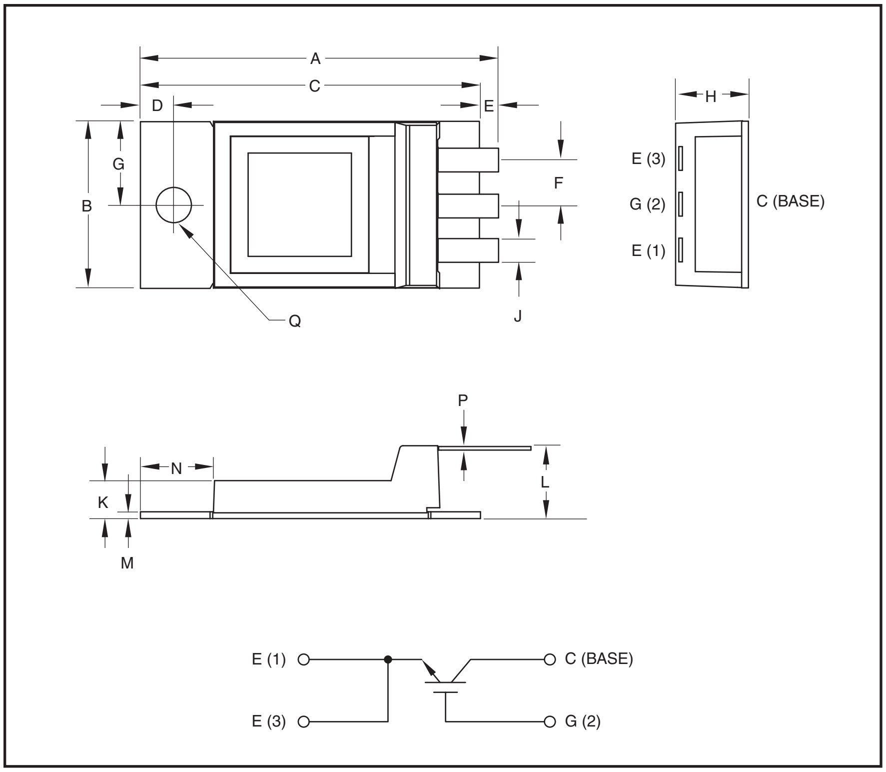
QIS4506001 Preliminary

Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

Single Discrete IGBT

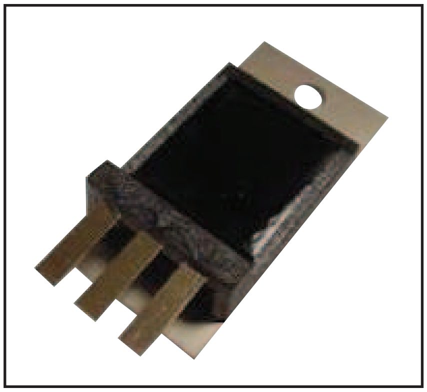
60 Amperes/4500 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	2.11	53.6
B	0.98	25.0
C	2.01	51.0
D	0.2	5.0
E.	0.1	2.5
F	0.27	6.9
G	0.49	12.5
H	0.46 Max.	11.8 Max.

Dimensions	Inches	Millimeters
J	0.14	3.6
K	0.22	5.7
L	0.43	10.8
M	0.04	1.0
N	0.43	10.9
P	0.02	0.5
Q	0.21 Dia.	5.3 Dia.



Description:

Powerex Single Non-isolated Discrete is designed specially for customer high voltage switching and pulse power applications.

Features:

- ☐ Low Drive Requirement
- ☐ Low $V_{CE(sat)}$
- ☐ Molybdenum Mounting Plate

QIS4506001
Single Discrete IGBT
60 Amperes/4500 Volts

Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	QIS4506001	Units
Collector Emitter Voltage	V_{CES}	4500	Volts
Gate Emitter Voltage	V_{GES}	±20	Volts
Collector Current (DC, T_C = 127°C)	I_C	60	Amperes
Peak Collector Current (Pulsed)	I_{CM}	120*	Amperes
Junction Temperature	T_j	-55 to 150	°C
Storage Temperature	T_{stg}	-55 to 125	°C
Mounting Torque, M5 Mounting Screws	—	30	in-lb
Weight (Typical)	—	20	Grams

Static Electrical Characteristics, T_j = 25 °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	—	—	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 7mA, V_{CE} = 10V	4.5	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 60A, V_{GE} = 15V, T_j = 25°C	—	3.0	3.9**	Volts
		I_C = 60A, V_{GE} = 15V, T_j = 125°C	—	3.6	—	Volts
Total Gate Charge	Q_G	V_{CC} = 2250V, I_C = 60A, V_{GE} = 15V	—	450	—	nC

