a host of high-voltage, high-current applications.



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{CES}	Collector-to-Emitter Voltage	900	V
$I_C @ T_C = 25^\circ C$	Continuous Collector Current	51	A
$I_C @ T_C = 100^\circ C$	Continuous Collector Current	28	
I_{CM}	Pulsed Collector Current ①	100	
I_{LM}	Clamped Inductive Load Current ②	100	
V_{GE}	Gate-to-Emitter Voltage	± 20	V
E_{ARV}	Reverse Voltage Avalanche Energy ③	20	mJ
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	200	W
$P_D @ T_C = 100^\circ C$	Maximum Power Dissipation	78	
T_J	Operating Junction and Storage Temperature Range	-55 to +150	°C
	Soldering Temperature, for 10 sec.	300 (0.063 in. (1.6mm) from case)	
	Mounting torque, 6-32 or M3 screw.	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	-----	-----	0.64	°C/W
$R_{\theta CS}$	Case-to-Sink, flat, greased surface	-----	0.24	-----	
$R_{\theta JA}$	Junction-to-Ambient, typical socket mount	-----	-----	40	
Wt	Weight	-----	6 (0.21)	-----	g (oz)

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	900	----	----	V	$V_{GE} = 0V, I_C = 250\mu A$
$V_{(BR)ECS}$	Emitter-to-Collector Breakdown Voltage ^④	20	----	----	V	$V_{GE} = 0V, I_C = 1.0A$
$\Delta V_{(BR)CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	----	0.74	----	V/ $^\circ\text{C}$	$V_{GE} = 0V, I_C = 1.0mA$
$V_{CE(on)}$	Collector-to-Emitter Saturation Voltage	----	2.1	2.7	V	$I_C = 28A$ $I_C = 51A$ $I_C = 28A, T_J = 150^\circ\text{C}$ $V_{GE} = 15V$ See Fig. 2, 5
		----	2.7	----		
		----	2.4	----		
$V_{GE(th)}$	Gate Threshold Voltage	3.0	----	5.5		$V_{CE} = V_{GE}, I_C = 250\mu A$
$\Delta V_{GE(th)}/\Delta T_J$	Temperature Coeff. of Threshold Voltage	----	-9.7	----	mV/ $^\circ\text{C}$	$V_{CE} = V_{GE}, I_C = 250\mu A$
g_{fe}	Forward Transconductance ^⑤	12	18	----	S	$V_{CE} = 100V, I_C = 28A$
I_{CES}	Zero Gate Voltage Collector Current	----	----	250	μA	$V_{GE} = 0V, V_{CE} = 900V$ $V_{GE} = 0V, V_{CE} = 900V, T_J = 150^\circ\text{C}$
		----	----	2000		
I_{GES}	Gate-to-Emitter Leakage Current	----	----	± 100	nA	$V_{GE} = \pm 20V$

Switching Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge (turn-on)	----	81	120	nC	$I_C = 28A$ $V_{CC} = 400V$ $V_{GE} = 15V$ See Fig. 8
Q_{ge}	Gate - Emitter Charge (turn-on)	----	16	24		
Q_{gc}	Gate - Collector Charge (turn-on)	----	29	44		
$t_{d(on)}$	Turn-On Delay Time	----	32	----	ns	$T_J = 25^\circ\text{C}$ $I_C = 28A, V_{CC} = 720V$ $V_{GE} = 15V, R_G = 5.0\Omega$ Energy losses include "tail"
t_r	Rise Time	----	22	----		
$t_{d(off)}$	Turn-Off Delay Time	----	200	280		
t_f	Fall Time	----	130	180		
E_{on}	Turn-On Switching Loss	----	1.1	----	mJ	See Fig. 9, 10, 11, 14
E_{off}	Turn-Off Switching Loss	----	1.8	----		
E_{ts}	Total Switching Loss	----	2.9	4.1		
$t_{d(on)}$	Turn-On Delay Time	----	32	----	ns	$T_J = 150^\circ\text{C}$, $I_C = 28A, V_{CC} = 720V$ $V_{GE} = 15V, R_G = 5.0\Omega$ Energy losses include "tail"
t_r	Rise Time	----	20	----		
$t_{d(off)}$	Turn-Off Delay Time	----	480	----		
t_f	Fall Time	----	450	----		
E_{ts}	Total Switching Loss	----	5.7	----	mJ	See Fig. 10, 14
L_E	Internal Emitter Inductance	----	13	----	nH	Measured 5mm from package
C_{ies}	Input Capacitance	----	2300	----	pF	$V_{GE} = 0V$ $V_{CC} = 30V$ $f = 1.0MHz$ See Fig. 7
C_{oes}	Output Capacitance	----	180	----		
C_{res}	Reverse Transfer Capacitance	----	27	----		

