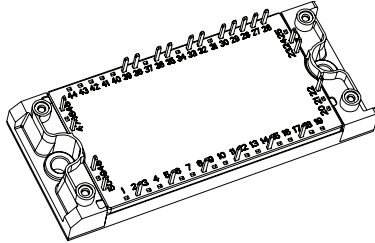


IGBT PIM Module, 25 A


ECONO2 PIM
FEATURES

- Low $V_{CE(on)}$ non punch through IGBT technology
- Low diode V_F
- 10 μ s short circuit capability
- Square RBSOA
- HEXFRED® antiparallel diode with ultrasoft reverse recovery characteristics
- Positive $V_{CE(on)}$ temperature coefficient
- Ceramic DBC substrate
- Low stray inductance design
- Speed 8 to 60 kHz
- Totally lead (Pb)-free
- Designed and qualified for industrial market


RoHS
COMPLIANT

PRODUCT SUMMARY

V_{CES}	1200 V
$V_{CE(on)}$	2.4 V
t_{sc} at $T_J = 150\text{ }^\circ\text{C}$	> 10 μ s
I_C at $T_C = 80\text{ }^\circ\text{C}$	25 A

BENEFITS

- Benchmark efficiency for motor control
- Rugged transient performance
- Low EMI, requires less snubbing
- Direct mounting to heatsink
- PCB solderable terminals
- Low junction to case thermal resistance

ABSOLUTE MAXIMUM RATINGS

	PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS	
Inverter	Collector to emitter voltage	V_{CES}		1200	V	
	Gate to emitter voltage	V_{GES}		± 20		
	Continuous collector current	I_C		$T_C = 25\text{ }^\circ\text{C}$	40	A
				$T_C = 80\text{ }^\circ\text{C}$	25	
	Pulsed collector current See fig. C.T.5	I_{CM}			80	A
	Diode maximum forward current	I_{FM}	Pulsed		80	A
Power dissipation	P_D	One IGBT	25 $^\circ\text{C}$	198	W	
Input rectifier	Repetitive peak reverse voltage	V_{RRM}		1600	V	
	Average output current	$I_{F(AV)}$	50/60 Hz sine pulse	80 $^\circ\text{C}$	20	A
	Surge current (non-repetitive)	I_{FSM}	Rated V_{RRM} applied, 10 ms, sine pulse		250	
	I^2t (non-repetitive)	I^2t			316	A ² s
Brake	Collector to emitter voltage	V_{CES}		1200	V	
	Gate to emitter voltage	V_{GES}		± 20		
	Continuous collector current	I_C		$T_C = 25\text{ }^\circ\text{C}$	40	A
				$T_C = 80\text{ }^\circ\text{C}$	25	
	Pulsed collector current See fig. C.T.5	I_{CM}			80	A
	Power dissipation	P_D	One IGBT	25 $^\circ\text{C}$	198	W
	Maximum operating junction temperature	T_J			150	$^\circ\text{C}$
	Storage temperature range	T_{Stg}			- 40 to + 125	
Isolation voltage	V_{ISOL}	AC (1 min)		2500		

ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise noted)							
	PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Inverter IGBT	Collector to emitter breakdown voltage	BV _(CES)	V _{GE} = 0 V, I _C = 500 μA	1200	-	-	V
	Temperature coefficient of breakdown voltage	ΔV _{(BR)CES} /ΔT _J	V _{GE} = 0 V, I _C = 1 mA (25 °C to 125 °C)	-	1.0	-	V/°C
	Collector to emitter voltage	V _{CE(on)}	I _C = 25 A, V _{GE} = 15 V	-	2.40	2.70	V
			I _C = 40 A, V _{GE} = 15 V	-	2.95	3.30	
			I _C = 25 A, V _{GE} = 15 V, T _J = 125 °C	-	2.85	-	
			I _C = 40 A, V _{GE} = 15 V, T _J = 125 °C	-	3.55	-	
	Gate threshold voltage	V _{GE(th)}	V _{CE} = V _{GE} , I _C = 250 μA	4.0	5.0	6.0	
	Threshold voltage temp. coefficient	ΔV _{GE(th)} /ΔT _J	V _{CE} = V _{GE} , I _C = 1 mA (25 °C to 125 °C)	-	- 10	-	mV/°C
	Zero gate voltage collector current	I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V	-	-	100	μA
			V _{GE} = 0 V, V _{CE} = 1200 V T _J = 125 °C	-	750	-	
	Gate to emitter leakage current	I _{GES}	V _{GE} = ± 20 V	-	-	± 200	nA
	Total gate charge (turn-on)	Q _G	I _C = 25 A	-	175	265	nC
	Gate to emitter charge (turn-on)	Q _{GE}	V _{CC} = 400 V	-	17.5	30	
	Gate to collector charge (turn-on)	Q _{GC}	V _{GE} = 15 V	-	81	125	
	Turn-on switching loss	E _{on}	I _C = 25 A, V _{CC} = 600 V	-	2.45	4.45	mJ
	Turn-off switching loss	E _{off}	V _{GE} = 15 V, R _G = 10 Ω, L = 400 μH, T _J = 25 °C ⁽¹⁾	-	2.05	3.20	
	Total switching loss	E _{tot}		-	4.50	7.65	
	Turn-on switching loss	E _{on}	I _C = 25 A, V _{CC} = 600 V	-	3.35	5.65	
	Turn-off switching loss	E _{off}	V _{GE} = 15 V, R _G = 10 Ω, L = 400 μH, T _J = 125 °C ⁽¹⁾	-	2.85	3.85	
	Total switching loss	E _{tot}		-	6.20	9.50	
	Turn-on delay time	t _{d(on)}	I _C = 25 A, V _{CC} = 600 V V _{GE} = 15 V, R _G = 10 Ω, L = 400 μH, T _J = 125 °C	-	80	104	ns
	Rise time	t _r		-	50	70	
	Turn-off delay time	t _{d(off)}		-	510	1000	
Fall time	t _f	-		230	299		
Input capacitance	C _{ies}	V _{GE} = 0 V	-	2370	-	pF	
Output capacitance	C _{oes}	V _{CC} = 30 V	-	455	-		
Reverse transfer capacitance	C _{res}	f = 1 MHz	-	60	-		
Inverter IGBT	Reverse bias safe operating area	RBSOA	T _J = 150 °C, I _C = 80 A R _G = 47 Ω, V _{GE} = 15 V to 0 V	Fullsquare			
	Short circuit safe operating area	SCSOA	I _P = 180 A to 270 A V _{CC} = 900 V R _G = 47 Ω, V _{GE} = 15 V to 0 V	10	-	-	μs
	Diode peak reverse recovery current	I _{rr}	T _J = 125 °C V _{CC} = 600 V, I _F = 25 A, L = 400 μH, R _G = 10 Ω, V _{GE} = 15 V	-	35	-	A
	Diode forward voltage drop	V _{FM}	I _F = 25 A	-	1.90	2.35	V
			I _F = 40 A	-	2.25	2.80	
I _F = 25 A, T _J = 125 °C			-	2.00	-		
I _F = 40 A, T _J = 125 °C			-	2.45	-		