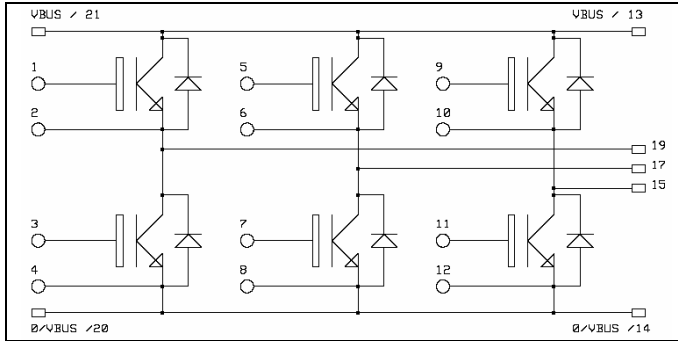


3 Phase bridge Trench + Field Stop IGBT® Power Module

$V_{CES} = 1200V$
 $I_C = 150A @ T_c = 80^\circ C$



Application

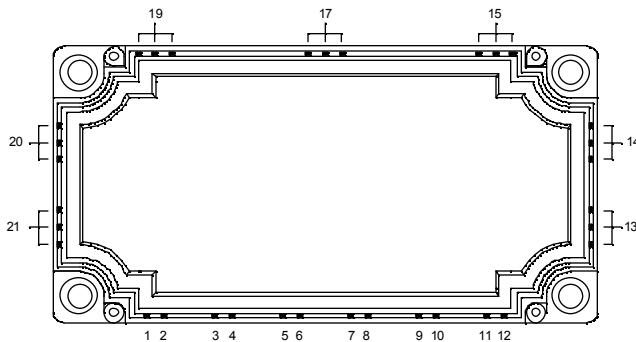
- AC Motor control

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
- High level of integration

Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CEsat}
- Low profile
- RoHS complaint



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	$T_C = 25^\circ C$	350
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	700
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	300A @ 1150V

 **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	$V_{GE} = 0\text{V}$, $V_{CE} = 1200\text{V}$			250	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 150\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.7 2.0	2.1	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 6\text{mA}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		10.8		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		0.56		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.5		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		250		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		30		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$		420		
T_f	Fall Time	$I_C = 150\text{A}$ $R_G = 2.2\Omega$		70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		300		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		50		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$		520		
T_f	Fall Time	$I_C = 150\text{A}$ $R_G = 2.2\Omega$		90		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$	$T_j = 125^\circ\text{C}$	14		mJ
E_{off}	Turn-off Switching Energy	$I_C = 150\text{A}$ $R_G = 2.2\Omega$	$T_j = 125^\circ\text{C}$	17		

