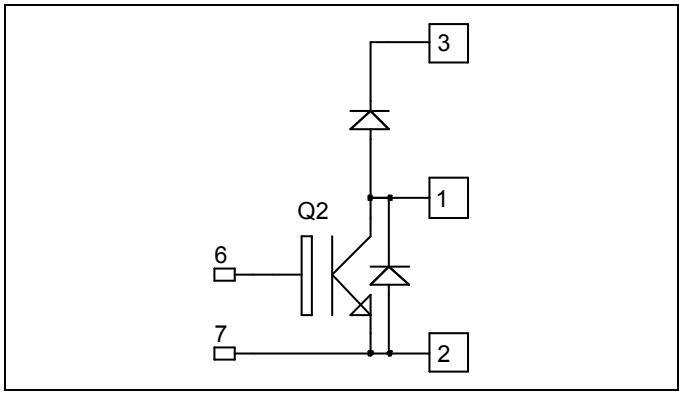
APTGT75DA170D1G

Boost chopper
Trench + Field Stop IGBT
Power Module

V_{CES} = 1700V
I_C = 75A @ Tc = 80°C

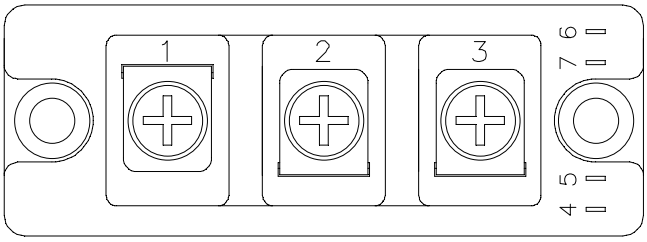


Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

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
  - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- High level of integration
- M5 power connectors



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 VCEsat
- RoHS Compliant

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{CES}	Collector - Emitter Breakdown Voltage		1700	V
I_C	Continuous Collector Current	T_C = 25°C	130	A
		T_C = 80°C	75	
I_{CM}	Pulsed Collector Current	T_C = 25°C	150	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	465	W
RBSOA	Reverse Bias Safe Operating Area	T_j = 125°C	150A @ 1600V	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

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} = 1700V				250	µA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	V_{GE} = 15V, I_C = 75A	T_j = 25°C		2.0	2.4	V
			T_j = 125°C		2.4		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE} , I_C = 3mA		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			6800		pF
C_{oes}	Output Capacitance				277		
C_{res}	Reverse Transfer Capacitance				220		
Q_G	Gate charge	V_{GE}=±15V, I_C=75A V_{CE}=900V			0.85		µC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = 15V V_{Bus} = 900V I_C = 75A R_G = 18Ω			280		ns
T_r	Rise Time				80		
$T_{d(off)}$	Turn-off Delay Time				850		
T_f	Fall Time				120		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) V_{GE} = 15V V_{Bus} = 900V I_C = 75A R_G = 18Ω			300		ns
T_r	Rise Time				100		
$T_{d(off)}$	Turn-off Delay Time				1000		
T_f	Fall Time				200		
E_{on}	Turn-on Switching Energy	V_{GE} = 15V V_{Bus} = 900V I_C = 75A R_G = 18Ω	T_j = 125°C		27		mJ
E_{off}	Turn-off Switching Energy		T_j = 125°C		24.5		
I_{sc}	Short Circuit data	V_{GE} ≤15V ; V_{Bus} = 1000V t_p ≤ 10µs ; T_j = 125°C			300		A

