



IET26075

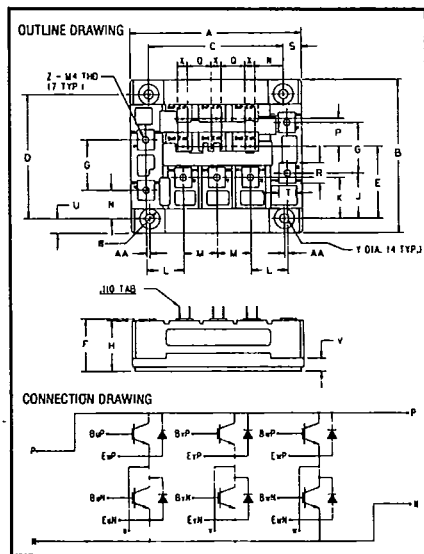
T-39-31

Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

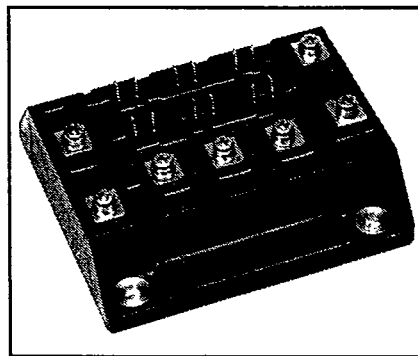
Six-IGBT IGBTMOD™ Power Module

75 Amperes/600 Volts



IET26075
Outline Drawing

Dimension	Inches	Millimeters
A	4.02±.02	102±0.5
B	3.58±.02	91±0.5
C	3.150±.010	80±0.25
D	2.913±0.10	74±0.25
E	1.69	43
F	1.24 Max.	31.5 Max.
G	1.18	30
H	1.16	29.5
J	1.06	27
K	.96	24.5
L	.87	22
M	.79	20
N	.67	17
P	.65	16.5
Q	.55	14
R	.47	12
S	.43	11
T	.39	10
U	.33	8.5
V	.28	7
W	.24 Rad.	Rad. 6.0
X	.24	6
Y	.22 Dia.	Dia. 5.5
Z	M4 Metric	M4
AA	.08	2



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Description

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of six IGBT Transistors in a three phase bridge configuration, with each transistor having a reverse-connected super-fast recovery free wheel diode. All components and interconnects are isolated from the heat sinking base-plate, offering simplified system assembly and thermal management.

Features:

- ☐ Low Drive Power
- ☐ Low $V_{CE(sat)}$
- ☐ Discrete Super-Fast Recovery (150ns) Free Wheel Diode
- ☐ High Frequency Operation (15-20kHz)
- ☐ Isolated Base Plate for Easy Heat Sinking

Applications:

- ☐ AC Motor Control
- ☐ Motion/Servo Control
- ☐ UPS
- ☐ Welding Power Supplies
- ☐ Laser Power Supplies

Ordering Information

Example: Select the complete eight digit part module number you desire from the table below -i.e. IET26075 is a 600V (V_{CES}), 75 Ampere Six-IGBT IGBTMOD™ Power Module.

Type	V_{CES} Volts (x10)	Current Rating Amperes (75)
IET2	60	75



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

Ratings	Symbol	IET26075	Units
Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Collector-Emitter Voltage (G-E SHORT)	V_{CES}	600	Volts
Gate-Emitter Voltage	V_{GES}	± 20	Volts
Collector Current	I_C	75	Amperes
Peak Collector Current	I_{CM}	150*	Amperes
Diode Forward Current	I_{FM}	75	Amperes
Diode Forward Surge Current	I_{FM}	150*	Amperes
Power Dissipation	P_d	310	Watts
Max. Mounting Torque M4 Terminal Screws	—	12	in.-lb.
Max. Mounting Torque M5 Mounting Screws	—	17	in.-lb.
Module Weight (Typical)	—	540	Grams
V isolation	V_{RMS}	2500	Volts

* Pulse width and repetition rate should be such that device junction temperature does not exceed the device rating.

