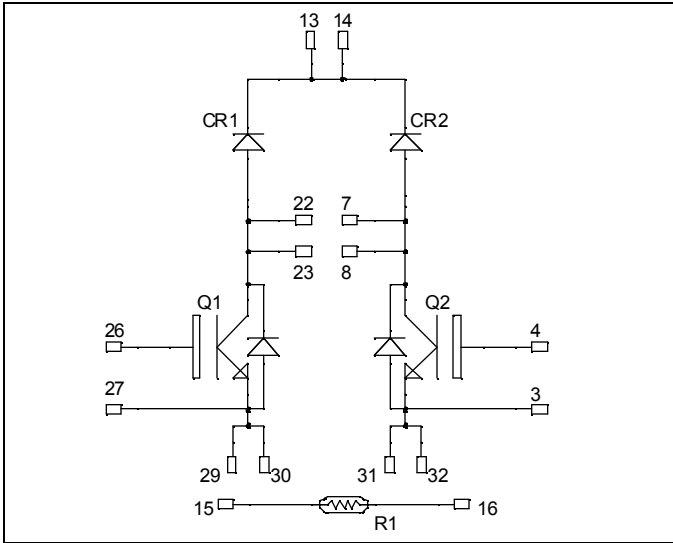


**Dual Boost chopper
PT IGBT Power Module**

**$V_{CES} = 600V$
 $I_C = 30A @ T_c = 80^\circ C$**

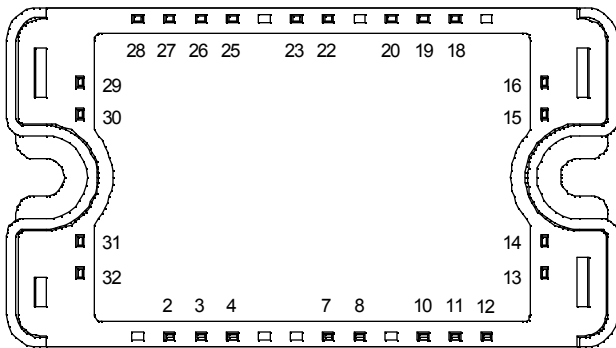


Application

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

Features

- Power MOS 7® Punch Through (PT) IGBT
 - Low conduction loss
 - Ultra fast tail current shutoff
 - Low gate charge
 - Switching frequency capability in the 200kHz range
 - Soft recovery parallel diodes
 - Low diode VF
- Kelvin emitter for easy drive
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration



Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Each leg can be easily paralleled to achieve a single boost of twice the current capability.

All multiple inputs and outputs must be shorted together
Example: 13/14 ; 29/30 ; 22/23 ...

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	48
		$T_c = 80^\circ C$	30
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	120
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	156
SSOA	Switching Safe Operating Area	$T_j = 150^\circ C$	120A @ 600V

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

All ratings @ T_j = 25°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 = 500μA	600			V
I _{CES}	Zero Gate Voltage Collector Current	V _{GE} = 0V V _{CE} = 600V			500 3000	μA
V _{CE(on)}	Collector Emitter on Voltage	V _{GE} = 15V I _C = 30 A		2.2 2.1	2.7	V
V _{GE(th)}	Gate Threshold Voltage	V _{GE} = V _{CE} , I _C = 1mA	3		6	V
I _{GES}	Gate - Emitter Leakage Current	V _{GE} = ±20V, V _{CE} = 0V			±100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{ies}	Input Capacitance	V _{GE} = 0V		3200		pF
C _{oes}	Output Capacitance	V _{CE} = 25V		295		
C _{res}	Reverse Transfer Capacitance	f = 1MHz		20		
Q _g	Total gate Charge	V _{GE} = 15V		90		nC
Q _{ge}	Gate - Emitter Charge	V _{Bus} = 300V		20		
Q _{gc}	Gate - Collector Charge	I _C = 30A		30		
T _{d(on)}	Turn-on Delay Time	Inductive Switching (25°C)		13		ns
T _r	Rise Time	V _{GE} = 15V		18		
T _{d(off)}	Turn-off Delay Time	V _{Bus} = 400V		55		
T _f	Fall Time	I _C = 30A		46		
E _{on1}	Turn-on Switching Energy	R _G = 5Ω		260		
E _{on2}	Turn-on Switching Energy ❶			335		μJ
E _{off}	Turn-off Switching Energy ❷			250		
T _{d(on)}	Turn-on Delay Time	Inductive Switching (125°C)		13		
T _r	Rise Time	V _{GE} = 15V		18		
T _{d(off)}	Turn-off Delay Time	V _{Bus} = 400V		84		
T _f	Fall Time	I _C = 30A		80		
E _{on1}	Turn-on Switching Energy	R _G = 5Ω		260		
E _{on2}	Turn-on Switching Energy ❶			508		μJ
E _{off}	Turn-off Switching Energy ❷			518		