Dynamic Electrical Characteristics, T_j = 25 °C unless otherwise specified

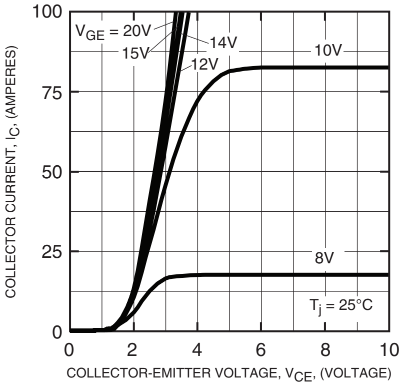
Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	V_{GE} = 0V, V_{CE} = 10V	—	9.0	—	nF
Output Capacitance		C_{oes}		—	0.65	—	nF
Reverse Transfer Capacitance		C_{res}		—	0.2	—	nF
Resistive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 2250V,	—	—	2.4	μs
Load	Rise Time	t_r	I_C = 60A,	—	—	2.4	μs
Switching	Turn-off Delay Time	$t_{d(off)}$	$V_{GE1} = V_{GE2}$ = 15V,	—	—	6.0	μs
Times	Fall Time	t_f	R_G = 120Ω	—	—	1.2	μs
Turn-on Switching Energy		E_{on}	T_j = 125°C, I_C = 60A, V_{CC} = 2250V,	—	250	—	mJ/P
Turn-off switching Energy		E_{off}	V_{GE} = ±15V, R_G = 120Ω, L_S = 180nH	—	170	—	mJ/P

Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

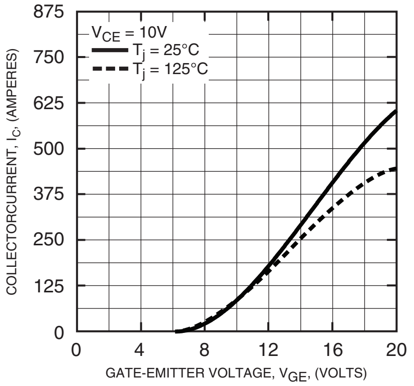
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	IGBT	—	0.10	TBD	°C/W
Thermal Resistance, Case to Sink Thermal Grease Applied	$R_{th(c-s)}$	λ_{grease} = 1W/mK	—	0.10	—	°C/W

* Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed device rating.
**Pulse width and repetition rate should be such that device junction temperature rise is negligible.

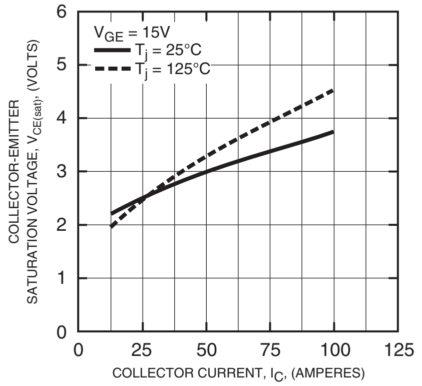
OUTPUT CHARACTERISTICS (TYPICAL)



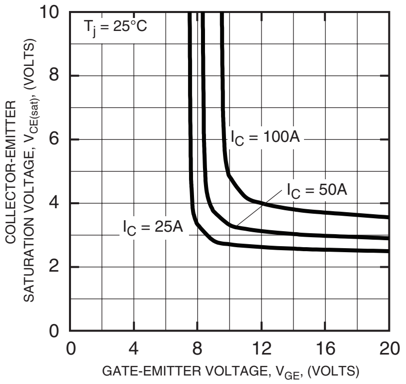
TRANSFER CHARACTERISTICS (TYPICAL)



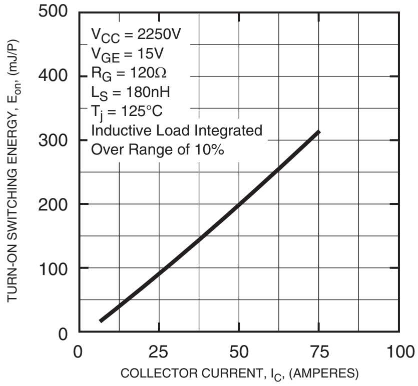
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



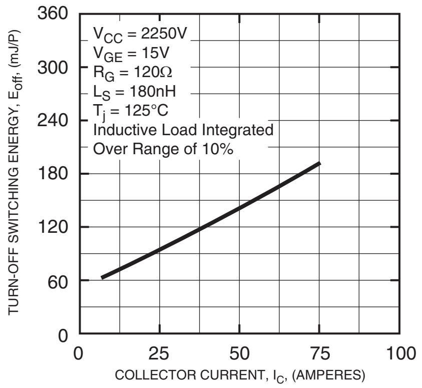
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



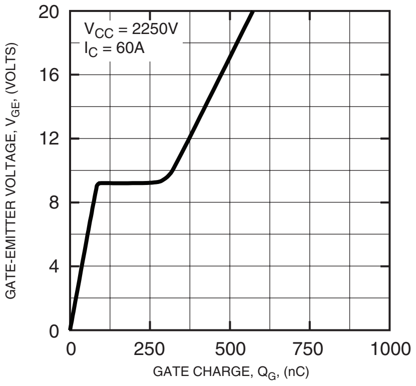
TURN-ON SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



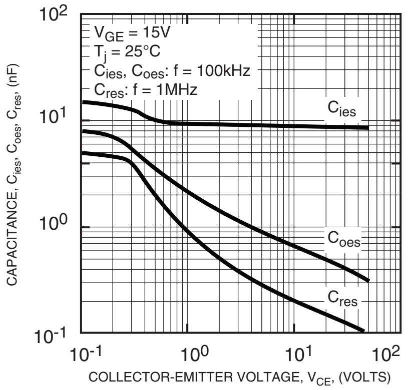
TURN-OFF SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



GATE CHARGE CHARACTERISTICS (TYPICAL)



CAPACITANCE CHARACTERISTICS (TYPICAL)



TURN-ON SWITCHING SAFE OPERATING AREA (RBSOA) (TYPICAL)