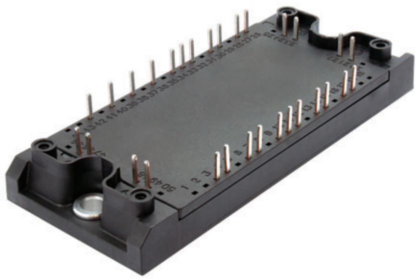
IGBT Fourpack Module, 50 A



ECONO 2

FEATURES

- Square RBSOA
- HEXFRED® low Q_{rr}, low switching energy
- Positive $V_{CE(on)}$ temperature coefficient
- Copper baseplate
- Low stray inductance design
- Designed and qualified for industrial market
- UL approved file E78996
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

BENEFITS

- Benchmark efficiency for SMPS appreciation in particular HF welding
- Rugged transient performance
- Low EMI, requires less snubbing
- Direct mounting to heatsink space saving
- PCB solderable terminals
- Low junction to case thermal resistance

PRIMARY CHARACTERISTICS	
V_{CES}	1200 V
I_C at T_C = 66 °C	50 A
$V_{CE(on)}$ (typical)	3.49 V
Speed	8 kHz to 30 kHz
Package	ECONO 2
Circuit configuration	4 pack

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Collector to emitter voltage	V_{CES}		1200	V
Continuous collector current	I_C	T_C = 25 °C	66	A
		T_C = 80 °C	44	
Pulsed collector current See fig. C.T.5	I_{CM}		150	
Clamped inductive load current	I_{LM}		150	
Diode continuous forward current	I_F	T_C = 25 °C	40	
		T_C = 80 °C	25	
Diode maximum forward current	I_{FM}		150	
Gate to emitter voltage	V_{GE}		± 20	V
Maximum power dissipation (IGBT)	P_D	T_C = 25 °C	330	W
		T_C = 80 °C	180	
Maximum operating junction temperature	T_J		150	°C
Storage temperature range	T_{Stg}		-40 to +125	
Isolation voltage	V_{ISOL}		AC 2500 (min)	V

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Collector to emitter breakdown voltage	$BV_{(CES)}$	V_{GE} = 0 V, I_C = 500 μA	1200	-	-	V
Collector to emitter voltage	$V_{CE(ON)}$	I_C = 50 A, V_{GE} = 15 V	-	3.49	3.9	
		I_C = 75 A, V_{GE} = 15 V	-	4.15	4.5	
		I_C = 50 A, V_{GE} = 15 V, T_J = 125 °C	-	4.16	4.5	
		I_C = 75 A, V_{GE} = 15 V, T_J = 125 °C	-	4.97	5.4	
Gate threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 250 μA	4.0	4.9	6.0	
Threshold voltage temperature coefficient	$\Delta V_{GE(th)}/\Delta T_J$	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	-	11	250	μA
		V_{GE} = 0 V, V_{CE} = 1200 V, T_J = 125 °C	-	600	1000	
Diode forward voltage drop	V_{FM}	I_F = 50 A	-	3.30	4.5	V
		I_F = 75 A	-	3.90	5.0	
		I_F = 50 A, T_J = 125 °C	-	3.6	4.8	
		I_F = 75 A, T_J = 125 °C	-	4.37	5.5	
Gate to emitter leakage current	I_{GES}	V_{GE} = ± 20 V	-	-	± 200	nA

SWITCHING CHARACTERISTICS (T_J = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Total gate charge (turn-on)	Q_G	I_C = 50 A V_{CC} = 600 V V_{GE} = 15 V	-	400	-	nC
Gate to emitter charge (turn-on)	Q_{GE}		-	43	-	
Gate to collector charge (turn-on)	Q_{GC}		-	187	-	
Turn-on switching loss	E_{on}	I_C = 50 A, V_{CC} = 600 V V_{GE} = 15 V, R_G = 4.7 Ω, L = 500 μH T_J = 25 °C (1)	-	0.93	-	mJ
Turn-off switching loss	E_{off}		-	1.20	-	
Total switching loss	E_{tot}		-	2.13	-	
Turn-on switching loss	E_{on}	I_C = 50 A, V_{CC} = 600 V V_{GE} = 15 V, R_G = 4.7 Ω, L = 500 μH T_J = 125 °C (1)	-	1.68	-	
Turn-off switching loss	E_{off}		-	1.77	-	
Total switching loss	E_{tot}		-	3.46	-	
Turn-on delay time	$t_{d(on)}$	I_C = 50 A, V_{CC} = 600 V V_{GE} = 15 V, R_G = 4.7 Ω, L = 500 μH T_J = 125 °C	-	128	-	ns
Rise time	t_r		-	56	-	
Turn-off delay time	$t_{d(off)}$		-	292	-	
Fall time	t_f		-	134	-	
Reverse bias safe operating area	RBSOA	T_J = 150 °C, I_C = 150 A R_G = 10 Ω, V_{GE} = 15 V to 0 V	Fullsquare			
Short circuit safe operating area	SCSOA	T_J = 150 °C V_{CC} = 900 V, V_P = 1200 V R_G = 10 Ω, V_{GE} = 15 V to 0 V	10	-	-	μs
Diode peak reverse recovery current	I_{rr}	T_J = 25 °C; V_{CC} = 600 V, I_F = 50 A, dI/dt = 7 A/μs	-	1.3	2.3	A
		T_J = 125 °C	-	2.0	3	
Diode reverse recovery time	t_{rr}	T_J = 25 °C	-	0.453	0.49	μs
		T_J = 125 °C	-	0.74	0.82	
Total reverse recovery charge	Q_{rr}	T_J = 25 °C	-	0.12	0.3	μC
		T_J = 125 °C	-	0.4	1.5	

Note

(1) Energy losses include “tail” and diode reverse recovery