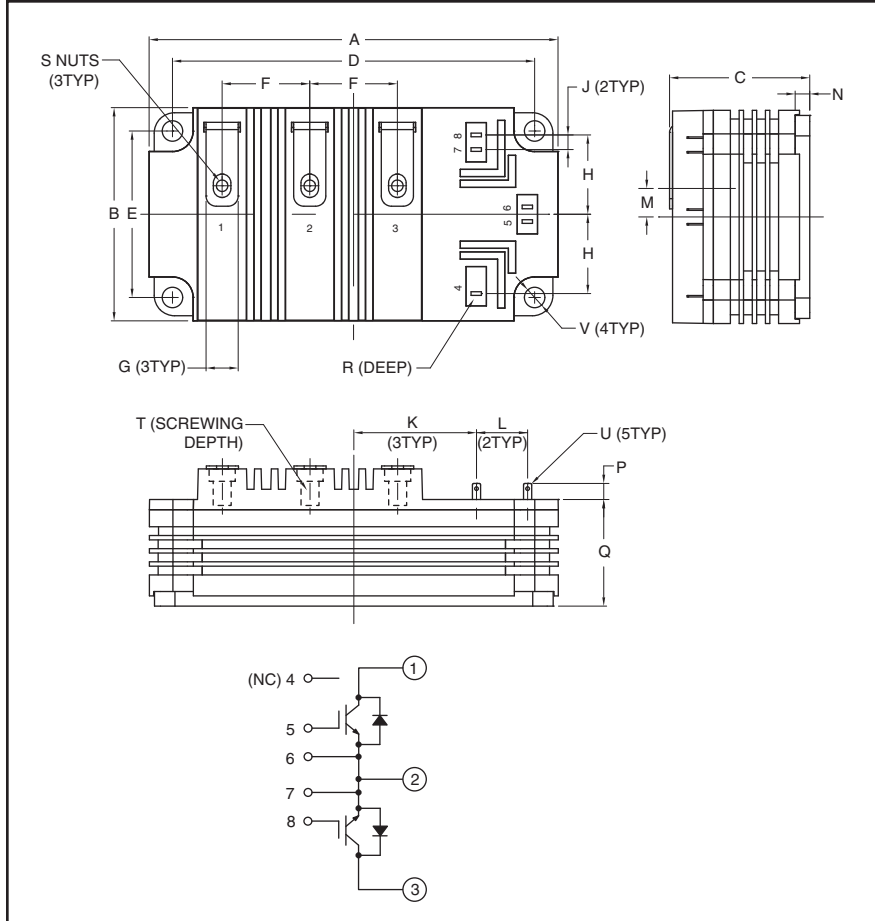


**Dual Common Emitter
 HVIGBT Module
 85 Amperes/6500 Volts**



Description:

Powerex HVIGBTs feature highly insulating housings that offer enhanced protection by means of greater creepage and strike clearance distance for many demanding applications like medium voltage drives and auxiliary traction applications.

Features:

- 40 to 150°C Extended Temperature Range
- 100% Dynamic Tested
- 100% Partial Discharge Tested
- Advanced Mitsubishi R-Series Chip Technology
- Aluminum Nitride (AlN) Ceramic Substrate for Low Thermal Impedance
- Complementary Line-up in Expanding Current Ranges to Mitsubishi HVIGBT Power Modules
- Copper Baseplate
- Creepage and Clearance Meet IEC 60077-1
- Rugged SWSOA and RRSOA

Applications:

- High Voltage Power Supplies
- Medium Voltage Drives
- Motor Drives
- Traction

Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.51	140.0
B	2.87	73.0
C	1.89	48.0
D	4.88±0.01	124.0±0.25
E	2.24±0.01	57.0±0.25
F	1.18	30.0
G	0.43	11.0
H	1.07	27.15
J	0.20	5.0
K	1.65	42.0

Dimensions	Inches	Millimeters
L	0.69±0.01	17.5±0.25
M	0.38	9.75
N	0.20	5.0
P	0.22	5.5
Q	1.44	36.5
R	0.16	4.0
S	M6 Metric	M6
T	0.63 Min.	16.0 Min.
U	0.11 x 0.02	2.8 x 0.5
V	0.28 Dia.	7.0 Dia.

