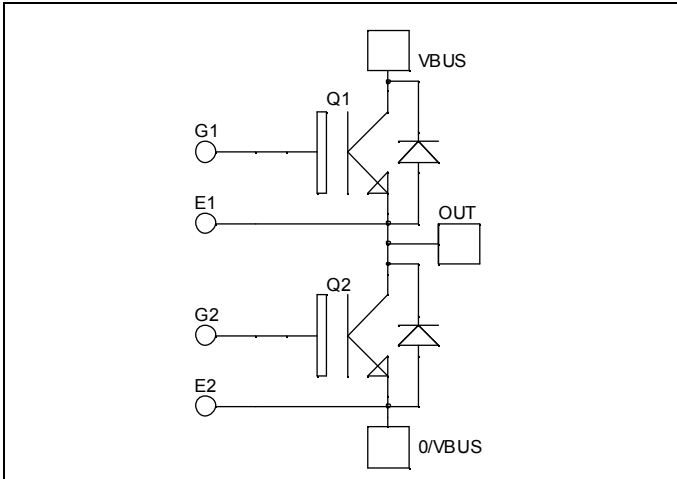


**Phase leg
Trench + Field Stop IGBT®
Power Module**

**$V_{CES} = 600V$
 $I_C = 300A @ T_c = 80^\circ C$**



Application

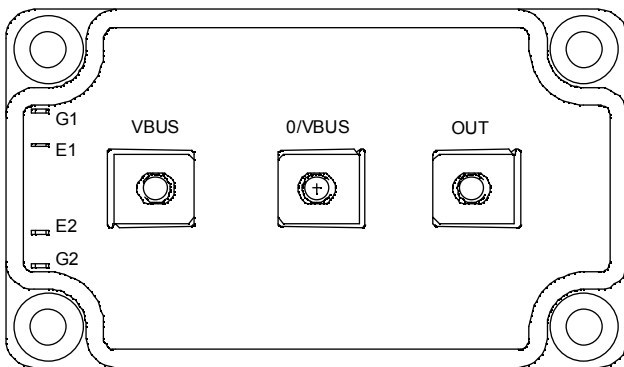
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration

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 VCEsat
- Low profile



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	430
		$T_C = 80^\circ C$	300
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	500
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1150
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	600A @ 550V

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
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$			350	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 300\text{A}$		1.4	1.8	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5\text{mA}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			500	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		24		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		1.5		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.75		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 300\text{A}$ $R_G = 3.3\Omega$		115		ns
T_r	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			200		
T_f	Fall Time			55		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 300\text{A}$ $R_G = 3.3\Omega$		120		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			250		
T_f	Fall Time			70		
E_{on}	Turn on Energy				5.2	
E_{off}	Turn off Energy			10.5		

