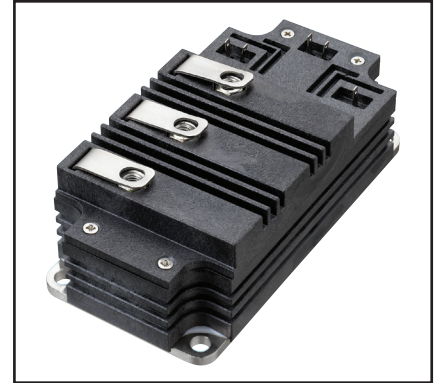
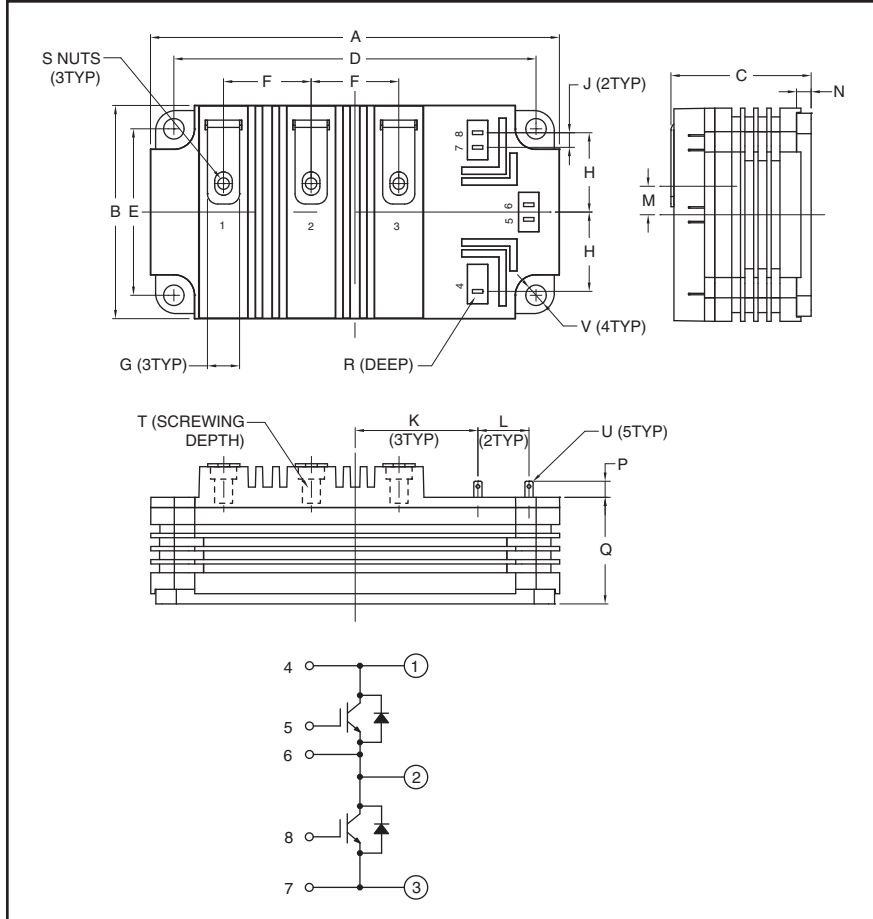