Notes:

- ① Repetitive rating; $V_{GE}=20V$, pulse width limited by max. junction temperature. (See fig. 13b)
- ② $V_{CC}=80\%(V_{CES})$, $V_{GE}=20V$, $L=10\mu H$, $R_G=5.0\Omega$, (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 $5.0\mu s$, single shot.

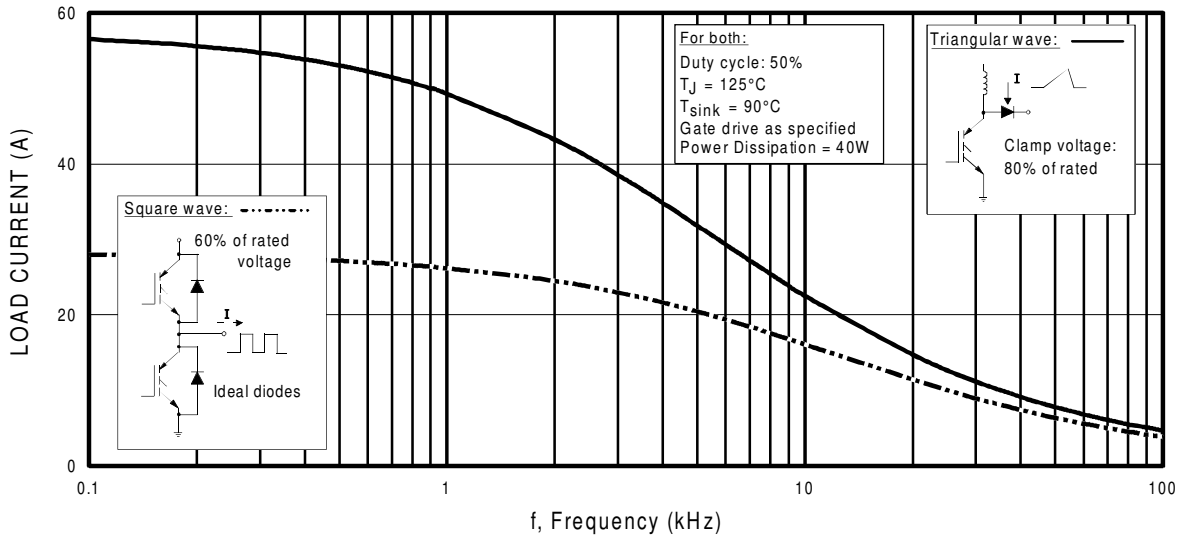


Fig. 1 - Typical Load Current vs. Frequency
 (For square wave, $I = I_{RMS}$ of fundamental; for triangular wave, $I = I_{PK}$)

