EP2 Power Module

APP075B12TFPP

PRELIMINARY
DATASHEET

V0.1, 2023/01

APP075B12TFPP
EP2 Power Module

Applications

- Motor Drives
- Inverters

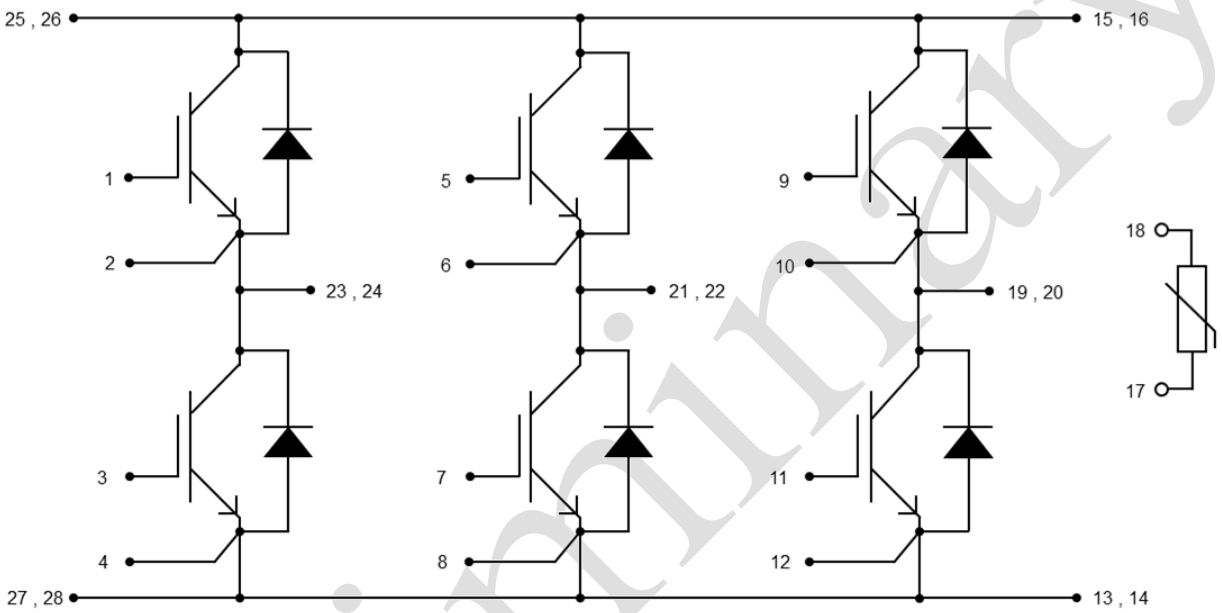
Electrical Features

- T_j op = 150°C
- Low Inductive Design
- Blocking voltage 1200V
- Low V_{CEsat}

Mechanical Features

- Low Thermal Resistance
- High Power
- Temperature sense included
- Pb-free device and RoHS compliant

Circuit Diagram



IGBT Inverter

Maximum Rated Values

Parameter	Conditions	Symbol	Values	Unit
Collector-emitter voltage	T_j = 25°C	V_{CES}	1200	V
Gate-emitter peak voltage		V_{GES}	±20	V
Implemented collector current		I_{CN}	75	A
Repetitive peak collector current	t_p = 1 ms	I_{CRM}	150	A