**Dual IGBT  
 HVIGBT Module  
 85 Amperes/6500 Volts**



**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.

**QID6508001**  
**Dual IGBT HVIGBT Module**  
 85 Amperes/6500 Volts

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

Ratings	Symbol		QID6508001	Units
Junction Temperature	$T_j$		-40 to +150	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$		-40 to +125	$^\circ\text{C}$
Collector-Emitter Voltage ( $V_{\text{GE}} = 0\text{V}$ )	$V_{\text{CES}}$	$T_j = -40^\circ\text{C}$	5800	Volts
		$T_j = +25^\circ\text{C}$	6300	Volts
		$T_j = +125^\circ\text{C}$	6500	Volts
Gate-Emitter Voltage ( $V_{\text{CE}} = 0\text{V}$ )	$V_{\text{GES}}$		$\pm 20$	Volts
Collector Current ( $T_{\text{C}} = 110^\circ\text{C}$ )	$I_{\text{C}}$		85	Amperes
Peak Collector Current (Pulse)	$I_{\text{CM}}$		$170^2$	Amperes
Diode Forward Current ( $T_{\text{C}} = 102^\circ\text{C}$ ) <sup>*1</sup>	$I_{\text{F}}$		85	Amperes
Diode Forward Surge Current (Pulse) <sup>*1</sup>	$I_{\text{FM}}$		$170^2$	Amperes
Maximum Collector Dissipation ( $T_{\text{C}} = 25^\circ\text{C}$ , IGBT Part, $T_{\text{j(max)}} \leq 150^\circ\text{C}$ )	$P_{\text{C}}$		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.)	$V_{\text{iso}}$		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))	$Q_{\text{pd}}$		10	pC
Maximum Short-Circuit Pulse Width, ( $V_{\text{CC}} \leq 4500\text{V}$ , $V_{\text{GE}} = \pm 15\text{V}$ , $T_j = 125^\circ\text{C}$ )	$t_{\text{psc}}$		10	$\mu\text{s}$

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	$I_{\text{CES}}$	$V_{\text{CE}} = V_{\text{CES}}$ , $V_{\text{GE}} = 0\text{V}$ , $T_j = 25^\circ\text{C}$	—	—	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	$I_{\text{GES}}$	$V_{\text{GE}} = V_{\text{GES}}$ , $V_{\text{CE}} = 0\text{V}$	—	—	0.5	$\mu\text{A}$
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	$Q_{\text{G}}$	$V_{\text{CC}} = 3600\text{V}$ , $I_{\text{C}} = 85\text{A}$ , $V_{\text{GE}} = 15\text{V}$	—	1.05	—	$\mu\text{C}$
Emitter-Collector Voltage <sup>*1</sup>	$V_{\text{EC}}$	$I_{\text{E}} = 85\text{A}$ , $V_{\text{GE}} = 0\text{V}$ , $T_j = 25^\circ\text{C}$	—	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.

**QID6508001**  
**Dual IGBT 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	$C_{res}$	$f = 100kHz$	—	0.44	—	nF
Resistive	Turn-on Delay Time	$V_{CC} = 3600V, I_C = 85A,$	—	TBD	—	$\mu s$
Load	Rise Time					
Switching	Turn-off Delay Time	$R_{G(on)} = 30\Omega, R_{G(off)} = 300\Omega,$	—	TBD	—	$\mu s$
	Times					
		Inductive Load	—	TBD	—	$\mu s$
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 <sup>*1</sup>	$t_{rr}$	$V_{CC} = 3600V, I_E = 85A,$	—	0.7	—	$\mu s$
Diode Reverse Recovery Charge <sup>*1</sup>	$Q_{rr}$	$V_{GE} = \pm 15V, R_{G(on)} = 30\Omega,$	—	100 <sup>*3</sup>	—	$\mu C$
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 $\Omega$

**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 <sup>*4</sup>	$R_{th(j-c)}$ Q	Per IGBT	—	0.100	—	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case <sup>*4</sup>	$R_{th(j-c)}$ D	Per FWDi	—	0.175	—	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance, Case to Fin	$R_{th(c-f)}$	Per Module, Thermal Grease Applied, $\lambda_{grease} = 1\text{W}/\text{mK}$	—	0.018	—	$^\circ\text{C}/\text{W}$
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

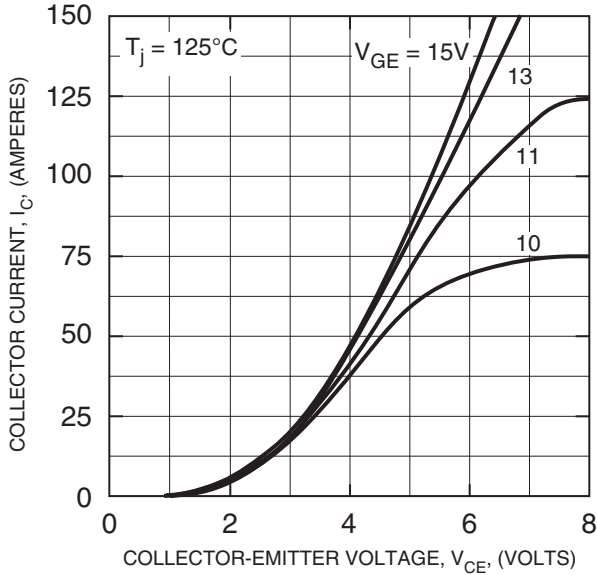
\*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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