Reverse diode ratings and characteristics

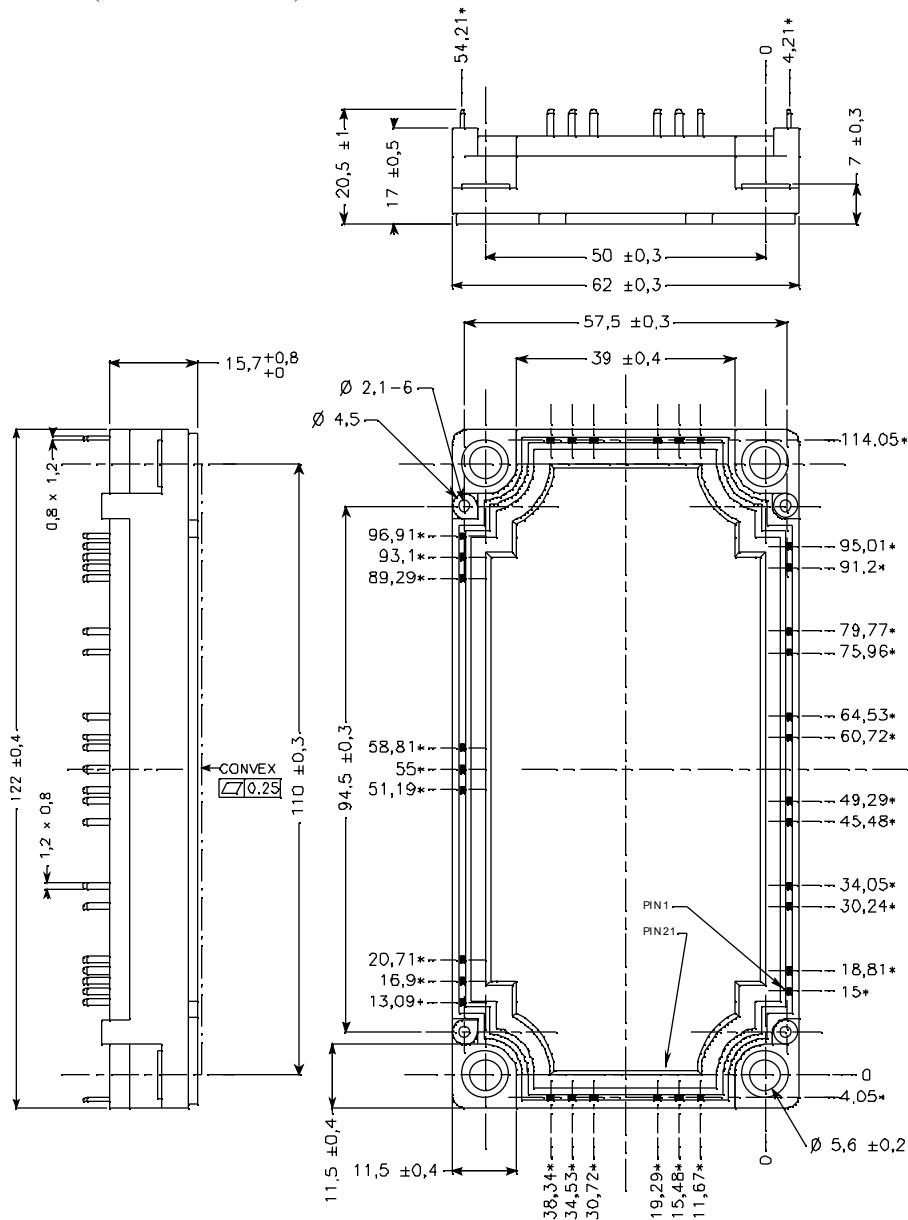
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		250 500	μA
I_F	DC Forward current		$T_c = 80^\circ\text{C}$	150		A
V_F	Diode Forward Voltage	$I_F = 150\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.6 1.6	2.1	V
E_r	Reverse Recovery Energy		$T_j = 125^\circ\text{C}$	12		mJ
t_{rr}	Reverse Recovery Time	$I_F = 150\text{A}$ $V_R = 600\text{V}$ $di/dt = 3000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	170 280		ns
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	15 29		μC

Thermal and package characteristics

Symbol Characteristic

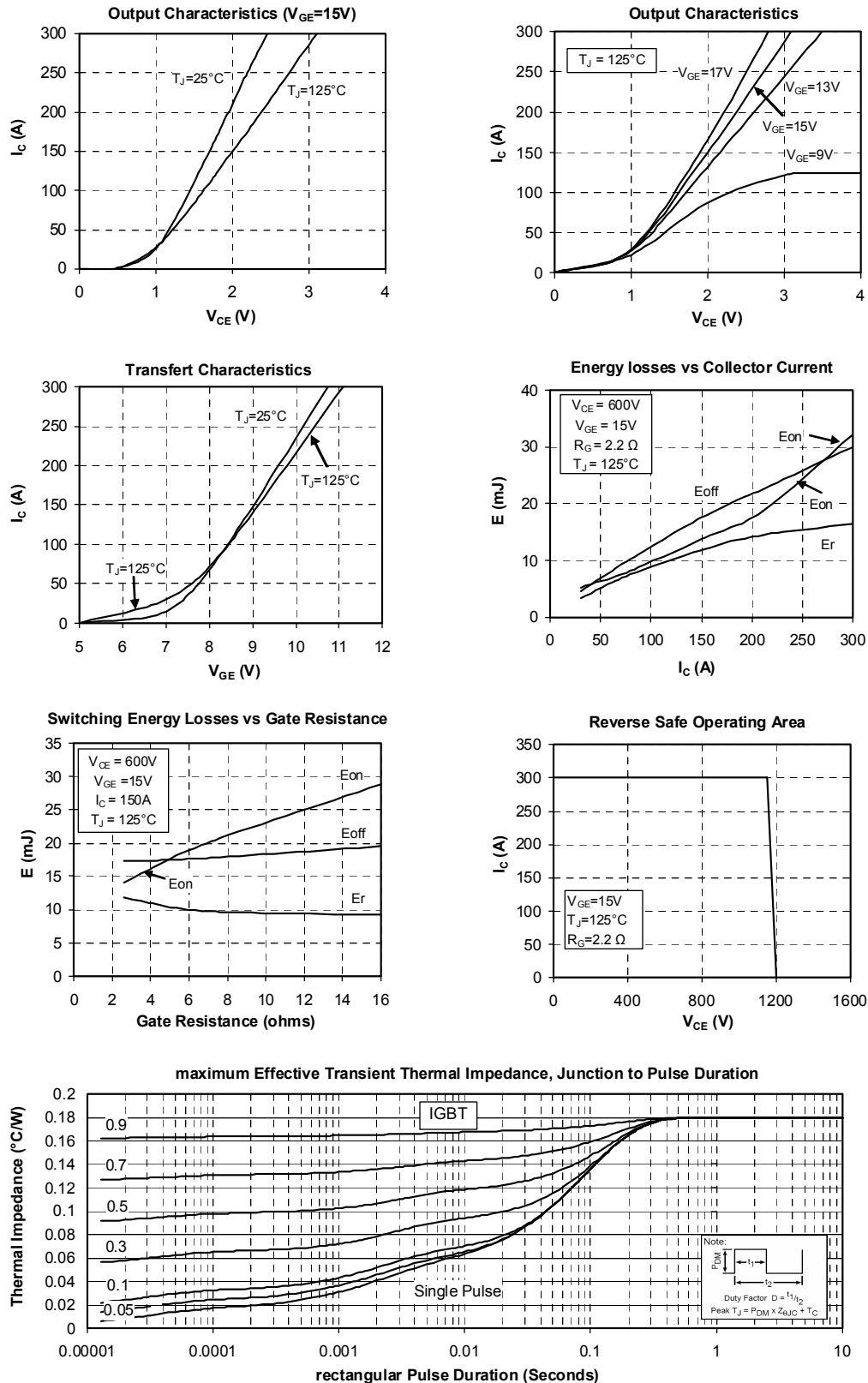
			Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal resistance	IGBT			0.18	°C/W
		Diode			0.34	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, $I_{isol} < 1$ mA, 50/60Hz		2500			V
T_J	Operating junction temperature range		-40		150	°C
T_{STG}	Storage Temperature Range		-40		125	
T_C	Operating Case Temperature		-40		125	
Torque	Mounting torque	To Heatsink M5	3		4.5	N.m
Wt	Package Weight				300	g