Characteristics Values

Parameter	Conditions		Symbol	Min.	Typ.	Max.	Unit
Collector-emitter saturation voltage	I_C = 75A, V_{GE} = 15V I_C = 75A, V_{GE} = 15V	T_j = 25°C T_j = 150°C	$V_{CE,sat}$		1.75 2.15	2.15	V
Gate threshold voltage	I_C = 2.40mA, V_{CE} = V_{GE}	T_j = 25°C	V_{GEth}	5.3	5.9	6.5	V
Collector-emitter cut-off current	V_{CE} = 1200V, V_{GE} = 0V	T_j = 25°C	I_{CES}			1.0	mA
Gate-emitter leakage current	V_{CE} = 0V, V_{GE} = 20V	T_j = 25°C	I_{GES}			100	nA
Gate Charge	V_{GE} = -15 V / + 15 V, V_{CE} = 600V	T_j = 25°C	Q_g		TBD		µC
Input capacitance	f = 1MHz, V_{CE} = 25 V, V_{GE} = 0V	T_j = 25°C	C_{ies}		6.0		nF
Output capacitance	f = 1MHz, V_{CE} = 25 V, V_{GE} = 0V	T_j = 25°C	C_{oes}		1.1		nF
Reverse transfer capacitance	f = 1MHz, V_{CE} = 25 V, V_{GE} = 0V	T_j = 25°C	C_{res}		0.1		nF
Turn-on delay time, inductive load	I_C = 75A, V_{CE} = 600V, V_{GE} = -15 V / + 15 V R_{GON} = 2.0 Ω	T_j = 25°C	$t_{d(on)}$		TBD		µs
Rise time, inductive load	I_C = 75A, V_{CE} = 600V, V_{GE} = -15 V / + 15 V R_{GON} = 2.0 Ω	T_j = 25°C	t_r		TBD		µs

Parameter	Conditions		Symbol	Min.	Typ.	Max.	Unit
Turn-on energy loss per pulse	I_C = 75A, V_{CE} = 600V, L_S = 30 nH V_{GE} = -15 V / + 15 V, R_{GON} = 2.0 Ω di/dt = TBD A/µs (25°C)	T_j = 25°C	E_{on}		TBD		mJ
Turn-off delay time, inductive load	I_C = 75A, V_{CE} = 600V, V_{GE} = -15 V / + 15 V R_{Goff} = 2.0 Ω	T_j = 25°C	$t_{d(off)}$		TBD		µs
Fall time, inductive load	I_C = 75A, V_{CE} = 600V, V_{GE} = -15 V / + 15 V R_{Goff} = 2.0 Ω	T_j = 25°C	t_f		TBD		µs
Turn-off energy loss per pulse	I_C = 75A, V_{CE} = 600V, L_S = 30 nH V_{GE} = -15 V / + 15 V, R_{Goff} = 2.0 Ω dv/dt = TBD V/µs (25°C)	T_j = 25°C	E_{off}		TBD		mJ
SC data	$V_{GE} \leqq$ 15 V, V_{CC} = 800 V $t_p \leqq$ 10 µs	T_j = 25°C	I_{SC}		TBD		A
Thermal resistance, junction to case	Per IGBT		R_{thJC}		0.20		K/W
Thermal resistance, case to heatsink	Per IGBT		R_{thCH}		0.30		K/W

Diode Inverter

Maximum Rated Values

Parameter	Conditions	Symbol	Values	Unit
Repetitive peak reverse voltage	T_j = 25°C	V_{RRM}	1200	V
Implemented forward current		I_{FN}	75	A
Repetitive peak forward current	t_p = 1 ms	I_{FRM}	150	A

Characteristics Values

Parameter	Conditions		Symbol	Typ.	Max.	Unit
Forward voltage	I_F = 75A, V_{GE} = 0V I_F = 75A, V_{GE} = 0V	T_j = 25°C T_j = 150°C	V_F	1.65 1.70	2.10	V
Recovered charge	I_F = 75A, V_R = 600V, V_{GE} = -15V, -di_F/dt = TBD A/µs (25°C)	T_j = 25°C	Q_{rr}	TBD		µC
Reverse recovery energy	I_F = 75A, V_R = 600V, V_{GE} = -15V, -di_F/dt = TBD A/µs (25°C)	T_j = 25°C	E_{rec}	TBD		mJ
Peak reverse recovery current	I_F = 75A, V_R = 600V, V_{GE} = -15V, -di_F/dt = TBD A/µs (25°C)	T_j = 25°C	I_{RM}	TBD		A
Thermal resistance, junction to case	Per diode		R_{thJC}		0.55	
Thermal resistance, case to heatsink	Per diode		R_{thCH}		0.18	

NTC-Thermistor

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Rated resistance	T_c = 25°C	R_{25}		5.0		kΩ
Resistance tolerance	T_c = 100°C	△R/R	-5		5	%
B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 – 1/(298.15\ K))$	$B_{25/50}$		3375		K
B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T2 – 1/(298.15\ K))$	$B_{25/80}$		3411		K
B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T2 – 1/(298.15\ K))$	$B_{25/100}$		3433		K