QIC6508001
Dual Common Emitter HVIGBT Module

85 Amperes/6500 Volts

Absolute Maximum Ratings, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Ratings	Symbol	QIC6508001	Units
Junction Temperature	T_j	-40 to +150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +125	$^\circ\text{C}$
Collector-Emitter Voltage ($V_{\text{GE}} = 0\text{V}$)	V_{CES}	$T_j = -40^\circ\text{C}$	5800 Volts
		$T_j = +25^\circ\text{C}$	6300 Volts
		$T_j = +125^\circ\text{C}$	6500 Volts
Gate-Emitter Voltage ($V_{\text{CE}} = 0\text{V}$)	V_{GES}	± 20	Volts
Collector Current ($T_{\text{C}} = 110^\circ\text{C}$)	I_{C}	85	Amperes
Peak Collector Current (Pulse)	I_{CM}	170^2	Amperes
Diode Forward Current ($T_{\text{C}} = 102^\circ\text{C}$) ^{*1}	I_{F}	85	Amperes
Diode Forward Surge Current (Pulse) ^{*1}	I_{FM}	170^2	Amperes
Maximum Collector Dissipation ($T_{\text{C}} = 25^\circ\text{C}$, IGBT Part, $T_{\text{j(max)}} \leq 150^\circ\text{C}$)	P_{C}	1100	Watts
Mounting Torque, M6 Terminal Screws	—	44	in-lb
Mounting Torque, M6 Mounting Screws	—	44	in-lb
Module Weight (Typical)	—	900	Grams
Isolation Voltage (Charged Part to Baseplate, AC 60Hz 1 min.)	V_{iso}	9.0	kVolts
Partial Discharge ($V_1 = 6900\text{ V}_{\text{RMS}}$, $V_2 = 5200\text{ V}_{\text{RMS}}$, $f = 60\text{Hz}$ (Acc. to IEC 1287))	Q_{pd}	10	pC
Maximum Short-Circuit Pulse Width, ($V_{\text{CC}} \leq 4500\text{V}$, $V_{\text{GE}} = \pm 15\text{V}$, $T_j = 125^\circ\text{C}$)	t_{psc}	10	μs

Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{\text{CE}} = V_{\text{CES}}$, $V_{\text{GE}} = 0\text{V}$, $T_j = 25^\circ\text{C}$	—	—	3	mA
		$V_{\text{CE}} = V_{\text{CES}}$, $V_{\text{GE}} = 0\text{V}$, $T_j = 125^\circ\text{C}$	—	3	—	mA
Gate Leakage Current	I_{GES}	$V_{\text{GE}} = V_{\text{GES}}$, $V_{\text{CE}} = 0\text{V}$	—	—	0.5	μA
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_{\text{C}} = 13\text{mA}$, $V_{\text{CE}} = 10\text{V}$	5.8	6.3	6.8	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 85\text{A}$, $V_{\text{GE}} = 15\text{V}$, $T_j = 25^\circ\text{C}$	—	3.8^3	—	Volts
		$I_{\text{C}} = 85\text{A}$, $V_{\text{GE}} = 15\text{V}$, $T_j = 125^\circ\text{C}$	—	4.8	5.6	Volts
Total Gate Charge	Q_{G}	$V_{\text{CC}} = 3600\text{V}$, $I_{\text{C}} = 85\text{A}$, $V_{\text{GE}} = 15\text{V}$	—	1.05	—	μC
Emitter-Collector Voltage ^{*1}	V_{EC}	$I_{\text{E}} = 85\text{A}$, $V_{\text{GE}} = 0\text{V}$, $T_j = 25^\circ\text{C}$	—	3.3	—	Volts
		$I_{\text{E}} = 85\text{A}$, $V_{\text{GE}} = 0\text{V}$, $T_j = 125^\circ\text{C}$	—	3.4	4.2	Volts

*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDI).

*2 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{\text{j(max)}}$ rating.