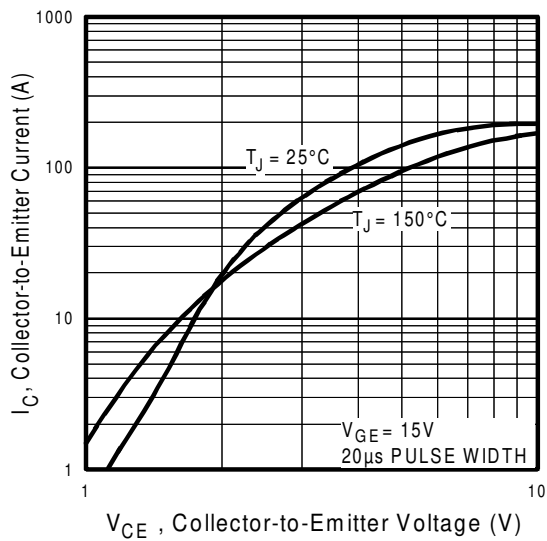


Fig. 2 - Typical Output Characteristics

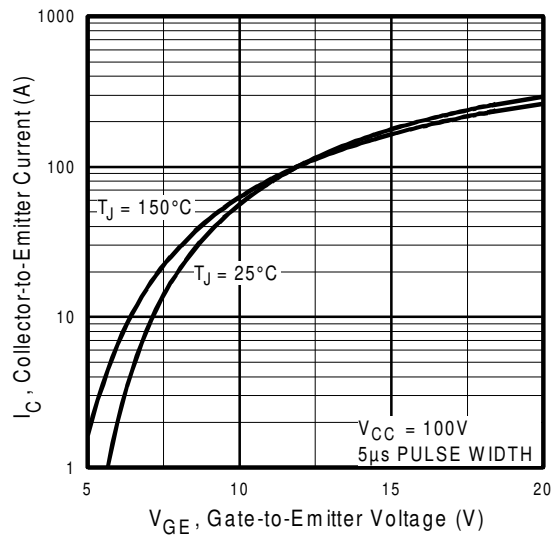


Fig. 3 - Typical Transfer Characteristics

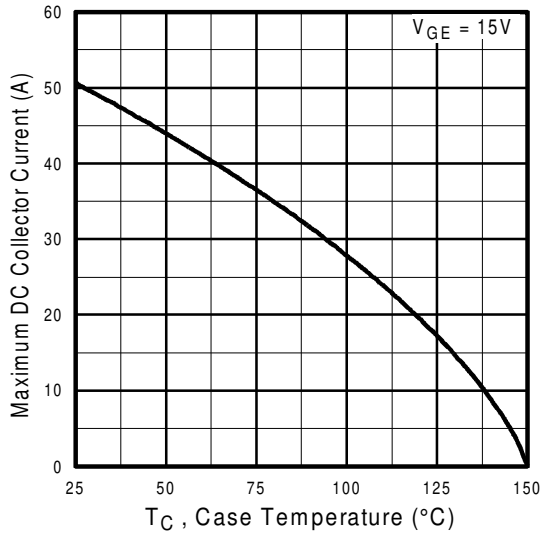


Fig. 4 - Maximum Collector Current vs. Case Temperature

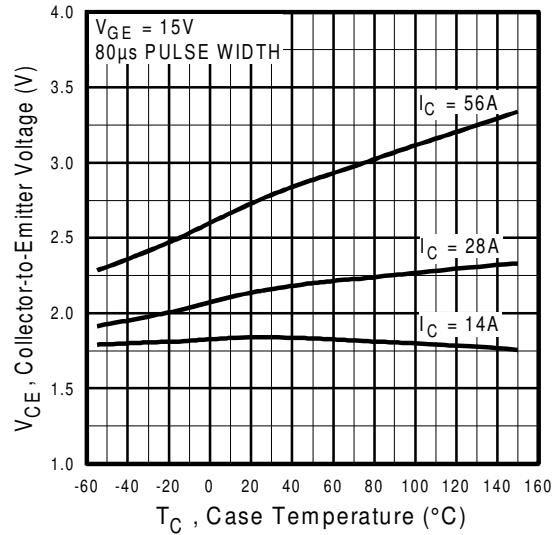


Fig. 5 - Collector-to-Emitter Voltage vs. Case Temperature

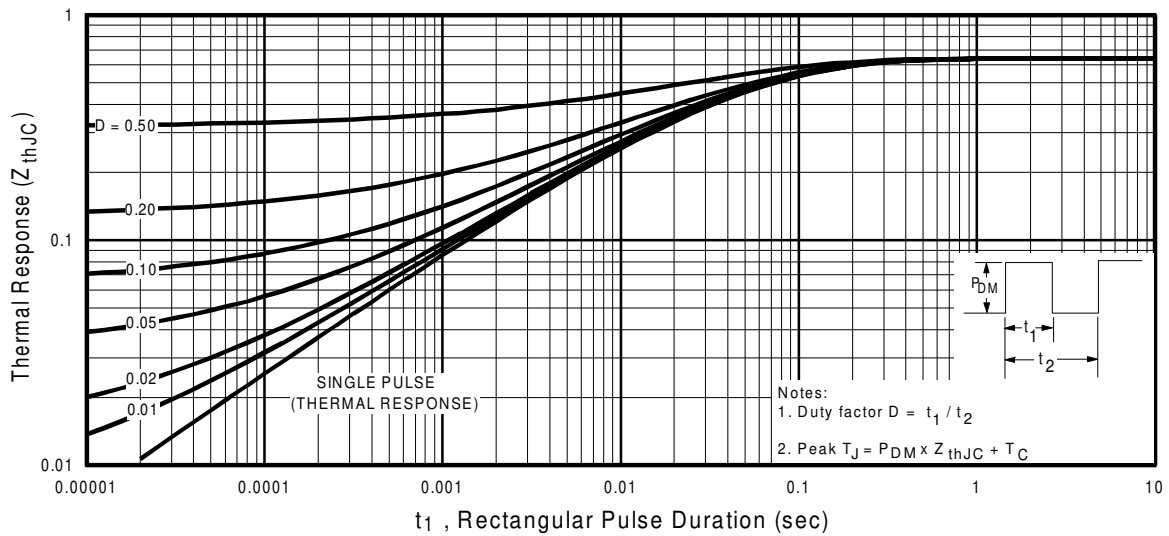


Fig. 6 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