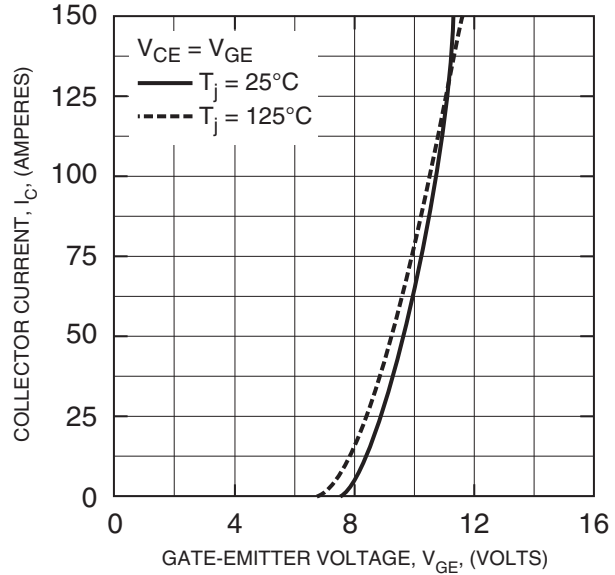
\*4  $T_C$  measurement point is just under the chips.

**QID6508001**  
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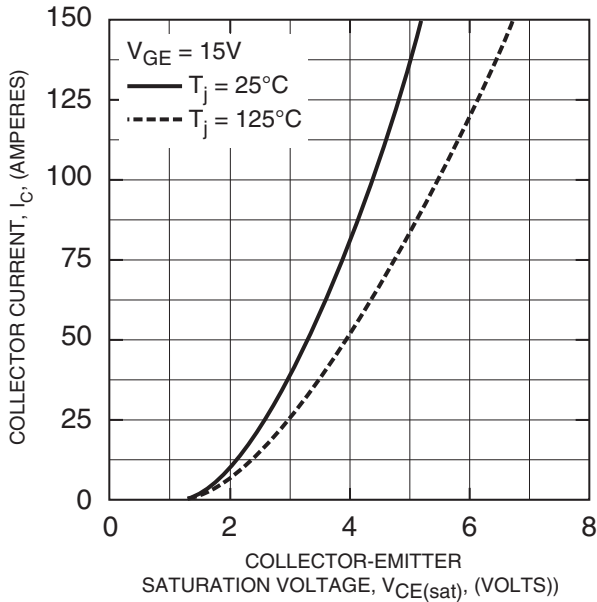
**OUTPUT CHARACTERISTICS (TYPICAL)**