Module

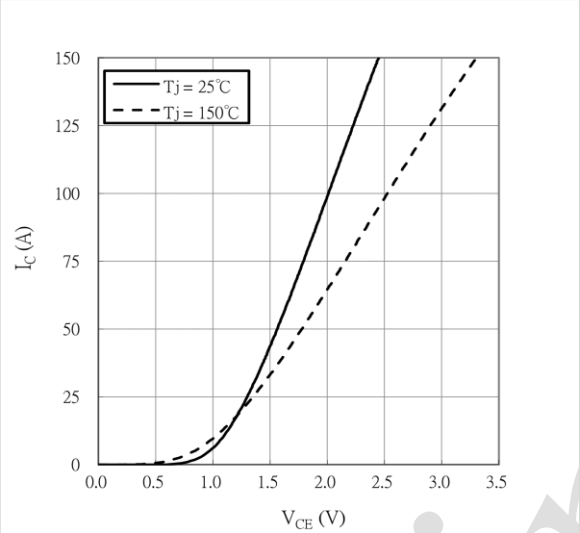
Parameter	Conditions	Symbol	Value	Unit
Isolation test voltage	RMS, f = 50 Hz, t = 1 min	V_{ISOL}	TBD	kV
Module baseplate material			Cu + Ni	
Module internal isolation material			Al_2O_3	
Creepage distance	Terminal to Terminal	d_{cree}	10.0	mm
Clearance	Terminal to Terminal	d_{clear}	7.5	mm
Comparative tracking index [1)]		CTI	> 200	

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Module stray inductance				TBD		
Storage temperature		T_{stg}	-40		125	°C
Weight		G		180		g

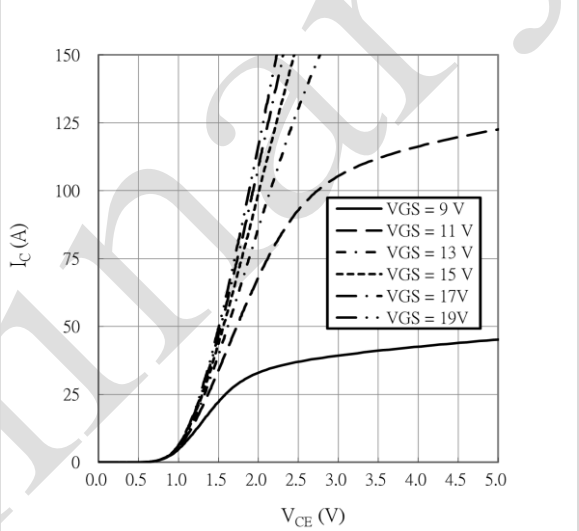
1) Extracted by following UL 746A

Characteristics Diagrams

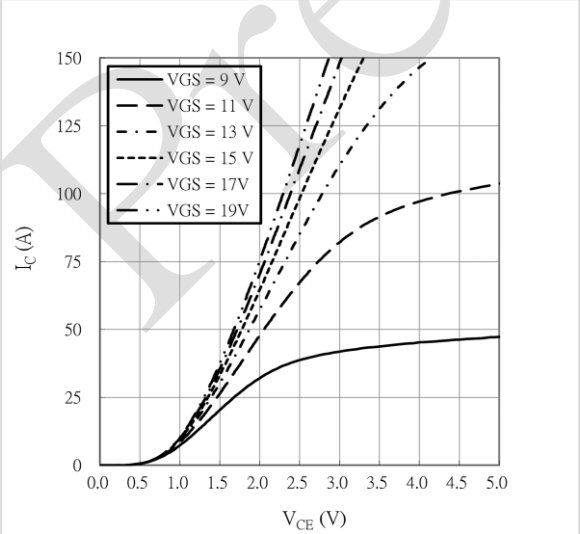
Output characteristics IGBT, Inverter
V_{GE} = 15 V, $I_C = f(V_{CE})$