❶ E_{on2} includes diode reverse recovery

❷ In accordance with JEDEC standard JESD24-1

Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		68		kΩ
B _{25/85}	T ₂₅ = 298.16 K		4080		K

$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

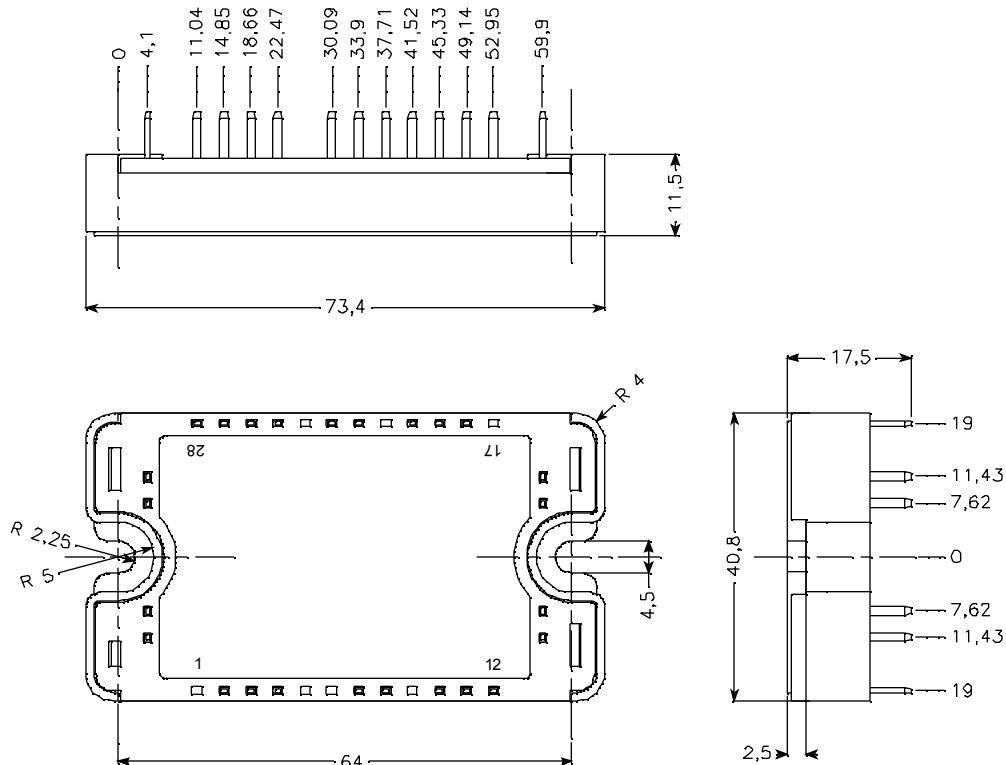
Diode ratings and characteristics

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 = 125°C			500	
I _{F(AV)}	Maximum Average Forward Current	50% duty cycle	T _c = 85°C		30		A
V _F	Diode Forward Voltage	I _F = 30A			2.2	2.7	V
		I _F = 60A			2.7		
		I _F = 30A	T _j = 150°C		1.5		
t _{rr}	Reverse Recovery Time	I _F = 30A V _R = 400V di/dt = 200A/µs	T _j = 25°C		74		ns
			T _j = 100°C		74		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		123		nC
			T _j = 100°C		288		