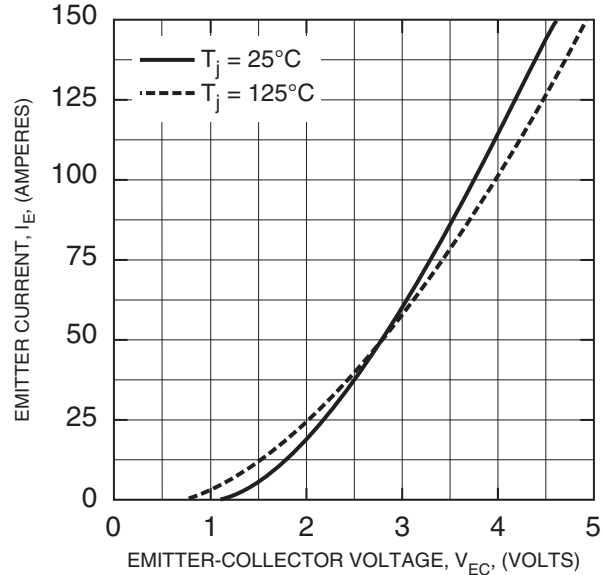
**TRANSFER CHARACTERISTICS (TYPICAL)**



**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**

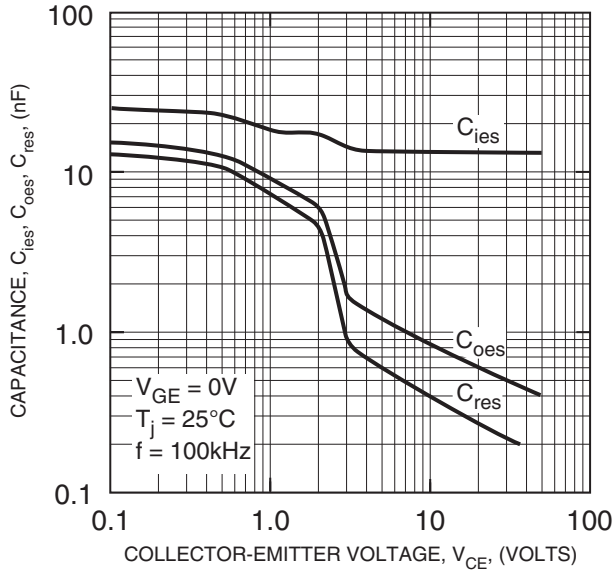


**FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)**

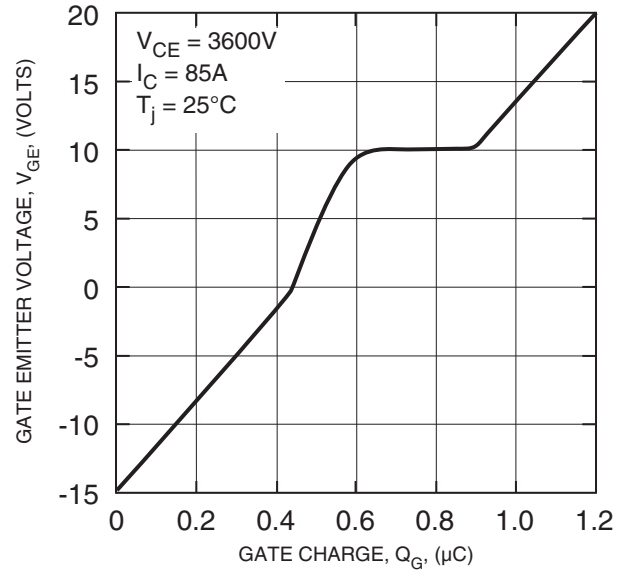


**QID6508001**  
**Dual IGBT HVIGBT Module**  
 85 Amperes/6500 Volts

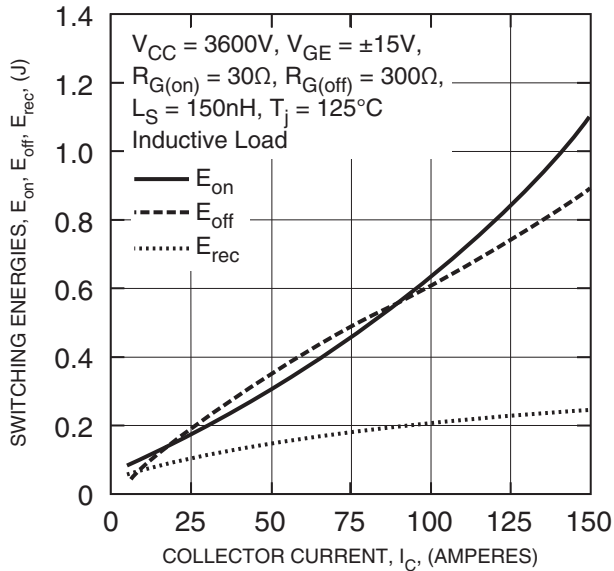
**CAPACITANCE CHARACTERISTICS (TYPICAL)**



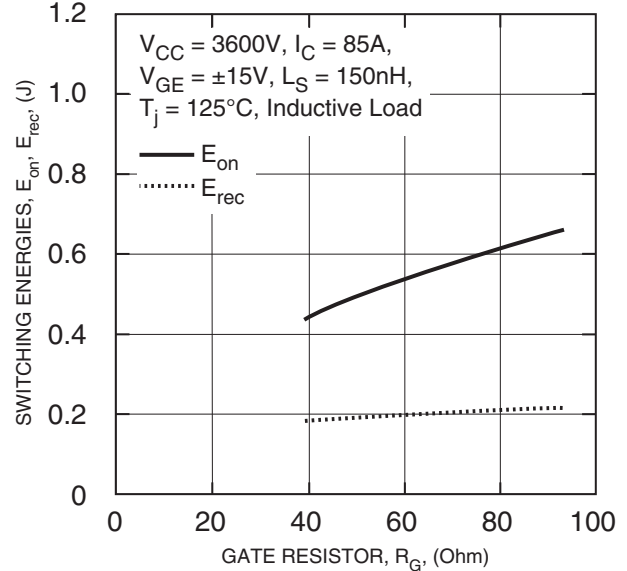
