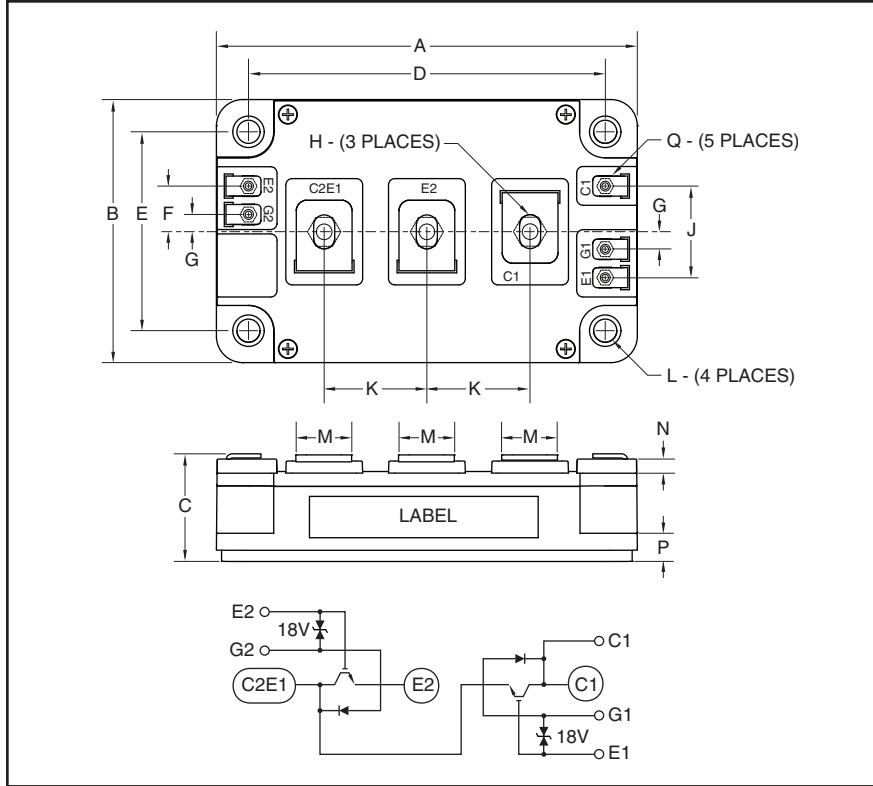


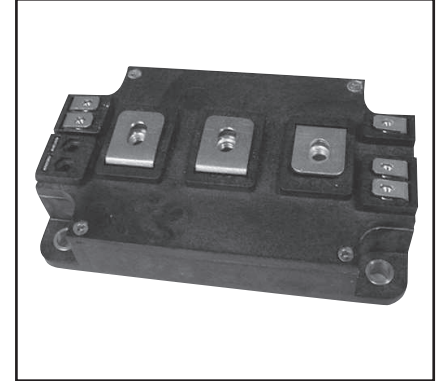
## Dual IGBT Module 600 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.00	101.6
B	2.50	63.5
C	1.00±0.015	25.4±0.4
D	3.39	86.1
E	1.89	48.0
F	0.435	11.0
G	0.165	4.2
H	#10-32 X 0.31 Min.	

Dimensions	Inches	Millimeters
J	0.87	22.1
K	0.98	24.9
L	0.22 Dia.	5.6 Dia.
M	0.53	13.5
N	0.09 Min.	2.3 Min.
P	0.27	6.9
Q	#2-56 X 0.17 Min.	



### Description:

Powerex Dual IGBT power module is configured as a half-bridge inverter. The Aluminum Silicon Carbide (AlSiC) baseplate offers light weight module design.

The power module is designed to operate reliably in harsh aerospace, military and other environments. The module is rated to operate over full temperature range of -55°C to 125°C.

Powerex is using High Accelerated Stress Test (HAST) to assure long term reliability of plastic power modules.

