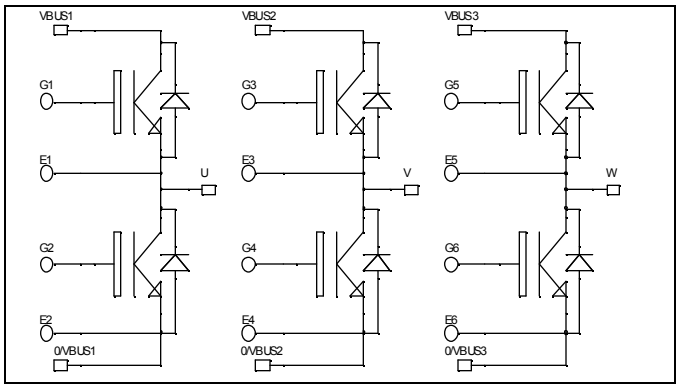
APTGT75TA60P

Triple phase leg
Trench + Field Stop IGBT®
Power Module

V_{CES} = 600V
I_C = 75A @ Tc = 80°C

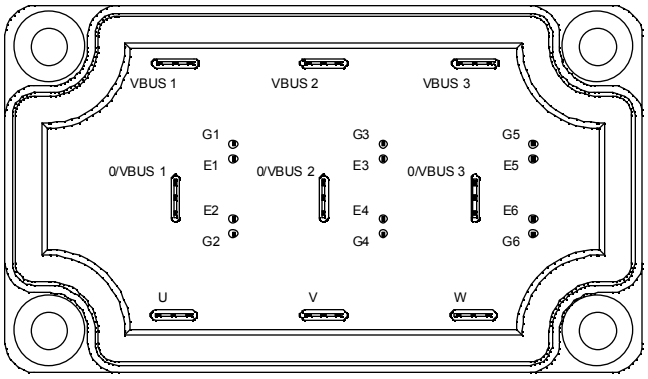


Application

- 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
- Very low stray inductance
  - Symmetrical design
  - Lead frames for power connections
- 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 TC of VCEsat
- Very low (12mm) profile
- Each leg can be easily paralleled to achieve a phase leg of three times the current capability
- Module can be configured as a three phase bridge
- Module can be configured as a boost followed by a full bridge

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{CES}	Collector - Emitter Breakdown Voltage		600	V
I_C	Continuous Collector Current	T_C = 25°C	100	A
		T_C = 80°C	75	
I_{CM}	Pulsed Collector Current	T_C = 25°C	140	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	250	W
RBSOA	Reverse Bias Safe Operating Area	T_J = 150°C	150A @ 550V	

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

All ratings @ T_j = 25°C unless otherwise specified

Electrical Characteristics

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V, V_{CE} = 600V				250	µA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	V_{GE} =15V, I_C = 75A	T_j = 25°C		1.5	1.9	V
			T_j = 150°C		1.7		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE}, I_C = 600µA		5.0	5.8	6.5	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		4620		pF
C_{oes}	Output Capacitance			300		
C_{res}	Reverse Transfer Capacitance			140		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 75A R_G = 12Ω		110		ns
T_r	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			200		
T_f	Fall Time			40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 75A R_G = 12Ω		120		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			250		
T_f	Fall Time			60		
E_{on}	Turn-on Switching Energy			1.3		mJ
E_{off}	Turn-off Switching Energy			2.6		