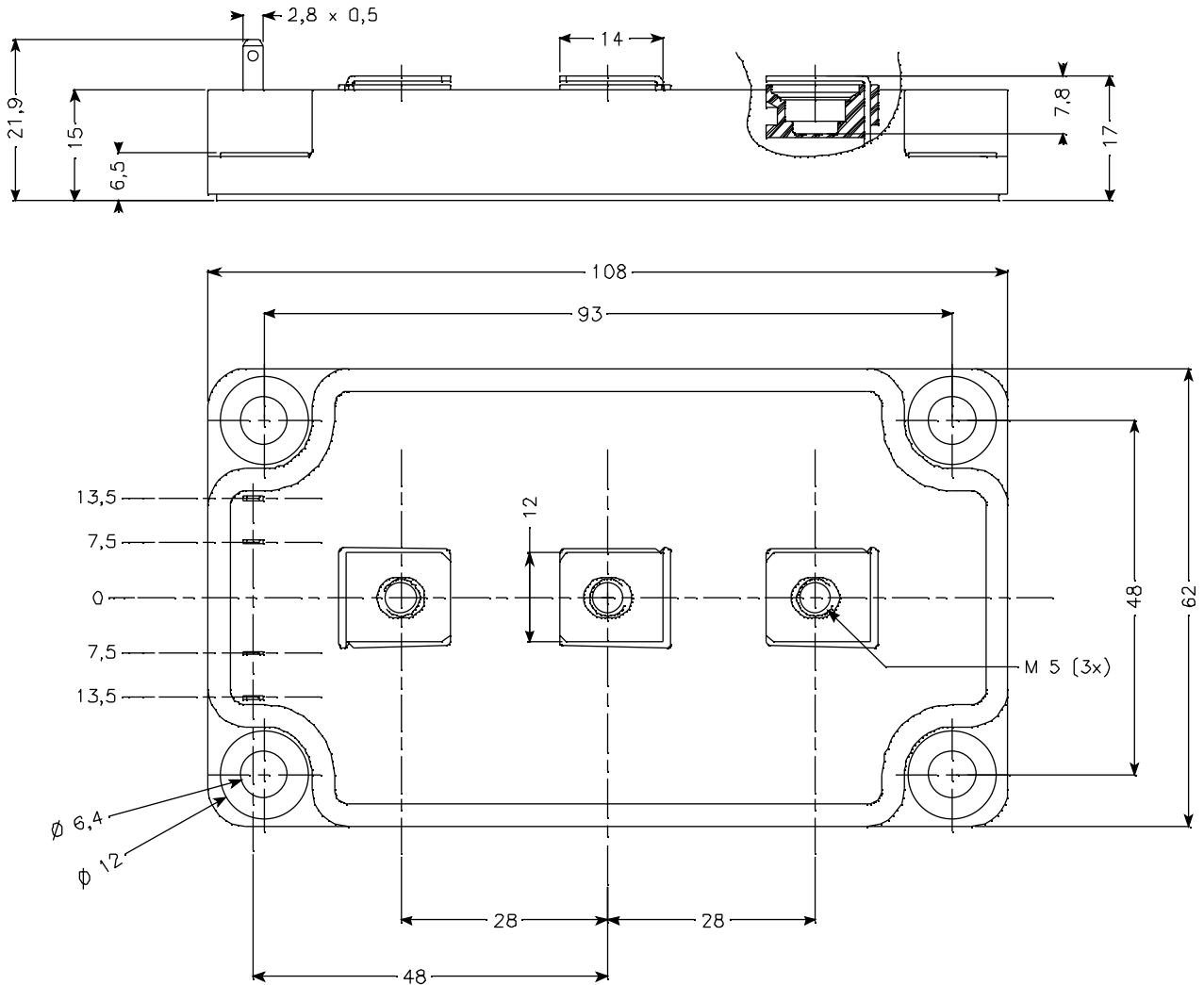
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$			350	μA
					600	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle $T_c = 80^\circ\text{C}$		300		A
V_F	Diode Forward Voltage	$I_F = 300\text{A}$ $V_{GE} = 0\text{V}$		1.5	1.9	V
				1.4		
t_{rr}	Reverse Recovery Time	$I_F = 300\text{A}$ $V_R = 300\text{V}$ $di/dt = 3100\text{A}/\mu\text{s}$		120		ns
					210	
Q_{rr}	Reverse Recovery Charge			13.5		μC
				28.5		