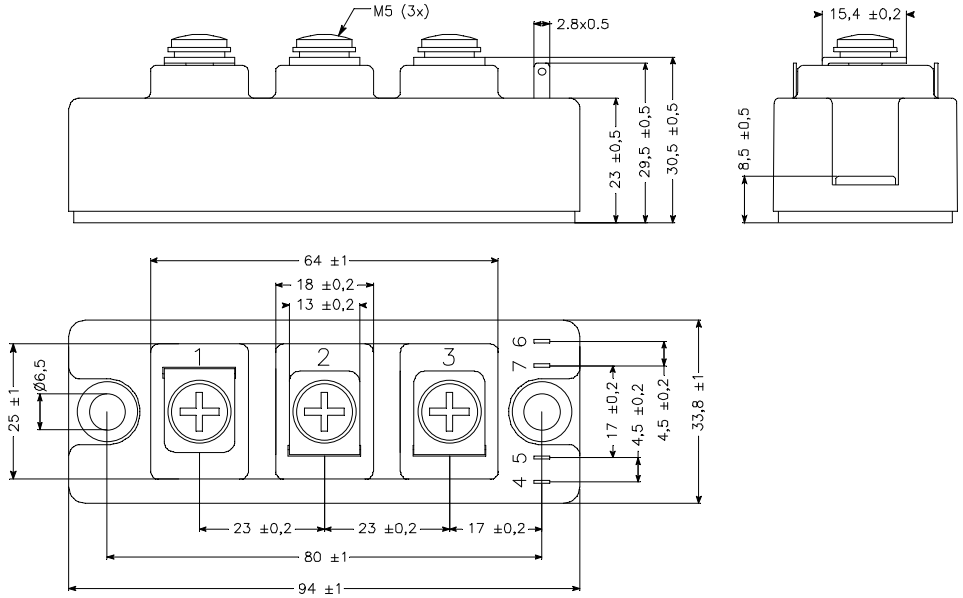
Chopper diode ratings and characteristics

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1700			V
I_{RM}	Maximum Reverse Leakage Current	V_R=1700V	T_j = 25°C			250	µA
			T_j = 125°C			500	
I_F	DC Forward Current		Tc = 80°C		75		A
V_F	Diode Forward Voltage	I_F = 75A	T_j = 25°C		1.8	2.2	V
			T_j = 125°C		1.9		
t_{rr}	Reverse Recovery Time	I_F = 75A V_R = 900V di/dt =800A/µs	T_j = 25°C		410		ns
			T_j = 125°C		520		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		19		µC
			T_j = 125°C		31		
E_{rr}	Reverse Recovery Energy		T_j = 25°C		9		mJ
			T_j = 125°C		17.5		

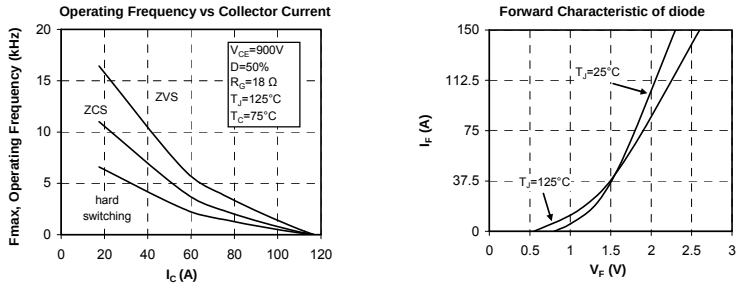
Thermal and package characteristics

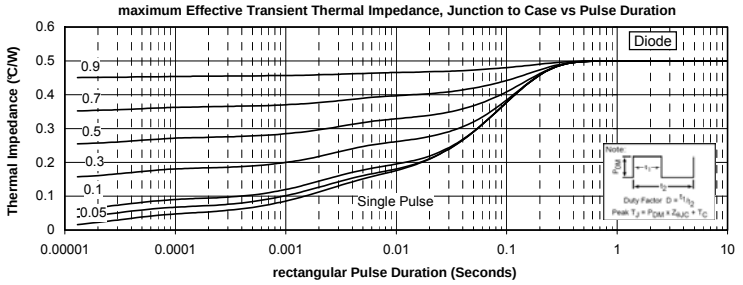
Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance		IGBT			0.27	°C/W
			Diode			0.5	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		150	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		125	
Torque	Mounting torque	For terminals	M5	2		3.5	N.m
		To Heatsink	M6	3		5	
Wt	Package Weight					180	g

D1 Package outline (dimensions in mm)