*3 Pulse width and repetition rate should be such that device junction temperature rise is negligible.

QIC6508001
Dual Common Emitter HVIGBT Module

85 Amperes/6500 Volts

Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}		—	15	—	nF
Output Capacitance	C_{oes}	$V_{GE} = 0V, V_{CE} = 10V$	—	0.95	—	nF
Reverse Transfer Capacitance	C_{res}	$f = 100\text{kHz}$	—	0.44	—	nF
Resistive	Turn-on Delay Time	$V_{CC} = 3600V, I_C = 85A,$	—	TBD	—	μs
Load	Rise Time					
Switching	Turn-off Delay Time	$R_{G(on)} = 30\Omega, R_{G(off)} = 300\Omega,$	—	TBD	—	μs
	Times					
		Inductive Load	—	TBD	—	μs
Turn-on Switching Energy	E_{on}	$T_j = 125^\circ\text{C}, I_C = 85A, V_{GE} = \pm 15V,$	—	460	—	mJ
Turn-off Switching Energy	E_{off}	$R_{G(on)} = 30\Omega, R_{G(off)} = 300\Omega,$ $V_{CC} = 3600V, \text{Inductive Load}$	—	500	—	mJ
Diode Reverse Recovery Time ^{*1}	t_{rr}	$V_{CC} = 3600V, I_E = 85A,$	—	0.7	—	μs
Diode Reverse Recovery Charge ^{*1}	Q_{rr}	$V_{GE} = \pm 15V, R_{G(on)} = 30\Omega,$	—	100^{*3}	—	μC
Diode Reverse Recovery Energy	E_{rec}	Inductive Load, $T_j = 125^\circ\text{C}$	—	200	—	mJ
Stray Inductance (C1-E2)	L_{SCE}		—	60	—	nH
Lead Resistance Terminal-Chip	R_{CE}		—	0.8	—	m Ω

Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case ^{*4}	$R_{th(j-c)}$ Q	Per IGBT	—	0.100	—	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case ^{*4}	$R_{th(j-c)}$ D	Per FWDi	—	0.175	—	$^\circ\text{C/W}$
Contact Thermal Resistance, Case to Fin	$R_{th(c-f)}$	Per Module, Thermal Grease Applied, $\lambda_{grease} = 1\text{W/mK}$	—	0.018	—	$^\circ\text{C/W}$
Comparative Tracking Index	CTI		600	—	—	
Clearance Distance in Air (Terminal to Terminal)	$d_a(t-t)$		19	—	—	mm
Creepage Distance Along Surface (Terminal to Terminal)	$d_s(t-t)$		54	—	—	mm

*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

*3 Pulse width and repetition rate should be such that device junction temperature rise is negligible.

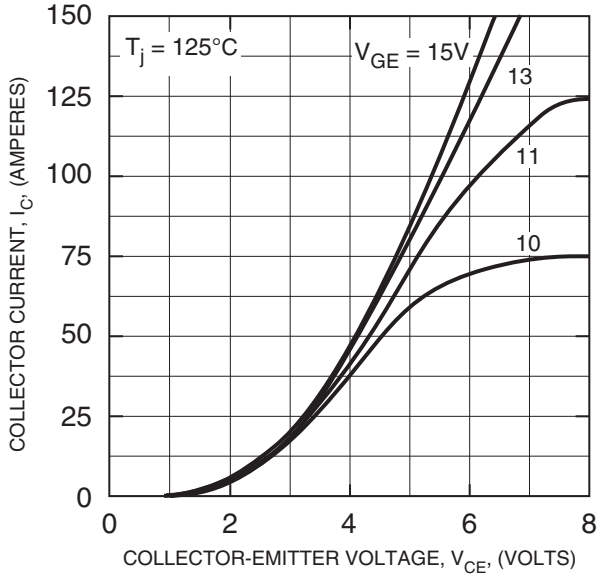
*4 T_C measurement point is just under the chips.