**GATE CHARGE CHARACTERISTICS (TYPICAL)**



**HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)**



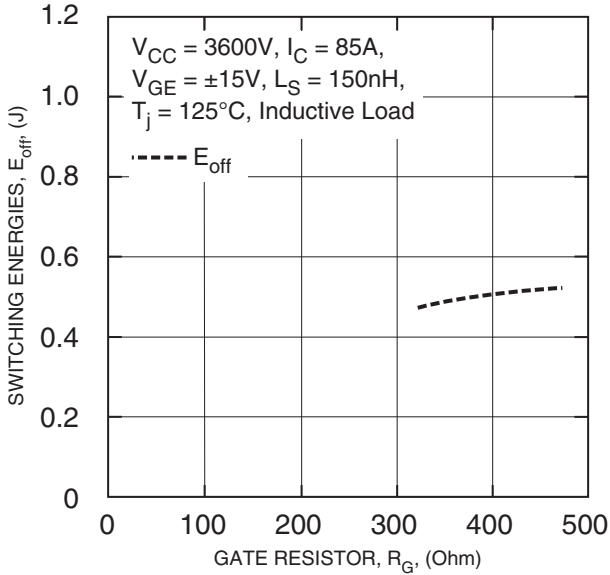
**HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)**



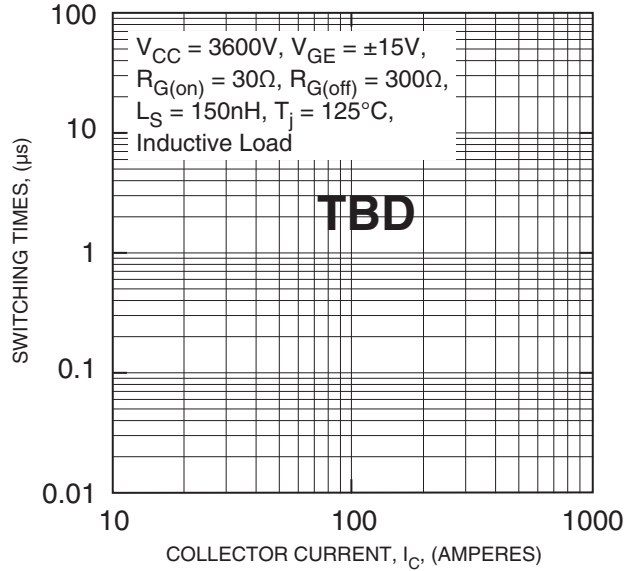
Information presented is based upon manufacturers testing and projected capabilities. This information is subject to change without notice. The manufacturer makes no claim as to the suitability of use, reliability, capability, or future availability of this product.