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$	—	—	1.0	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	$V_{\text{GE(th)}}$	$I_C = 7.5\text{mA}, V_{\text{CE}} = 10\text{V}$	3.0	4.0	6.0	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_C = 75\text{A}, V_{\text{GE}} = 15\text{V}$	—	2.8	5.0**	Volts
		$I_C = 75\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 150^\circ\text{C}$	—	3.0	**	Volts
Total Gate Charge	Q_G	$V_{\text{CC}} = 300\text{V}, I_C = 75\text{A}, V_{\text{GS}} = 15\text{V}$	—	270	—	nC
Diode Forward Voltage	V_{FM}	$I_C = 75\text{A}, V_{\text{GS}} = 0\text{V}$	—	—	2.5	Volts

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

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}	$V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}, f = 1\text{MHz}$	—	—	8300	pF
Output Capacitance	C_{oss}		—	—	2000	pF
Reverse Transfer Capacitance	C_{res}		—	—	200	pF
Resistive	Turn-on Delay Time	$V_{\text{CC}} = 300\text{V}, I_C = 75\text{A}, V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}, R_G = 33\Omega$	—	—	250	ns
	Rise Time		—	—	800	ns
Switch Times	Turn-off Delay Time		—	—	600	ns
	Fall Time		—	—	800	ns
Diode Reverse Recovery Time	t_{rr}	$I_E = 75\text{A}, di_E/dt = -150\text{A}/\mu\text{s}$	—	—	200	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_E = 75\text{A}, di_E/dt = -150\text{A}/\mu\text{s}$	—	1.0	—	μC

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per IGBT	—	—	0.40	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per Free Wheel Diode	—	—	0.90	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance	$R_{\text{th(c-f)}}$	Per 1/6 Module	—	—	0.20	$^\circ\text{C}/\text{W}$



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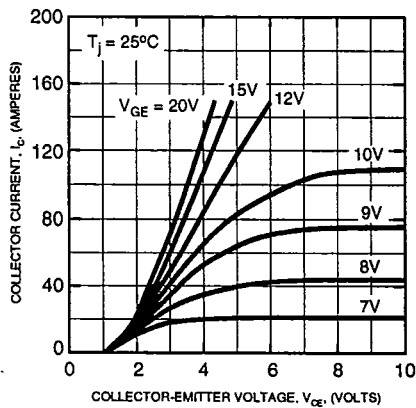
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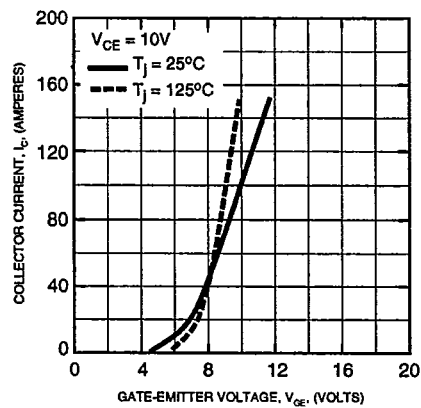
Six-IGBT IGBTMOD™ Power Module

75 Amperes/600 Volts

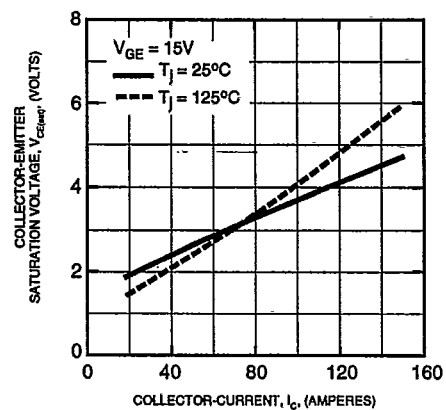
OUTPUT CHARACTERISTICS
(TYPICAL)