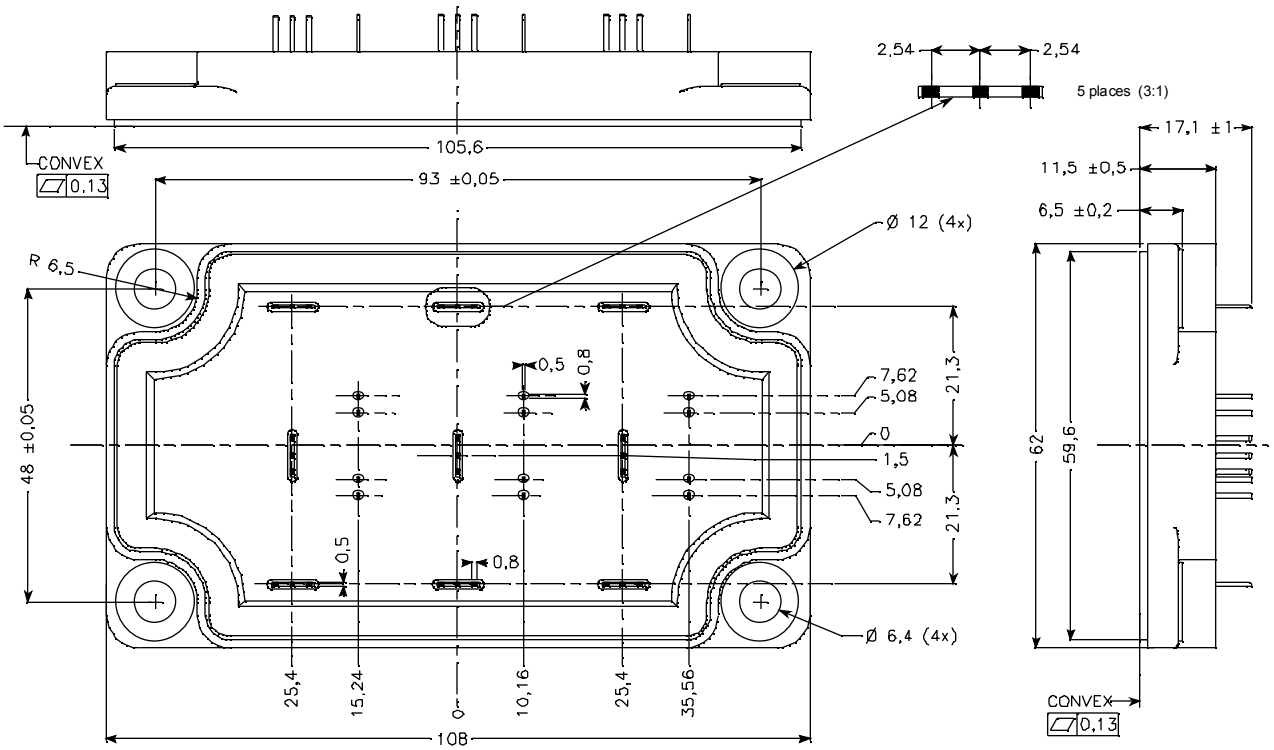
Reverse diode ratings and characteristics

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=600V	T_j = 25°C			250	µA
			T_j = 150°C			500	
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	Tc = 80°C		75		A
V_F	Diode Forward Voltage	I_F = 75A V_{GE} = 0V	T_j = 25°C		1.6	2	
			T_j = 150°C		1.5		V
t_{rr}	Reverse Recovery Time	I_F = 75A V_R = 300V di/dt =2000A/µs	T_j = 25°C		125		ns
			T_j = 150°C		220		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		3.6		µC
			T_j = 150°C		7.6		

Thermal and package characteristics

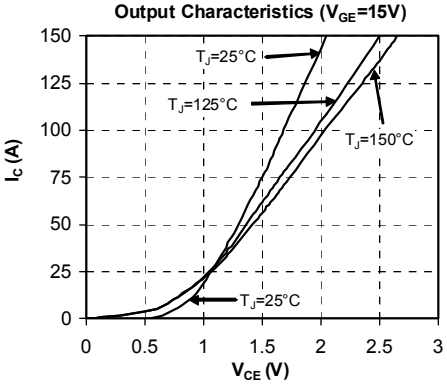
Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case		IGBT			0.60	°C/W
			Diode			0.98	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T_J	Operating junction temperature range			-40		175	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M6	3		5	N.m
Wt	Package Weight					250	g

Package outline (dimensions in mm)

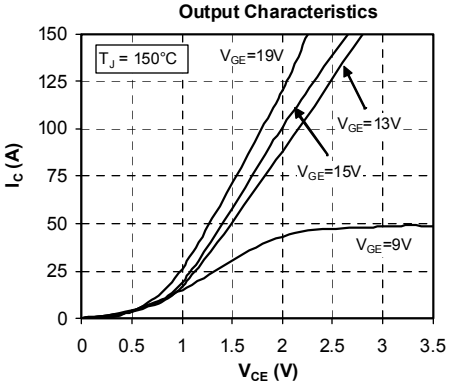


Typical Performance Curve

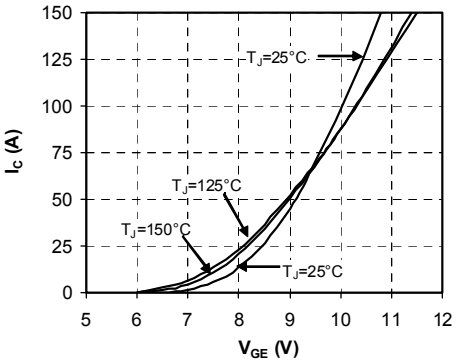
Output Characteristics (V_{GE}=15V)



