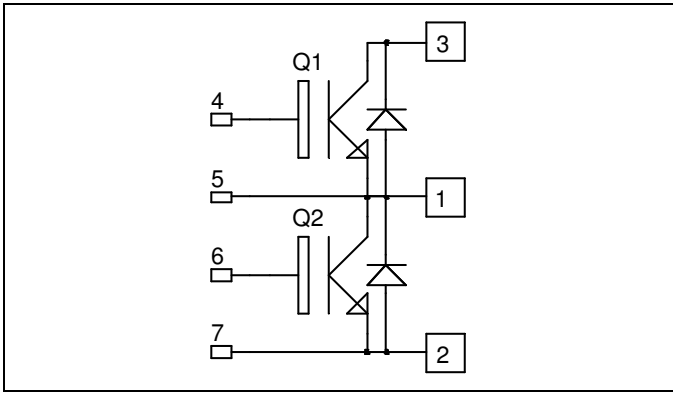


*Phase leg  
Trench IGBT® Power Module*

**V<sub>CES</sub> = 1700V  
I<sub>C</sub> = 50A @ T<sub>c</sub> = 80°C**



**Application**

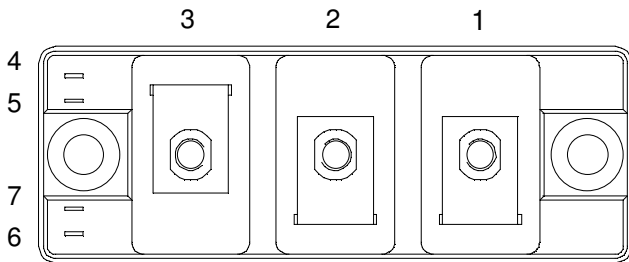
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

**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
- High level of integration
- Kelvin emitter for easy drive
- Low stray inductance
  - M5 power connectors

**Benefits**

- 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<sub>CEsat</sub>



**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
V <sub>CES</sub>	Collector - Emitter Breakdown Voltage	1700	V
I <sub>C</sub>	Continuous Collector Current	T <sub>C</sub> = 25°C	70
		T <sub>C</sub> = 80°C	50
I <sub>CM</sub>	Pulsed Collector Current	T <sub>C</sub> = 25°C	100
V <sub>GE</sub>	Gate - Emitter Voltage	±20	V
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> = 25°C	310
RBSOA	Reverse Bias Safe Operation Area	T <sub>j</sub> = 125°C	100A@1700V

**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	$V_{GE} = 0V, I_C = 2.5mA$	1700			V
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1700V$			6	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$		2.0	2.4	V
		$I_C = 50A$	$T_j = 25^\circ\text{C}$			
				2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2.5mA$	5.2	5.8	6.4	V
$I_{GES}$	Gate - Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		4400		pF
$C_{res}$	Reverse Transfer Capacitance			150		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 50A$ $R_G = 22\Omega$		200		ns
$T_r$	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			750		
$T_f$	Fall Time			90		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 50A$ $R_G = 22\Omega$		230		ns
$T_r$	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			850		
$T_f$	Fall Time			115		
$E_{off}$	Turn Off Energy			22		mJ

## Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$V_F$	Diode Forward Voltage	$I_F = 50A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$		1.8	2.2	V
			$T_j = 125^\circ\text{C}$		1.9		
$E_r$	Reverse Recovery Energy	$I_F = 50A$ $V_R = 900V$ $di/dt = 990A/\mu s$	$T_j = 25^\circ\text{C}$		9		mJ
			$T_j = 125^\circ\text{C}$		16		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 50A$ $V_R = 900V$ $di/dt = 990A/\mu s$	$T_j = 25^\circ\text{C}$		19		$\mu C$
			$T_j = 125^\circ\text{C}$		30		

## Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
$R_{thJC}$	Junction to Case	IGBT		0.40	$^\circ\text{C/W}$	
		Diode		0.70		
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t = 1$ min, $I_{isol} < 1mA, 50/60Hz$	3500			V	
$T_j$	Operating junction temperature range	-40		150	$^\circ\text{C}$	
$T_{STG}$	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.