QIC6508001

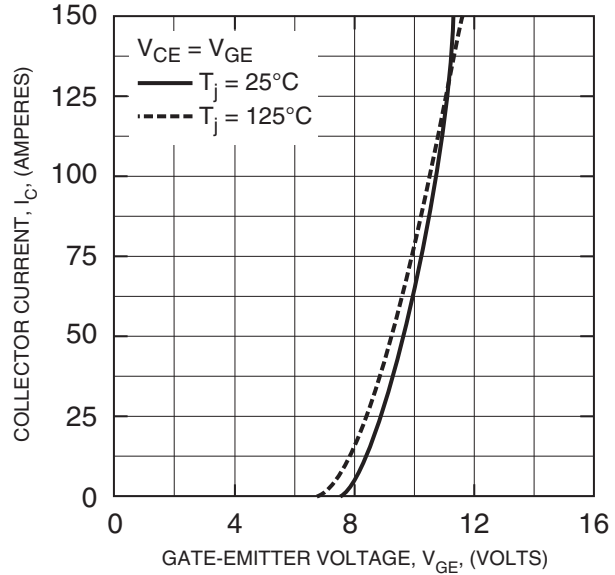
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85 Amperes/6500 Volts

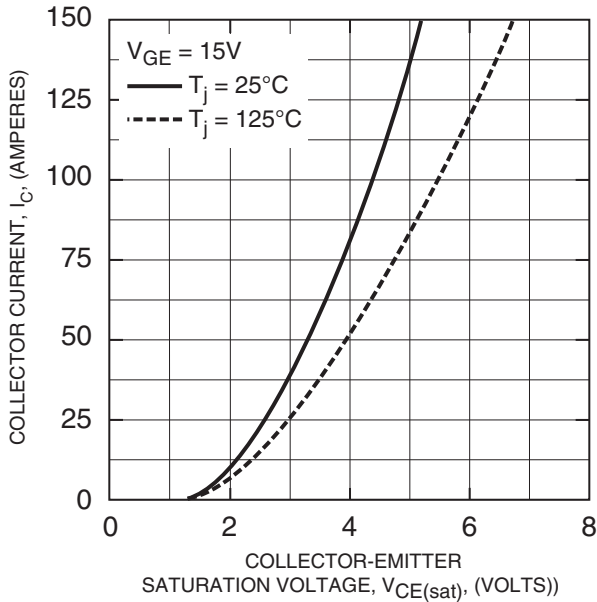
OUTPUT CHARACTERISTICS (TYPICAL)



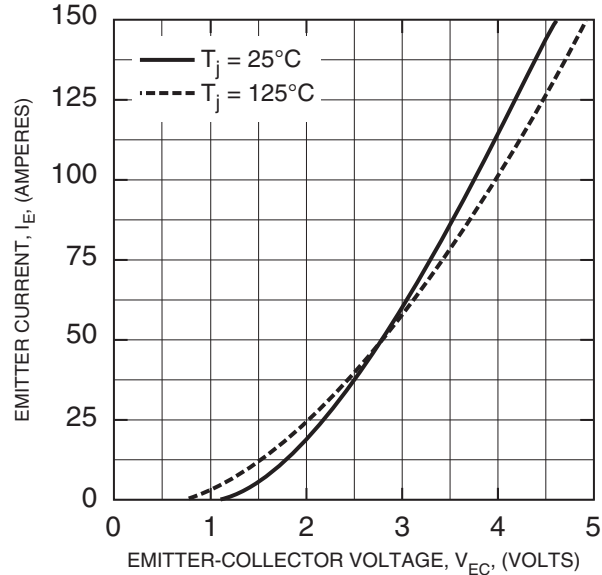
TRANSFER CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)