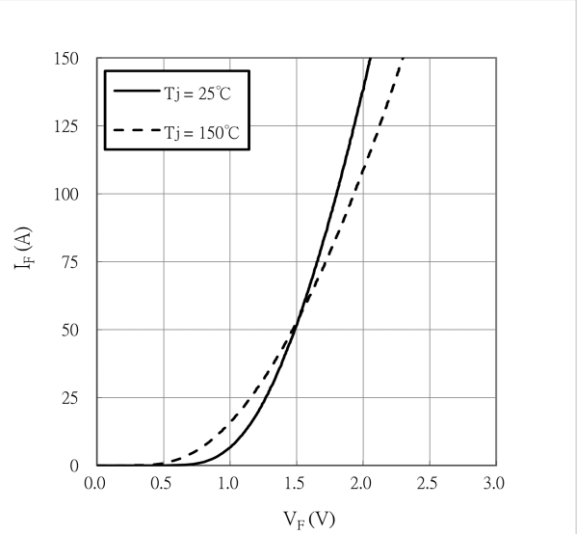
Output characteristics IGBT, Inverter
T_j = 25°C, $I_C = f(V_{CE})$



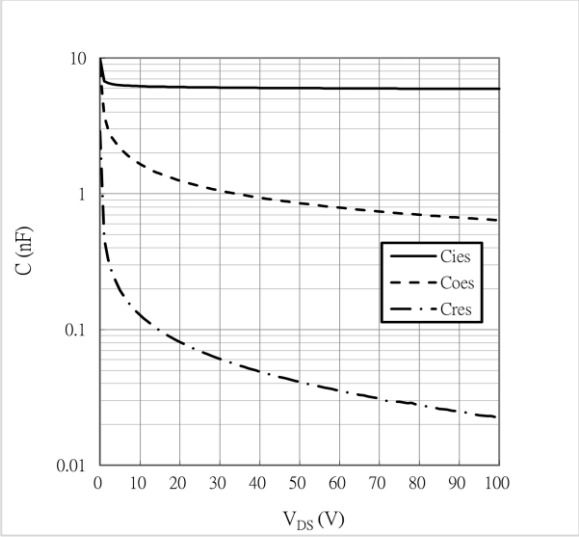
Output characteristics IGBT, Inverter
T_j = 150°C, $I_C = f(V_{CE})$



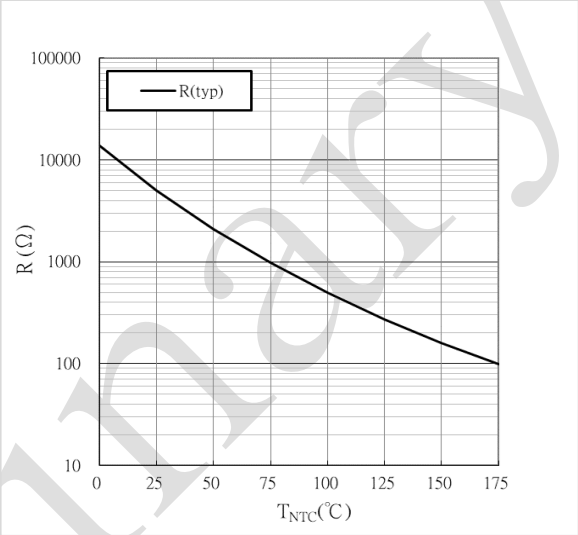
Forward characteristics of Diode, Inverter
$I_f = f(V_f)$