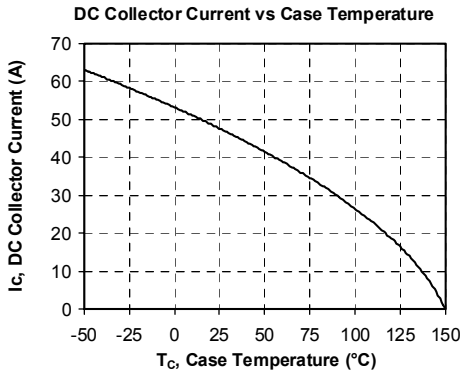
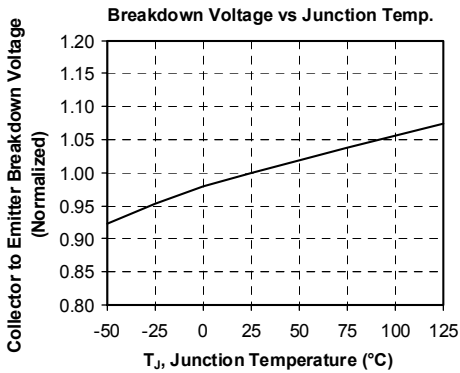
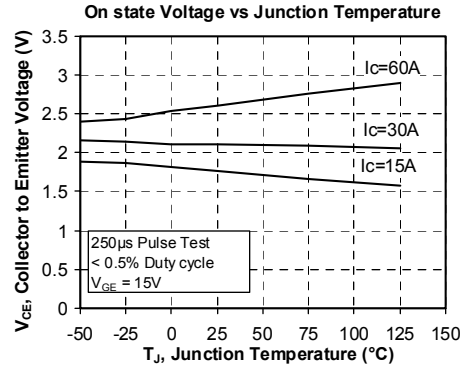
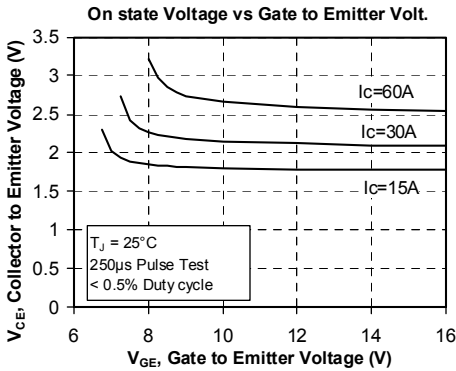
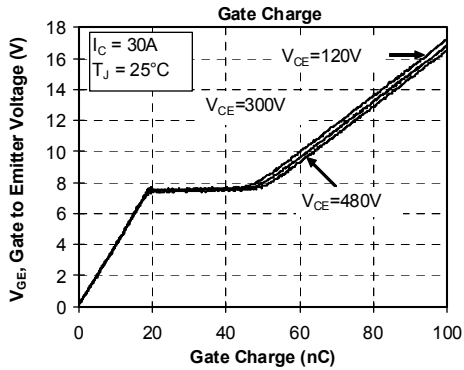
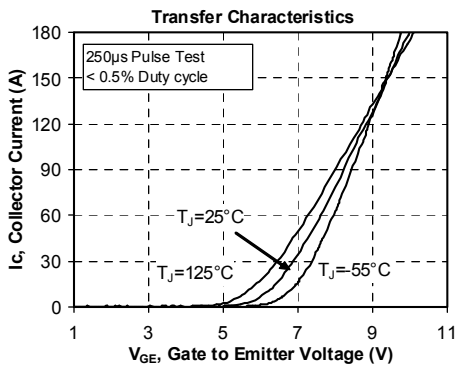
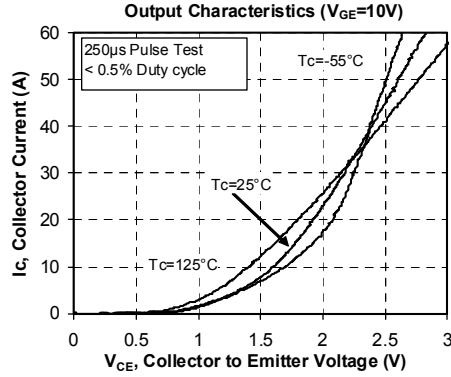
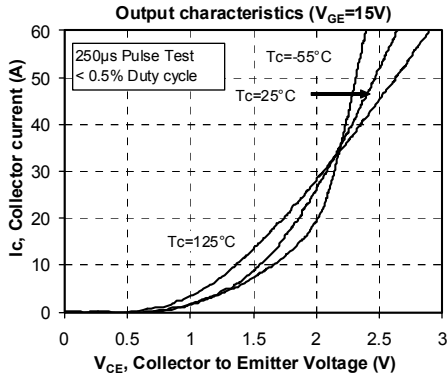
Thermal and package characteristics