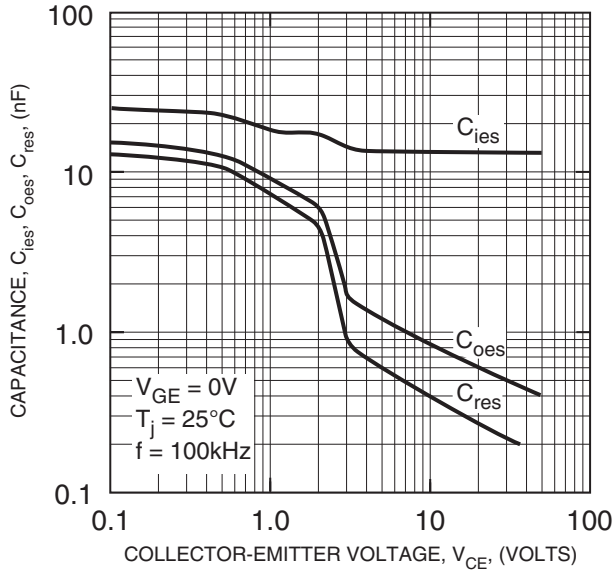


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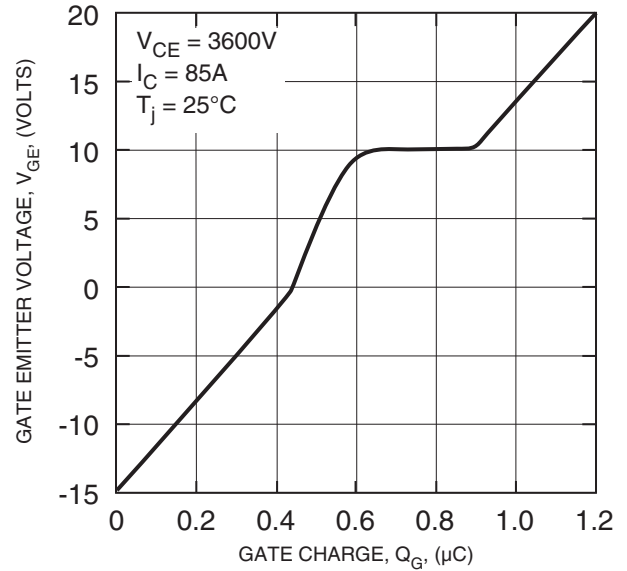
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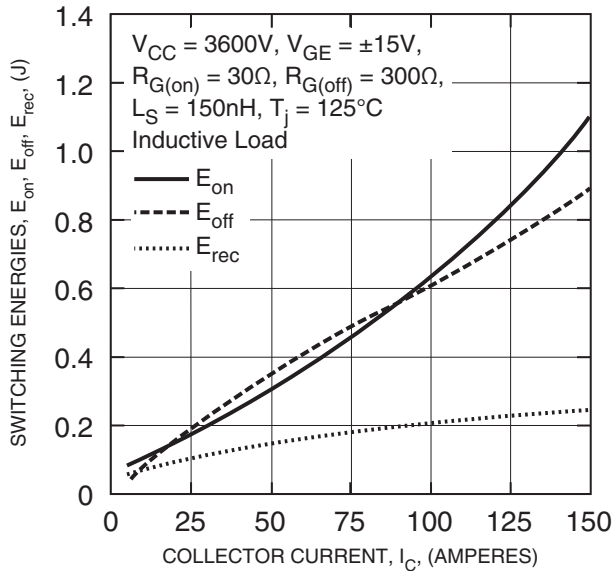
CAPACITANCE CHARACTERISTICS (TYPICAL)



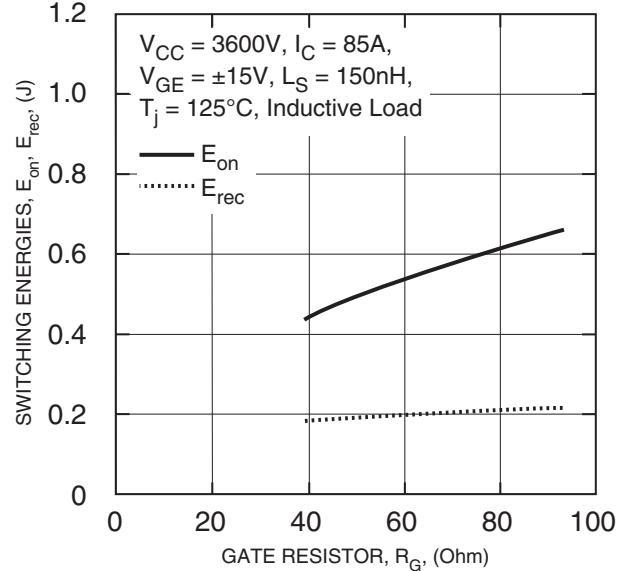
GATE CHARGE CHARACTERISTICS (TYPICAL)



HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



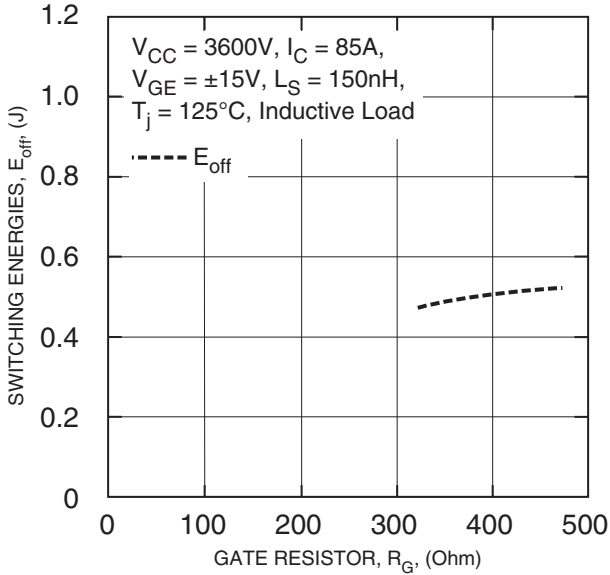
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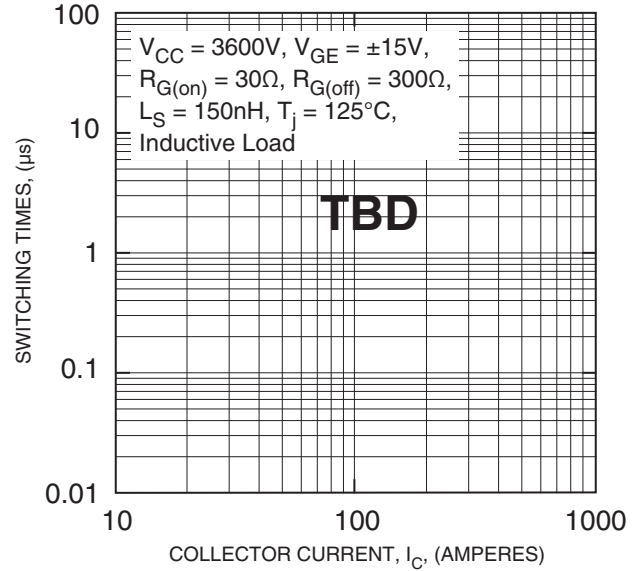
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85 Amperes/6500 Volts

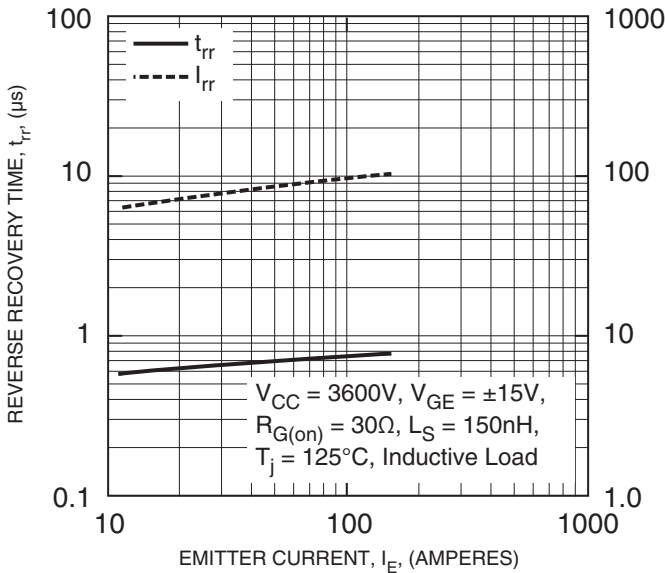
HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