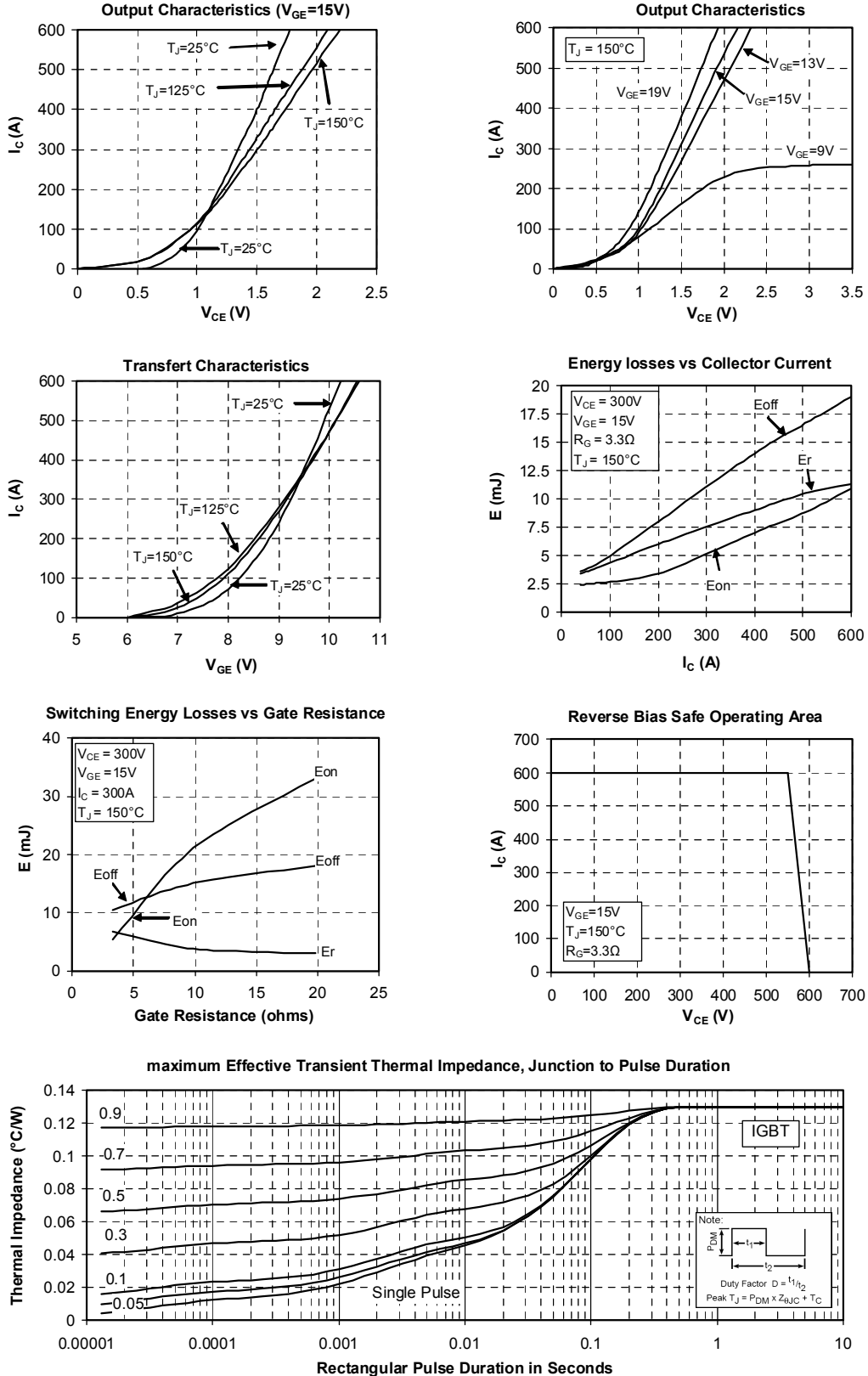
Thermal and package characteristics

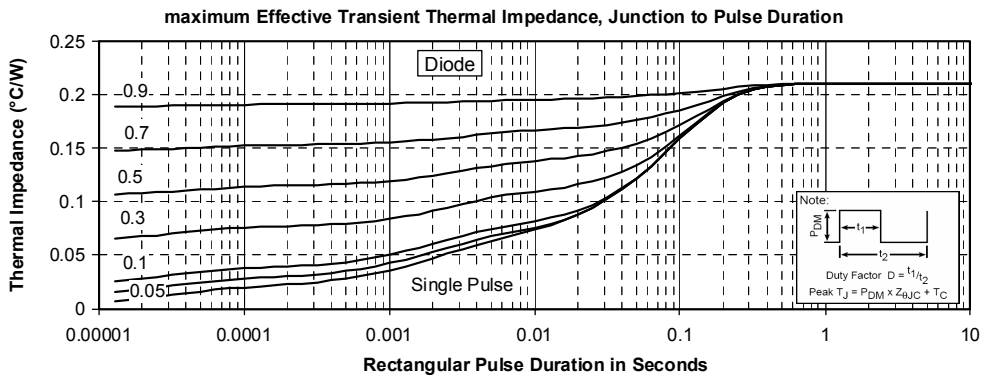
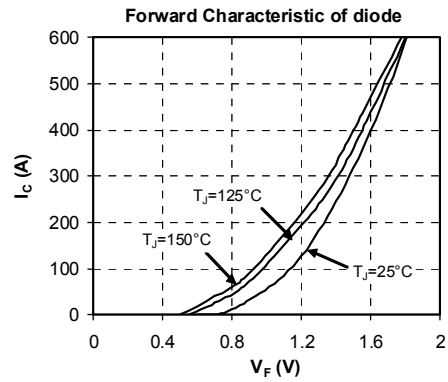
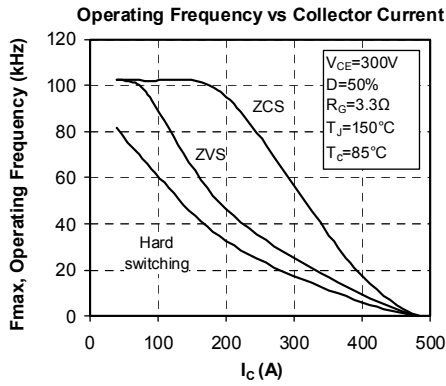
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case	IGBT		0.13	°C/W	
		Diode		0.21		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		175	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight			280	g	

Package outline (dimensions in mm)



Typical Performance Curve





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.