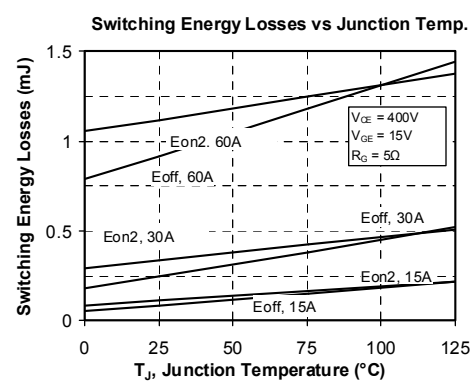
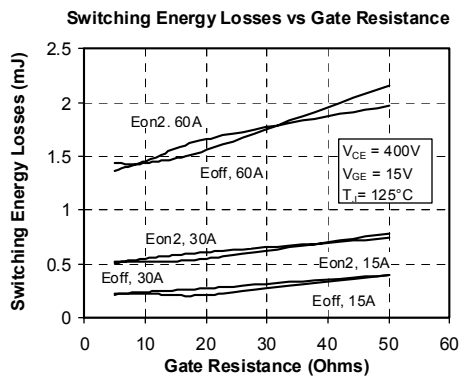
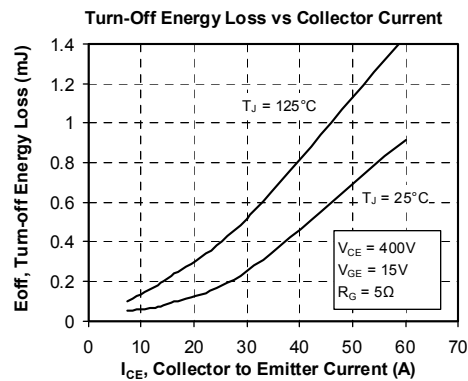
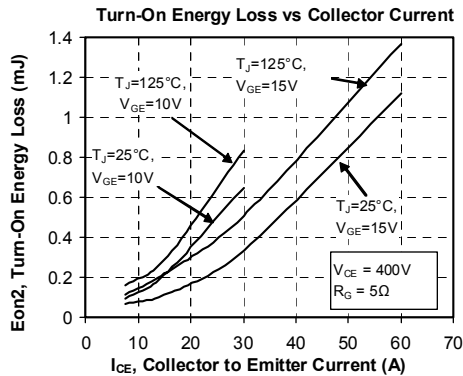
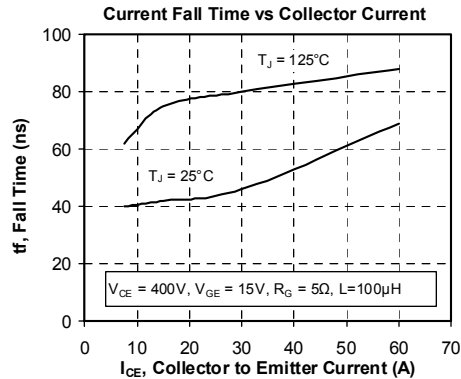
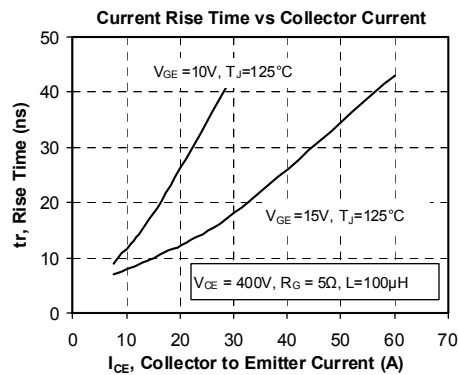
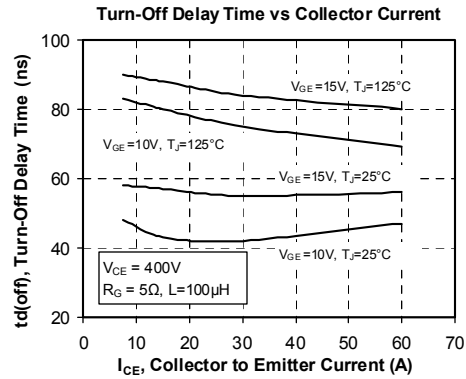
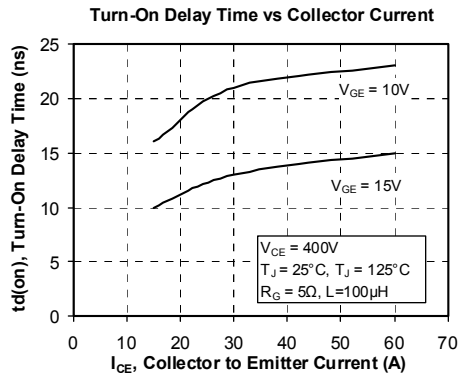
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case	IGBT			0.8	°C/W
		Diode			1.2	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz		2500			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M4		4.7	N.m
Wt	Package Weight				110	g

