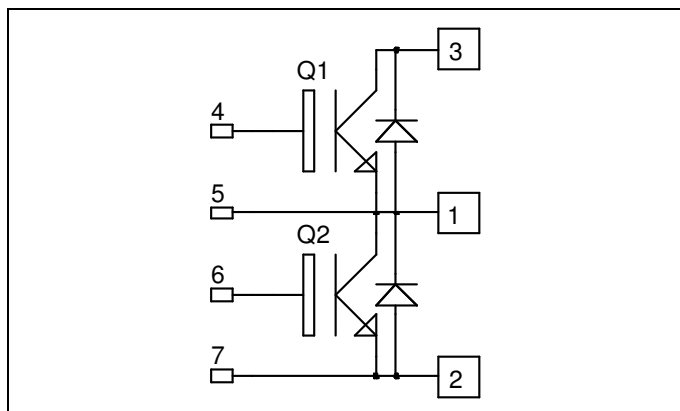


Phase Leg Trench IGBT® Power Module

$V_{CES} = 1200V$
 $I_C = 50A @ T_c = 80^\circ C$



Application

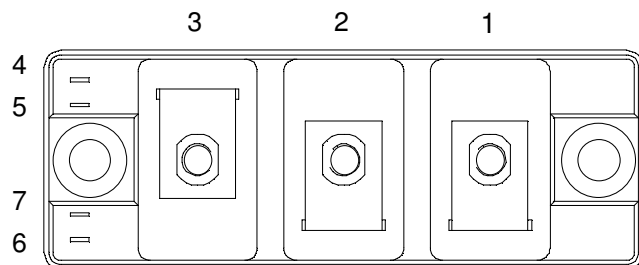
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Trench + Field Stop IGBT® Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - Avalanche energy rated
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Low stray inductance
 - M5 power connectors
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	A
		$T_C = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	100
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	270
RBSOA	Reverse Bias Safe Operating Area	$T_J = 125^\circ C$	100A @ 1100V



CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
BV _{CES}	Collector - Emitter Breakdown Voltage	V _{GE} = 0V, I _C = 2mA		1200			V
I _{CES}	Zero Gate Voltage Collector Current	V _{GE} = 0V, V _{CE} = 1200V				5	mA
V _{CE(on)}	Collector Emitter on Voltage	V _{GE} = 15V I _C = 50A	T _j = 25°C	1.4	1.7	2.1	V
			T _j = 125°C		2.0		
V _{GE(th)}	Gate Threshold Voltage	V _{GE} = V _{CE} , I _C = 2mA		5.0	5.8	6.5	V
I _{GES}	Gate – Emitter Leakage Current	V _{GE} = 20V, V _{CE} = 0V				400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		3600		pF
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		160		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 50A$ $R_G = 18\Omega$		150		ns
T_r	Rise Time			90		
$T_{d(off)}$	Turn-off Delay Time			550		
T_f	Fall Time			130		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 50A$ $R_G = 18\Omega$		180		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			650		
T_f	Fall Time			180		
E_{off}	Turn off Energy			6.5		mJ