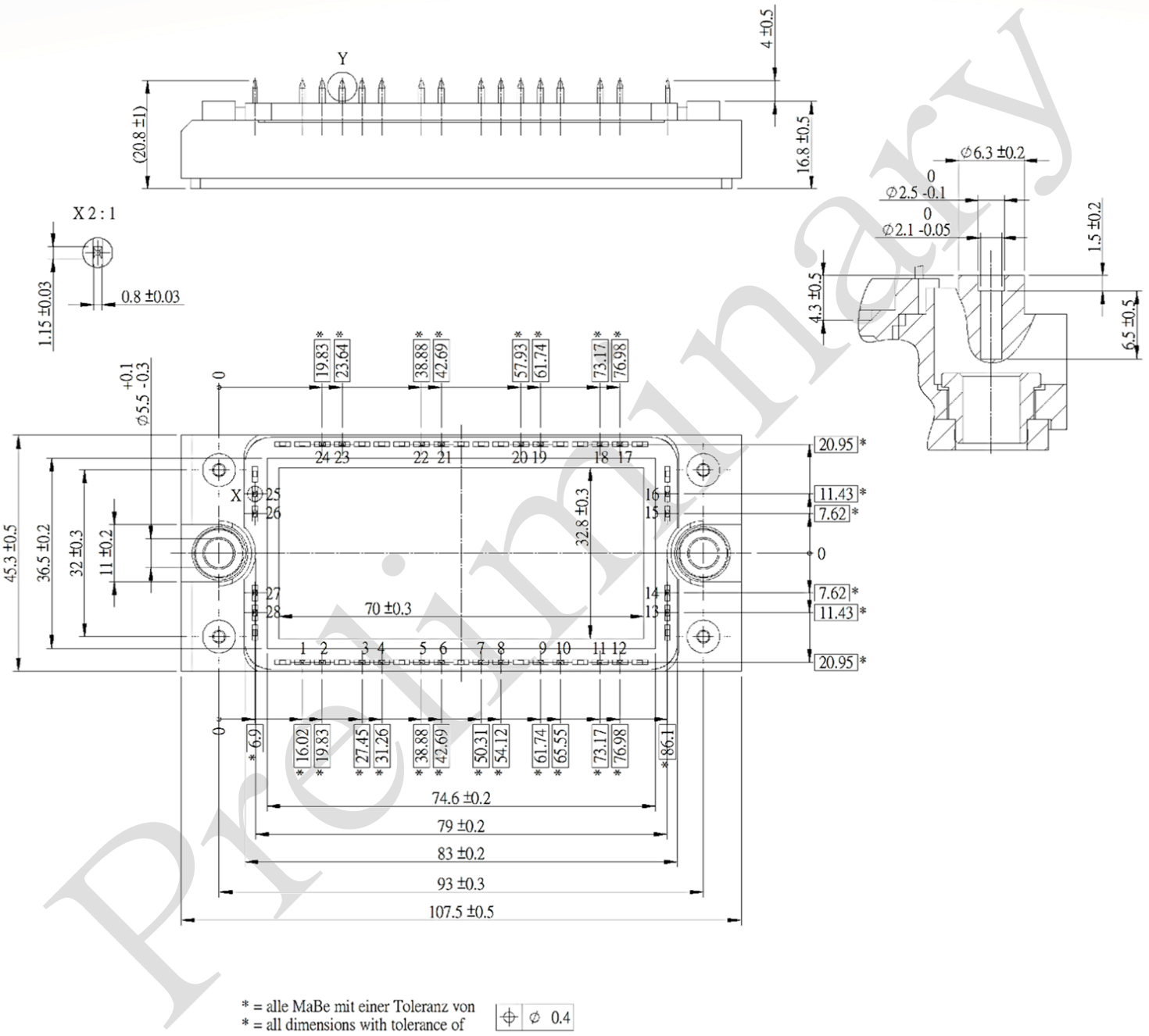
Capacitance characteristics IGBT, inverter
V_{GE} = 0 V, T_j = 25°C, f = 1 MHz



NTC-Thermistor-temperature characteristic



Package Outlines



IMPORTANT NOTICE AND DISCLAIMER
Edition 2023-01

Published by
Actron Technology

The information given in this document shall declare not to regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and / or any information regarding the application of the device. Actron technology provides such information, and other resources "as Is", and disclaims all warranties, express and implied, including without limitation any implied warranties of merchantability, fitness for a particular purpose or non-infringement of third party intellectual property rights.

These resources are intended for skilled developers designing with Actron products. You are solely responsible for (1) selecting the appropriate Actron products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

For further information on technology, delivery terms and conditions and prices, please contact the Actron Technology. (http://www.actron.com.tw/)

Warnings Due to technical requirements, components may contain dangerous substances For information on the types in question, please contact the Actron Technology. Actron Technology components may be used in special applications only with the express written approval of Actron Technology.

Revision: 2023-January