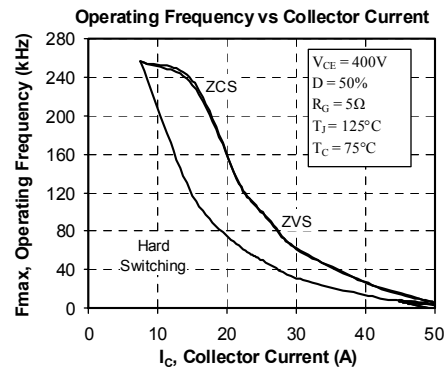
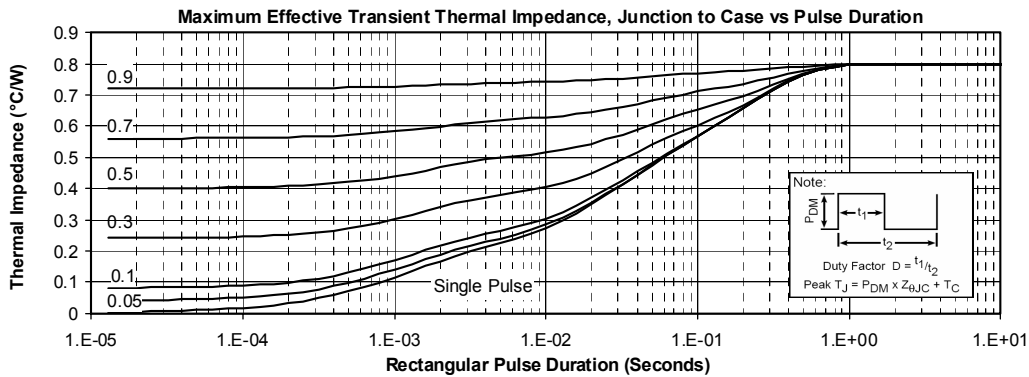
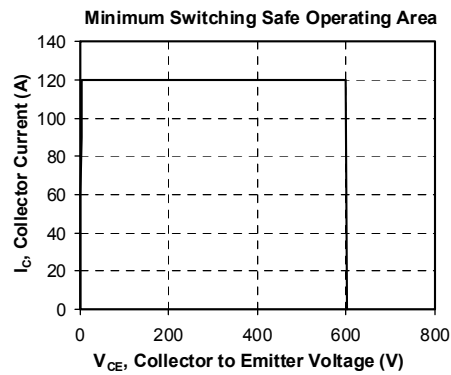
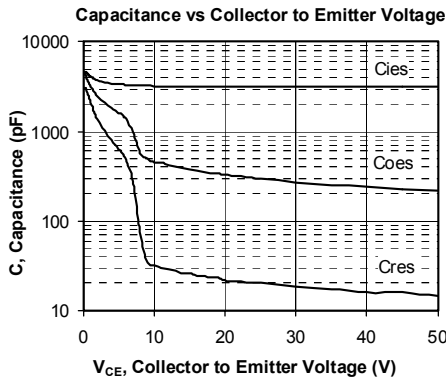
Package outline



Typical Performance Curve







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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.