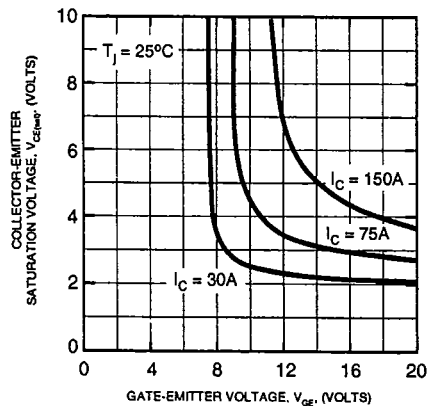
TRANSFER CHARACTERISTICS
(TYPICAL)



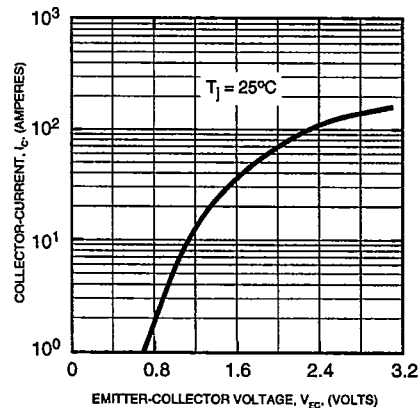
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



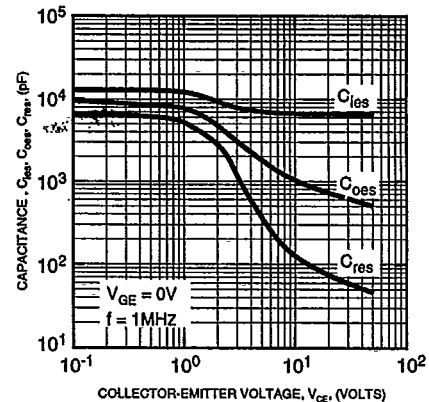
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



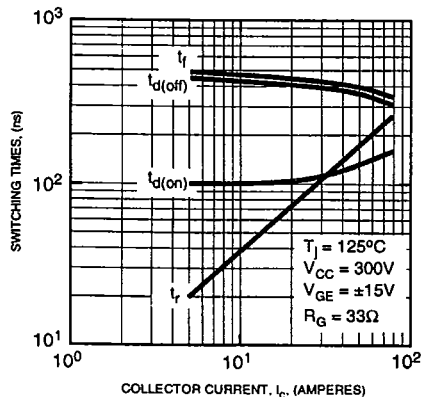
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



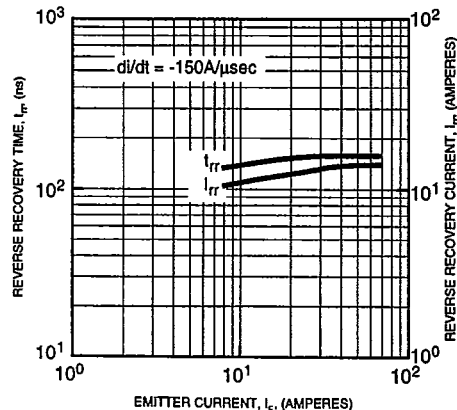
CAPACITANCE VS. V_{ce}
(TYPICAL)



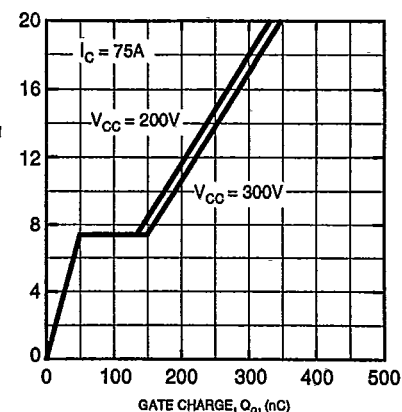
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



