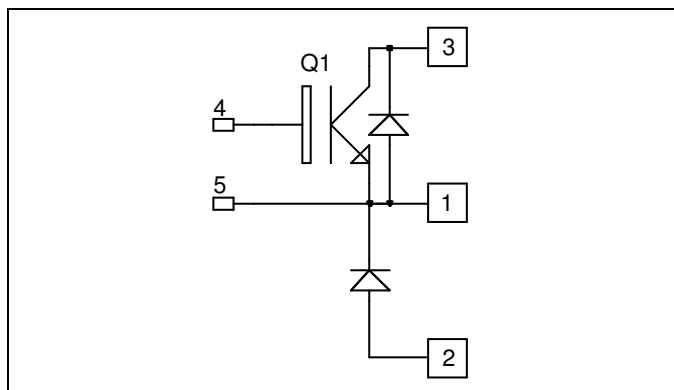


Buck chopper Trench IGBT® Power Module

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$V_{CES} = 1200V$
 $I_C = 300A @ T_c = 80^\circ C$



Application

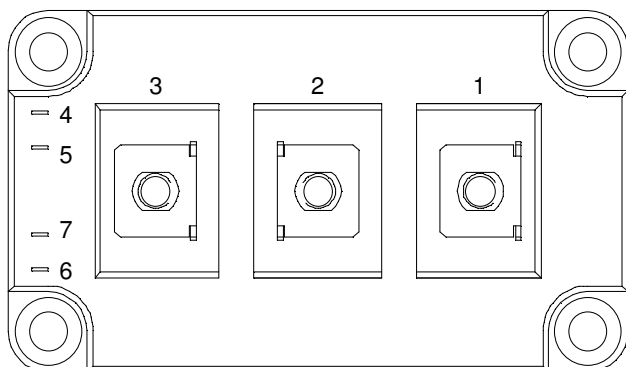
- AC and DC motor control
- Switched Mode Power Supplies

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
 - M6 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 V_{CESat}



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	440
		$T_C = 80^\circ C$	300
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	750
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1250
SCSOA	Short Circuit Safe Operating Area	$T_j = 125^\circ C$	1100A@900V



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	$V_{GE} = 0V, I_C = 12mA$	1200			V
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			8	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 300A$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.7 2.0	2.1	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 12mA$	5.0	5.8	6.5	V
I_{GES}	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			800	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		20		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		1.2		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		1		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$ $R_G = 2.2\Omega$		250		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) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$ $R_G = 2.2\Omega$		300		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			650		
T_f	Fall Time			180		

Reverse diode ratings and characteristics

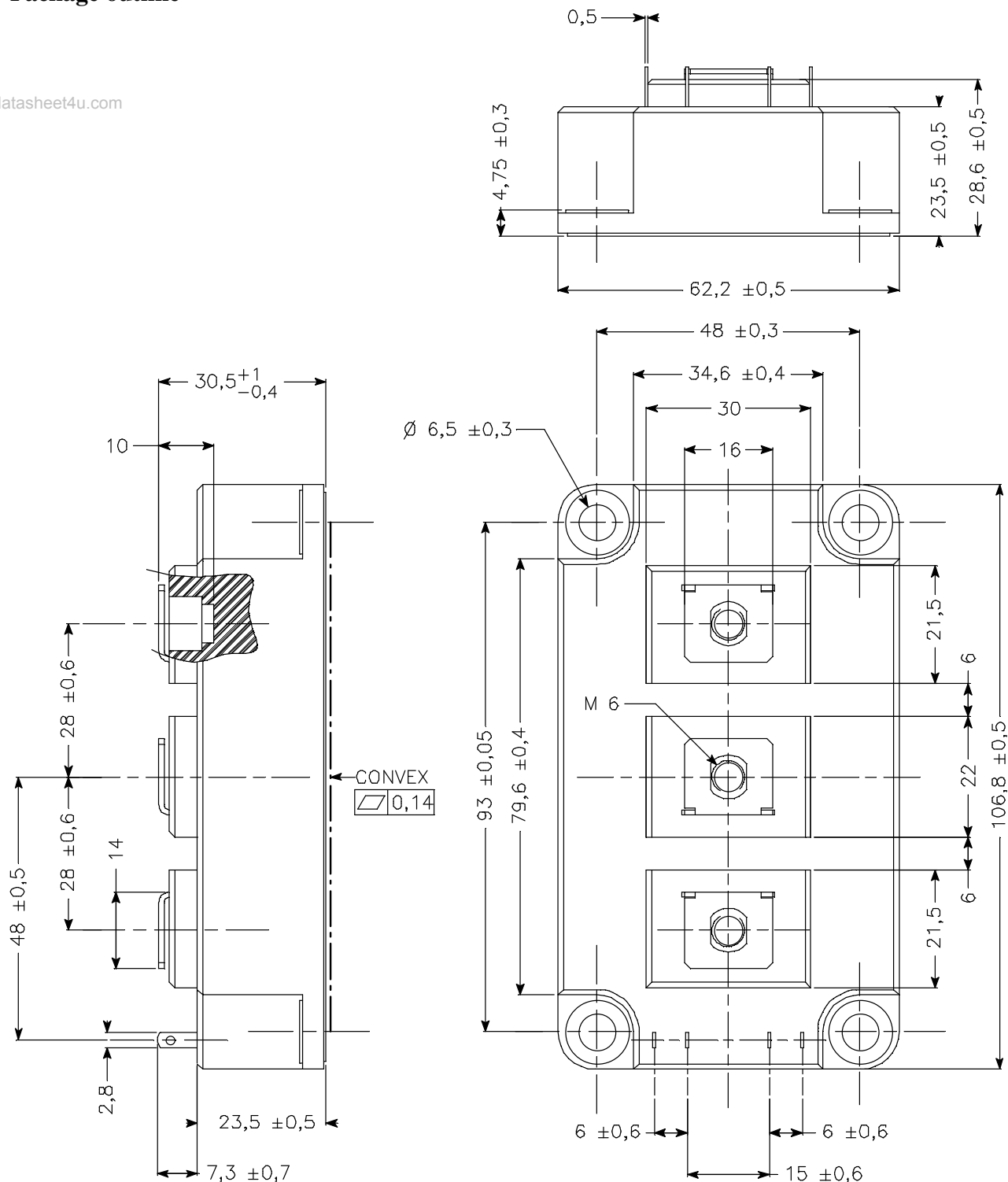
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 300A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.6 1.6	2.1	V
E_{rec}	Reverse Recovery Energy	$I_F = 300A$ $V_R = 600V$ $di/dt = 900A/\mu s$	$T_j = 125^\circ\text{C}$	24		mJ
Q_{rr}	Reverse Recovery Charge	$I_F = 300A$ $V_R = 600V$ $di/dt = 900A/\mu s$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	28 56		μC

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case			IGBT		0.1	°C/W
				Diode		0.15	
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	M6	3		5	N.m
		To Heatsink	M6	3		5	
Wt	Package Weight					380	g

Package outline

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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.