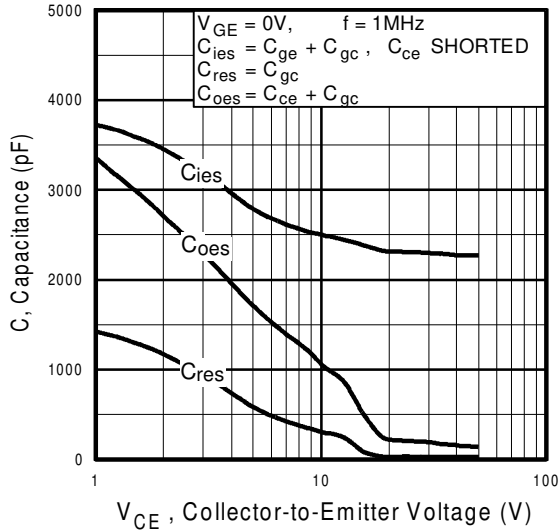


Fig. 7 - Typical Capacitance vs. Collector-to-Emitter Voltage

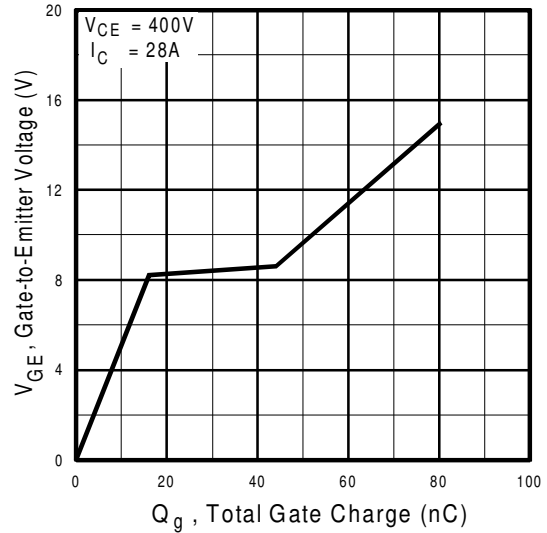


Fig. 8 - Typical Gate Charge vs. Gate-to-Emitter Voltage

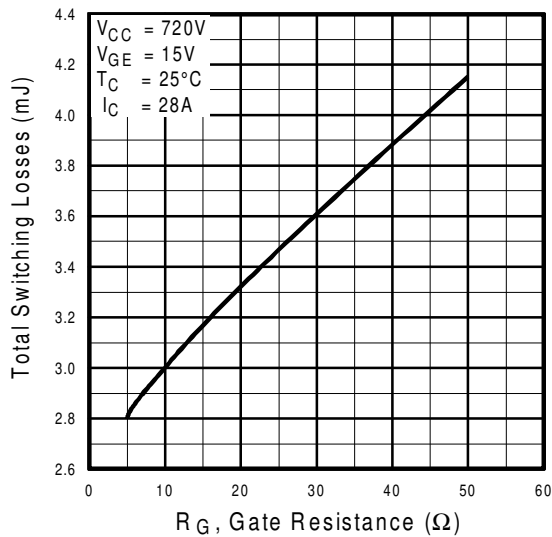


Fig. 9 - Typical Switching Losses vs. Gate Resistance

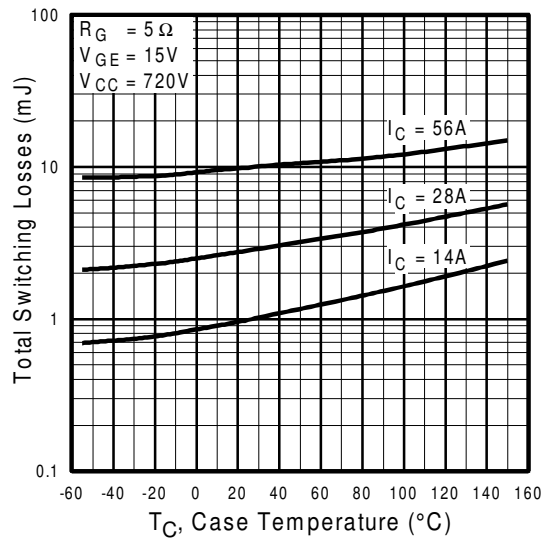


Fig. 10 - Typical Switching Losses vs. Case Temperature

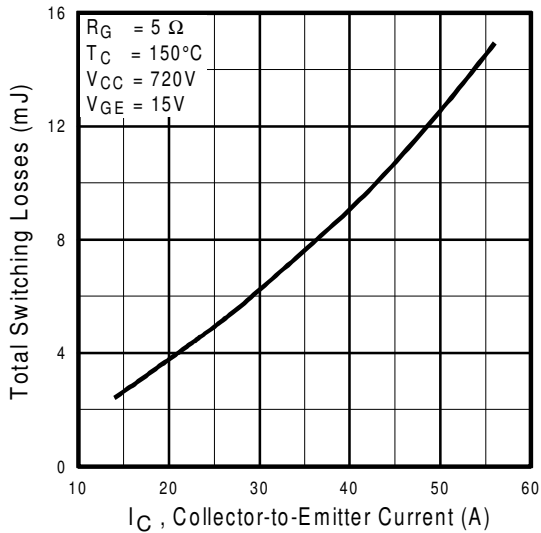


Fig. 11 - Typical Switching Losses vs. Collector-to-Emitter Current