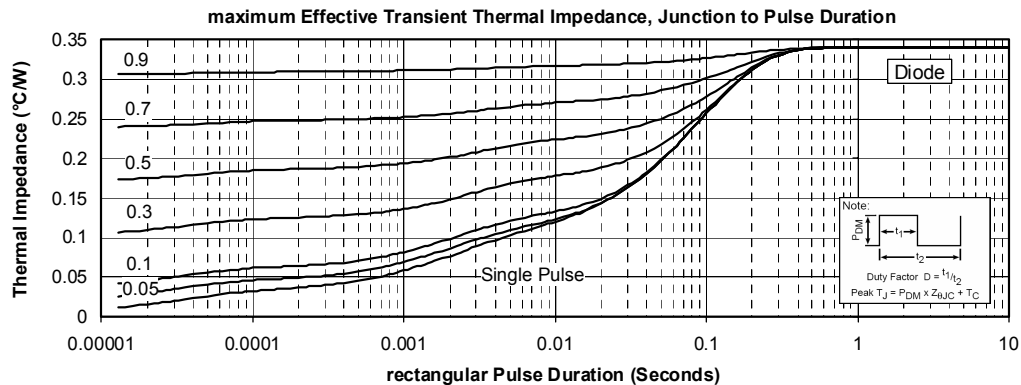
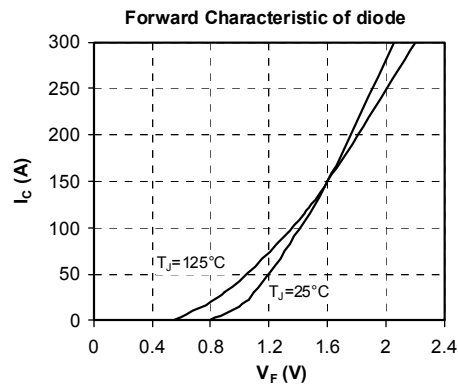
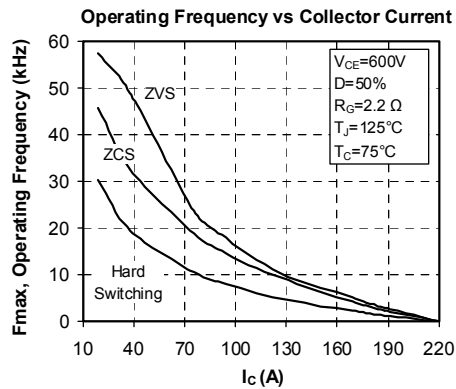
E3 Package outline (dimensions in mm)



ALL DIMENSIONS MARKED *** ARE TOLERANCED AS: $\varnothing 0,4$

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.