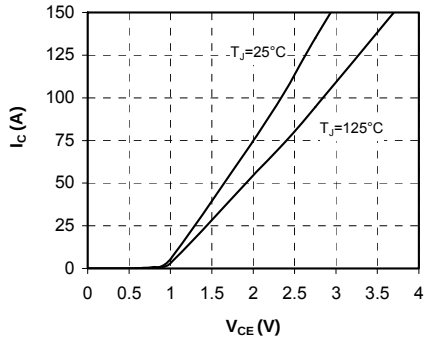


Typical Performance Curve

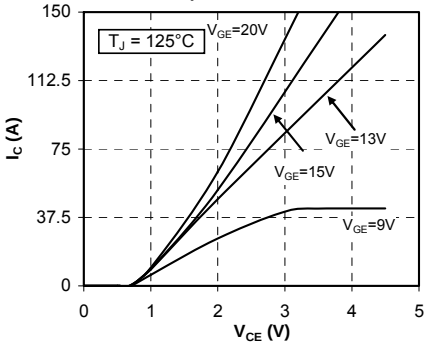




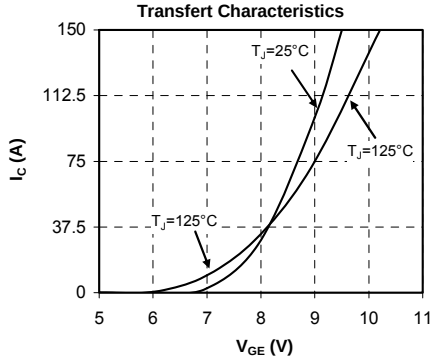
Output Characteristics (V_{GE}=15V)



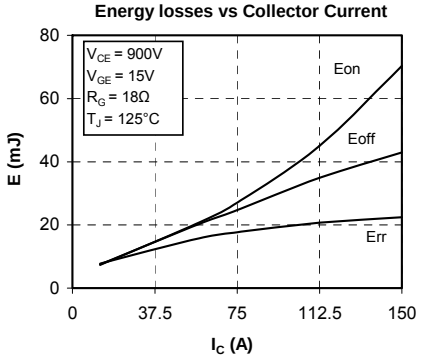
Output Characteristics



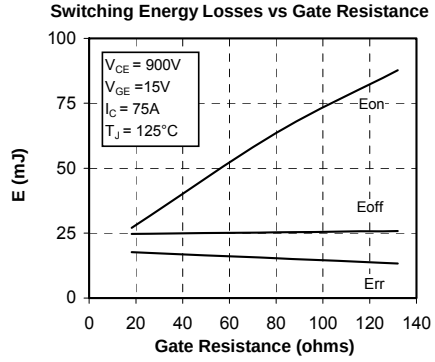
Transfert Characteristics



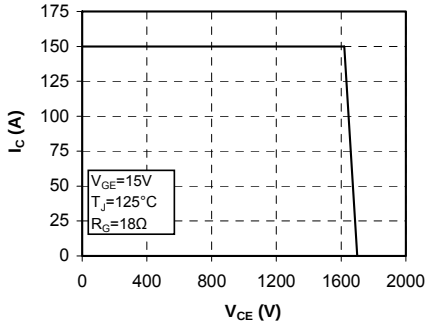
Energy losses vs Collector Current



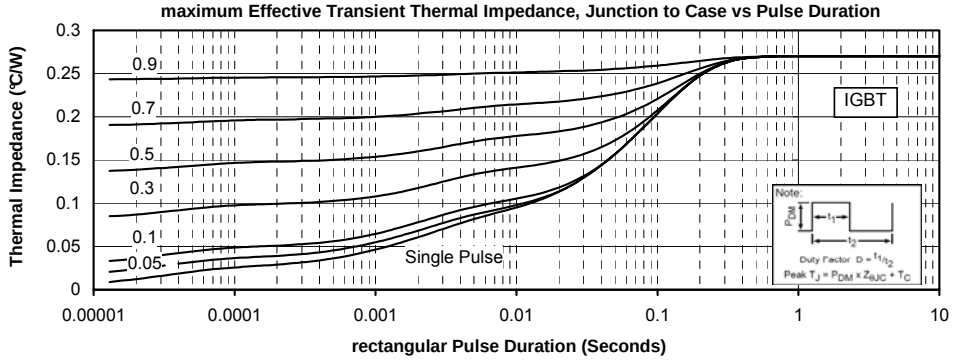
Switching Energy Losses vs Gate Resistance



Reverse Bias Safe Operating Area



maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



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