**QID6508001**  
**Dual IGBT HVIGBT Module**  
 85 Amperes/6500 Volts

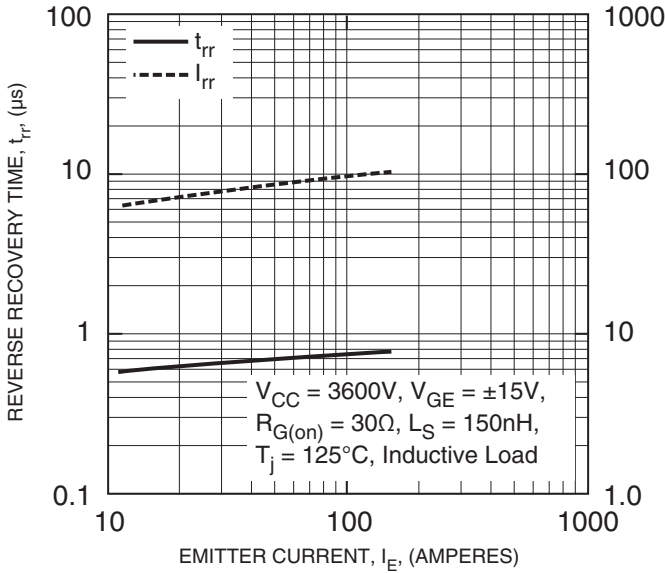
**HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)**



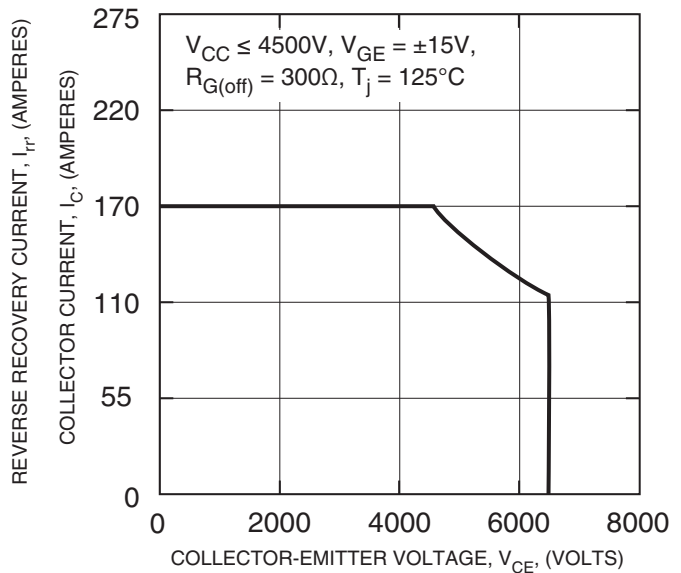
**HALF-BRIDGE SWITCHING TIME CHARACTERISTICS (TYPICAL)**



**FREE-WHEEL DIODE REVERSE RECOVERY (TYPICAL)**



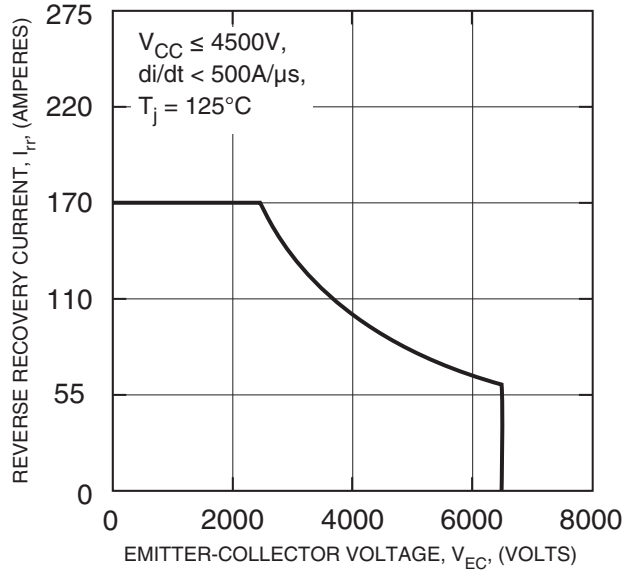
**REVERSE BIAS SAFE OPERATING AREA (RBSOA)**



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**QID6508001**  
**Dual IGBT HVIGBT Module**  
 85 Amperes/6500 Volts

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



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**