### Features:

- Class H Hybrid Screened to MIL-PRF-38534 Requirements
- Withstand HAST
- Light Weight AlSiC Baseplate
- Low Drive Requirement
- Ultra-fast Free Wheeling Diode
- Internal Zener Protection on Gates
- High Side Collector Sense Pin for De-sat Detection
- High Power Density
- Aluminum Nitride DBC Ceramic

### Applications:

- Aerospace
- Military
- Motor Control

**QID0660023**  
**Dual IGBT Module**  
 600 Amperes/600 Volts

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

Ratings	Symbol	QID0660023	Units
Collector Emitter Voltage	$V_{CES}$	600	Volts
Gate Emitter Voltage	$V_{GES}$	$\pm 20$	Volts
Collector Current	$I_C$	600	Amperes
Peak Collector Current (1msec)	$I_{CM}$	1200*	Amperes
Diode Forward Current	$I_F$	600	Amperes
Diode Forward Surge Current (1msec)	$I_{FM}$	1200*	Amperes
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to 125	$^\circ\text{C}$
Mounting Torque, Terminal Screws	—	26	in-lb
Mounting Torque, Control Screws	—	4	in-lb
Mounting Torque, Mounting Screws	—	26	in-lb
Module Weight (Typical)	—	270	Grams
V Isolation	$V_{RMS}$	2500	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current	$I_{CES}$	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1.0	mA
Gate Leakage Current	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	10.0	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 60\text{mA}, V_{CE} = 10V$	5.0	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 600\text{A}, V_{GE} = 15V$	—	1.7	2.2	Volts
		$I_C = 300\text{A}, V_{GE} = 15V$	—	—	2.0	Volts
		$I_C = 600\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	1.7	—	Volts
Total Gate Charge	$Q_G$	$V_{CC} = 300V, I_C = 600\text{A}, V_{GS} = 15V$	—	2400	—	nC
Diode Forward Voltage	$V_{FM}$	$I_E = 600\text{A}, V_{GS} = 0V$	—	1.8	2.5	Volts
		$I_E = 600\text{A}, V_{GS} = 0V, T_j = 125^\circ\text{C}$	—	—	2.2	Volts

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

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**Dual IGBT Module**  
 600 Amperes/600 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	$C_{ies}$		—	—	90	nF
Output Capacitance	$C_{oes}$	$V_{GE} = 0V, V_{CE} = 10V$	—	—	11.0	nF
Reverse Transfer Capacitance	$C_{res}$		—	—	3.6	nF
Turn-on Delay Time	$t_{d(on)}$		—	—	500	ns
Rise Time	$t_r$	$V_{CC} = 300V, I_C = 600A,$	—	—	300	ns
Turn-off Delay Time	$t_{d(off)}$	$V_{GE1} = V_{GE2} = 15V,$	—	—	750	ns
Fall Time	$t_f$	$R_G = 4.2\Omega, I_E = 600A,$	—	—	300	ns
Diode Reverse Recovery Time	$t_{rr}$	Inductive Load	—	—	250	ns
Diode Reverse Recovery Charge	$Q_{rr}$		—	8.7	—	$\mu\text{C}$
Turn-on Energy	$E_{on}$	$V_{CC} = 350V, I_C = 300A, R_G = 5.0\Omega,$ $V_{GE} = +15V/-7V, T_j = 125^\circ\text{C}$	—	—	18.0	mJ
Turn-off Energy	$E_{off}$	$V_{CC} = 350V, I_C = 300A, R_G = 10\Omega,$ $V_{GE} = +15V/-7V, T_j = 125^\circ\text{C}$	—	—	40.0	mJ
Reverse Recovery Energy	$E_{rec}$	$V_{CC} = 350V, I_C = 300A$ $V_{GE} = -7V, di/dt = -2000A/\mu\text{S}$	—	—	8.0	mJ

**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**	$R_{th(j-c)}$	Per IGBT, Half Module, $T_j = 125^\circ\text{C}$	—	0.063	0.075	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case**	$R_{th(j-c)}$	Per FWDi, Half Module, $T_j = 125^\circ\text{C}$	—	0.100	0.120	$^\circ\text{C/W}$
Contact Thermal Resistance, Case to Fin	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	—	0.020	—	$^\circ\text{C/W}$

\*\* $T_C$  measurement point is just under the chip.