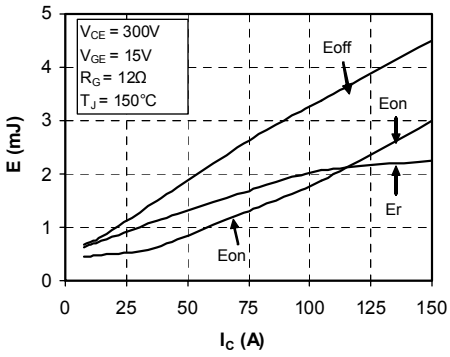
Output Characteristics



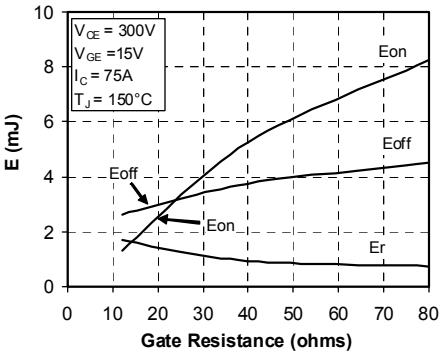
Transfert Characteristics



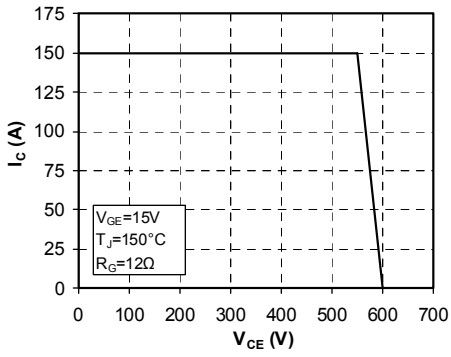
Energy losses vs Collector Current



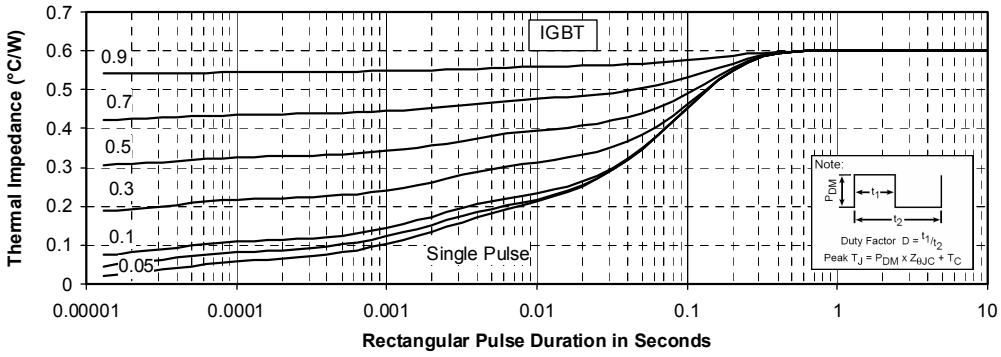
Switching Energy Losses vs Gate Resistance

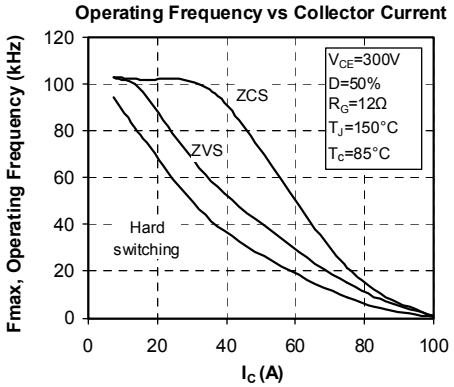


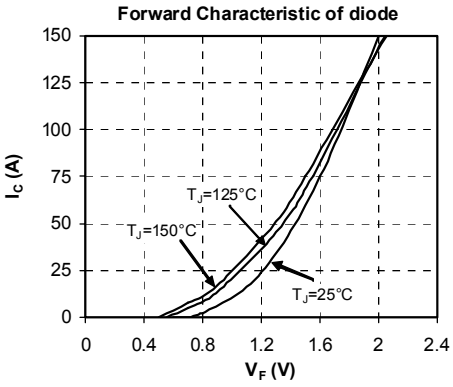
Reverse Bias Safe Operating Area

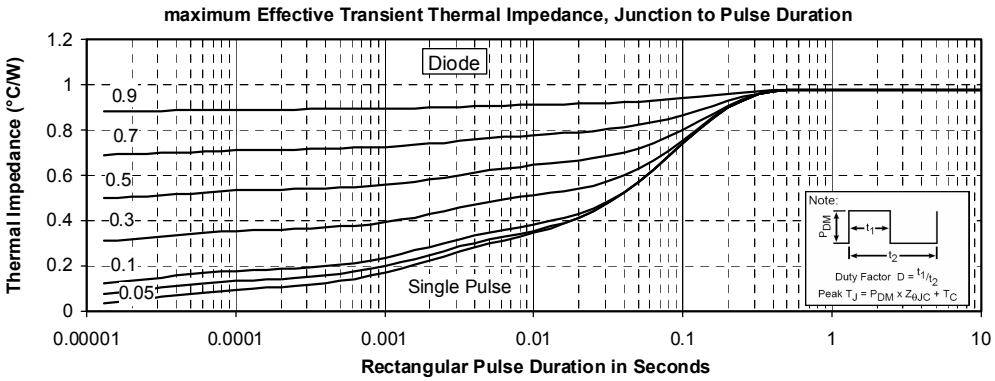


maximum Effective Transient Thermal Impedance, Junction to Pulse Duration









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.