GATE CHARGE, V_{ge}





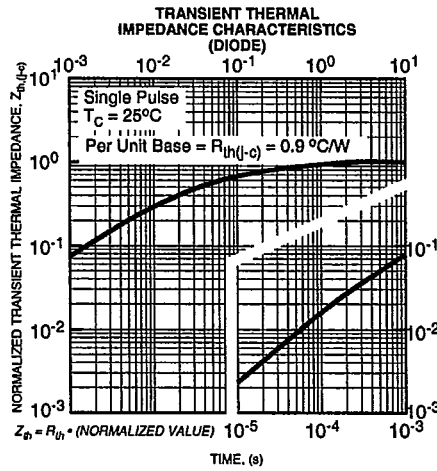
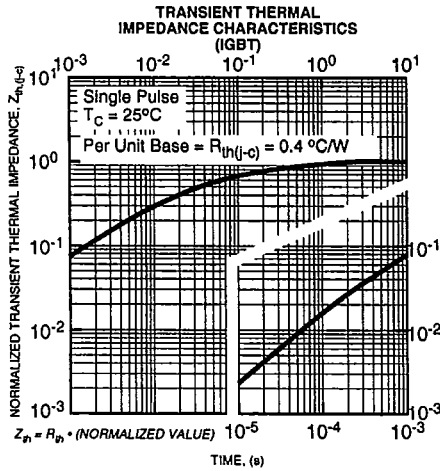
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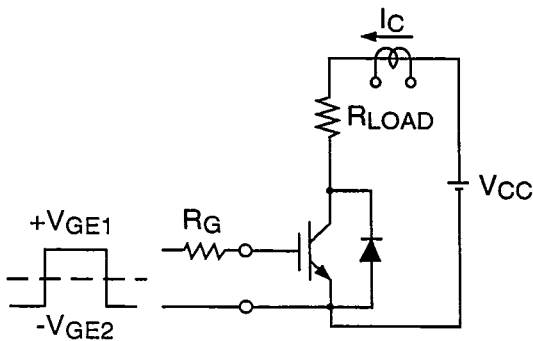
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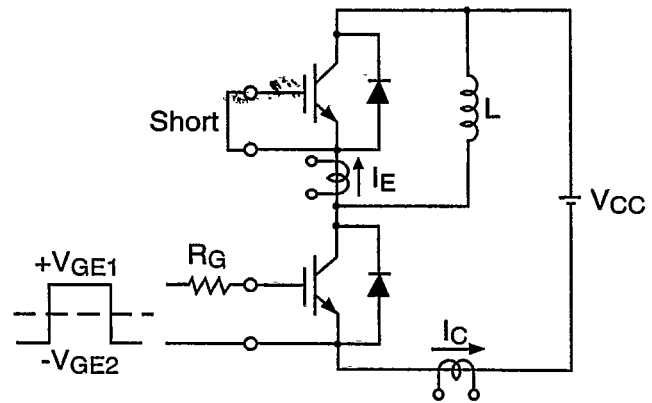
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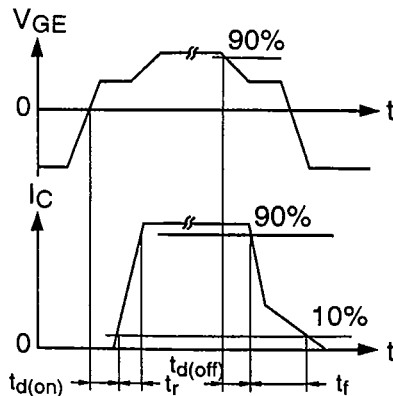
SWITCHING TIME TEST CIRCUITS & WAVEFORMS



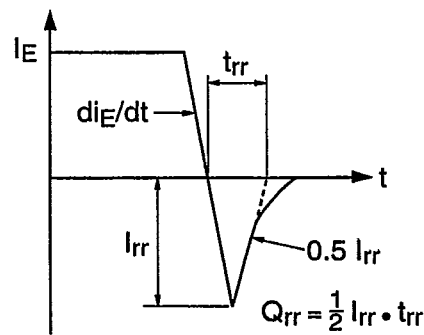
Resistance Load Switching Test Circuit



Half-Bridge Switching Test Circuit



Switching Time Test Waveforms



t_{rr} , Q_{rr} Waveforms