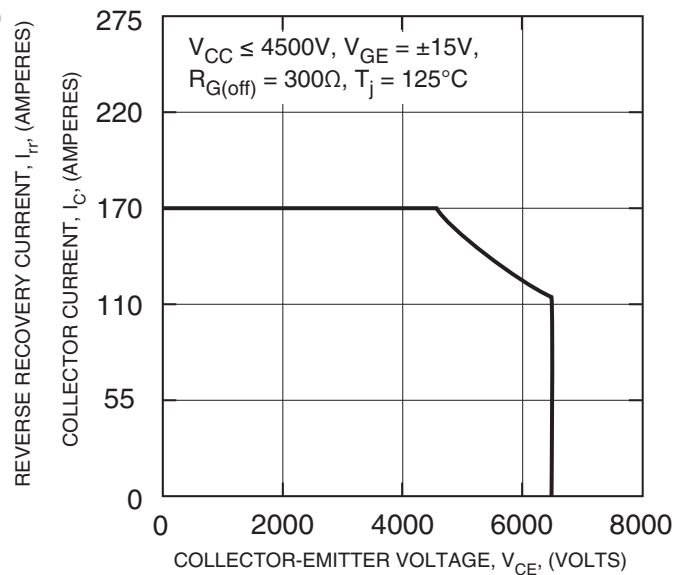
HALF-BRIDGE SWITCHING TIME CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE REVERSE RECOVERY (TYPICAL)

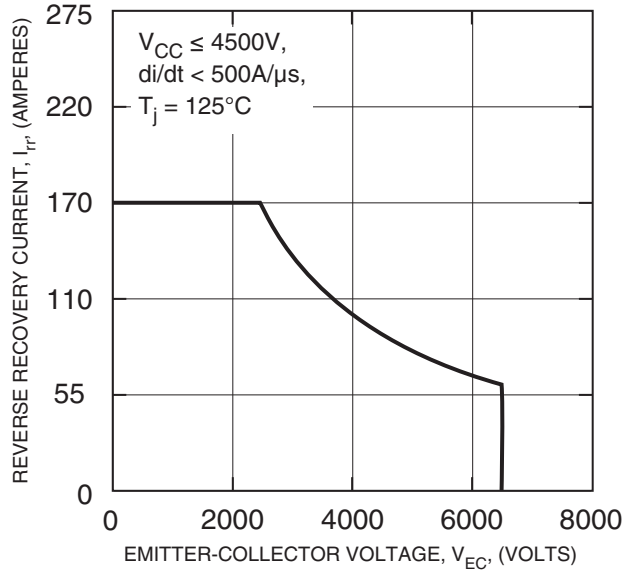


REVERSE BIAS SAFE OPERATING AREA (RBSOA)

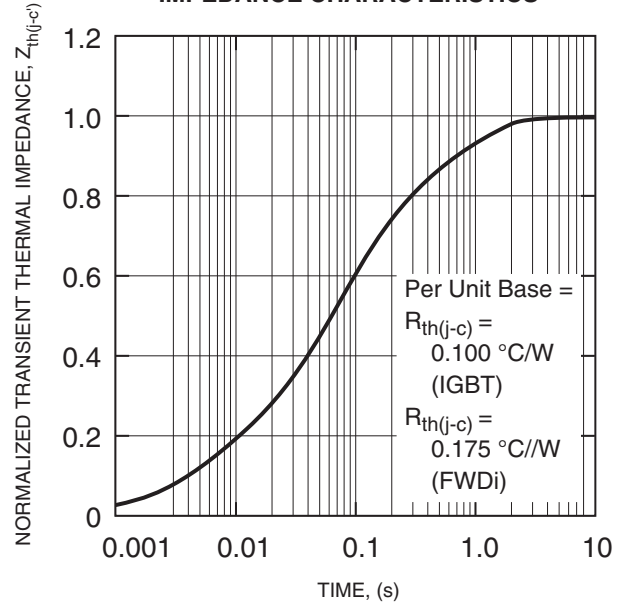


QIC6508001
Dual Common Emitter HVIGBT Module
 85 Amperes/6500 Volts

FREE-WHEEL DIODE REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS



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