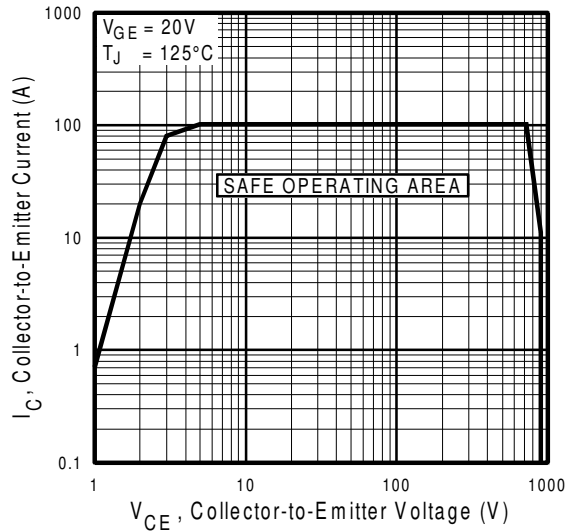


Fig. 12 - Turn-Off SOA

Refer to Section D for the following:

Appendix F: Section D - page D-8

- Fig. 13a - Clamped Inductive Load Test Circuit
- Fig. 13b - Pulsed Collector Current Test Circuit
- Fig. 14a - Switching Loss Test Circuit
- Fig. 14b - Switching Loss Waveform

Package Outline 3 - JEDEC Outline TO-247AC (TO-3P) Section D - page D-13

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