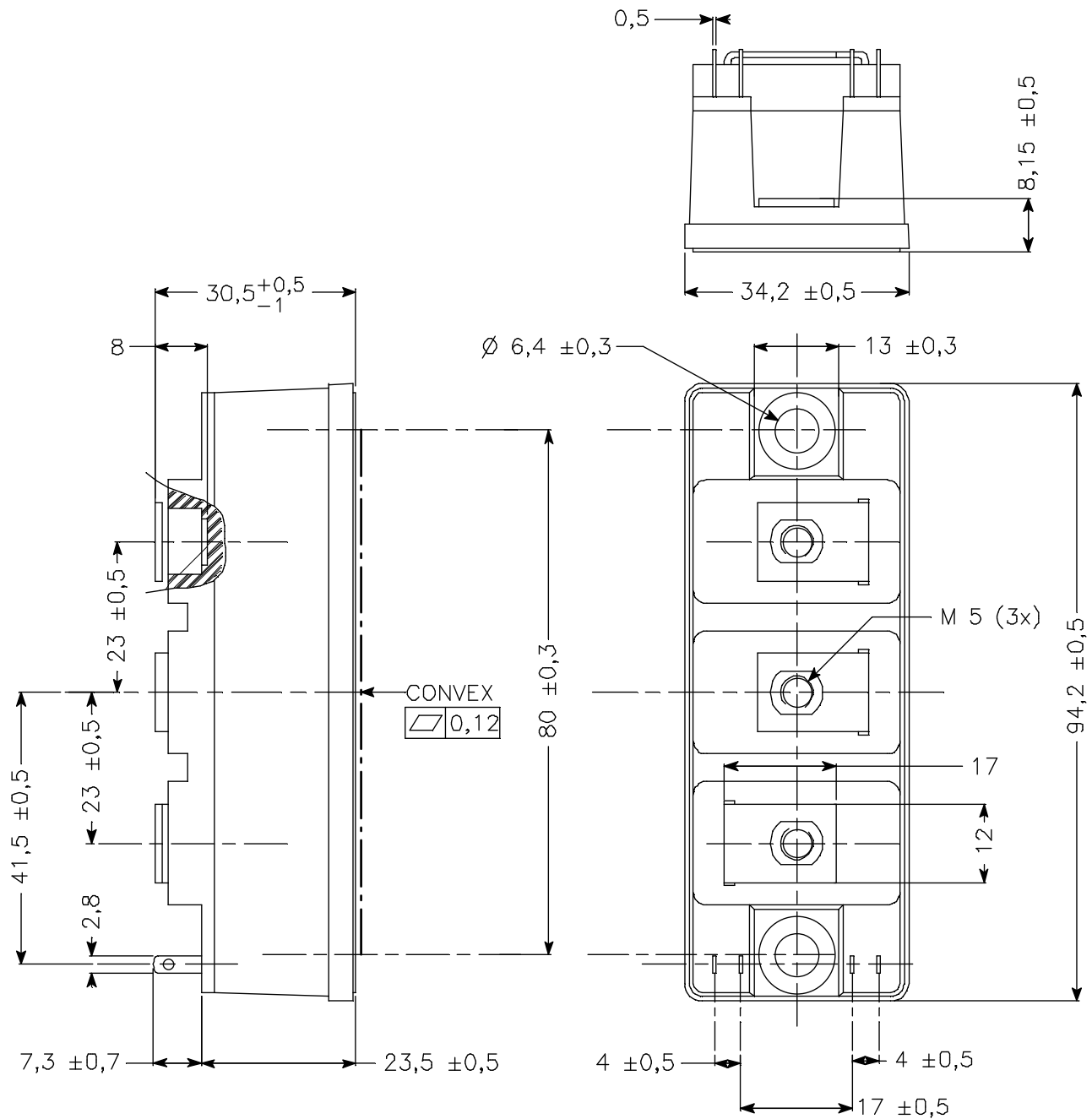
Reverse diode ratings and characteristics

V_F	Forward Voltage	$V_{GE} = 0V$ $I_F = 50A$	$T_j = 25^\circ\text{C}$		1.6	2.2	V
			$T_j = 125^\circ\text{C}$		1.6		
E_{rec}	Reverse Recovery Energy	$I_F = 50A$ $V_R = 600V$ $di/dt = 990A/\mu s$	$T_j = 125^\circ\text{C}$		4		mJ
Q_{rr}	Reverse Recovery Charge	$I_F = 50A$ $V_R = 600V$ $di/dt = 990A/\mu s$	$T_j = 25^\circ\text{C}$		5.2		μC
			$T_j = 125^\circ\text{C}$		9.4		

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case		IGBT			0.45	°C/W
			Diode			0.75	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		125	
Torque	Mounting torque	For terminals	M5	2		3.5	N.m
		To Heatsink	M6	3		5	
Wt	Package Weight					180	g

Package outline



APT reserves the right to change, without notice, the specifications and information contained herein

APT's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.