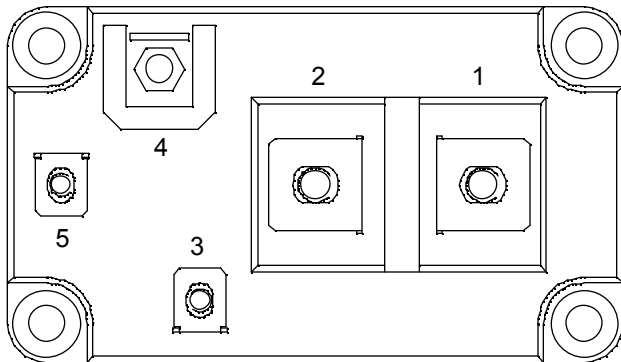
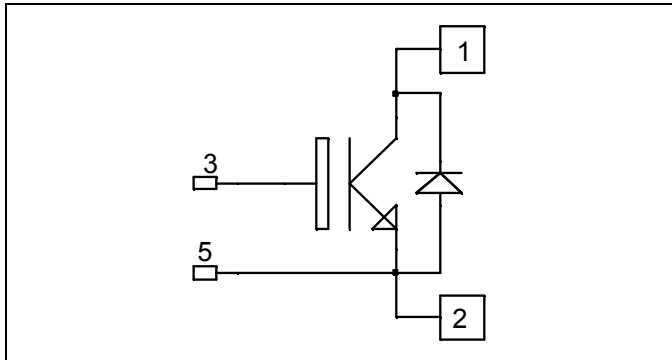


*Single switch
Trench + Field Stop IGBT®
Power Module*

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**$V_{CES} = 1700V$
 $I_C = 300A @ T_c = 80°C$**



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
- Low stray inductance
 - M6 connectors for power
 - M4 connectors for signal
- High level of integration

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 T_C of V_{CESat}
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1700	V
I_C	Continuous Collector Current	$T_C = 25°C$	530
		$T_C = 80°C$	300
I_{CM}	Pulsed Collector Current	$T_C = 25°C$	600
V_{GE}	Gate - Emitter Voltage	±20	V
P_D	Maximum Power Dissipation	$T_C = 25°C$	1470
RBSOA	Reverse Bias Safe Operation Area	$T_j = 125°C$	600A@1650V

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	$V_{GE} = 0\text{V}, V_{CE} = 1700\text{V}$			1	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 300\text{A}$	$T_j = 25^\circ\text{C}$	2.0	2.4	V
			$T_j = 125^\circ\text{C}$	2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 12\text{mA}$	5.2	5.8	6.4	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$		25		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.9		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 300\text{A}$ $R_G = 4.7\Omega$		280		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			750		
T_f	Fall Time			100		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 300\text{A}$ $R_G = 4.7\Omega$		330		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			900		
T_f	Fall Time			200		
E_{on}	Turn On Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 300\text{A}$	$T_j = 125^\circ\text{C}$	115		mJ
E_{off}	Turn Off Energy	$R_G = 4.7\Omega$	$T_j = 125^\circ\text{C}$	95		

Reverse 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	$V_R = 1700\text{V}$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC forward current		$T_c = 80^\circ\text{C}$	300		A
V_F	Forward Voltage	$I_F = 300\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.8	2.2	V
			$T_j = 125^\circ\text{C}$	1.9		
E_r	Reverse Recovery Energy	$I_F = 300\text{A}$ $V_R = 900\text{V}$ $di/dt = 3500\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	35		mJ
			$T_j = 125^\circ\text{C}$	70		
t_{rr}	Reverse Recovery Time		$T_j = 25^\circ\text{C}$	410		ns
			$T_j = 125^\circ\text{C}$	520		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	75		μC
		$T_j = 125^\circ\text{C}$	125			

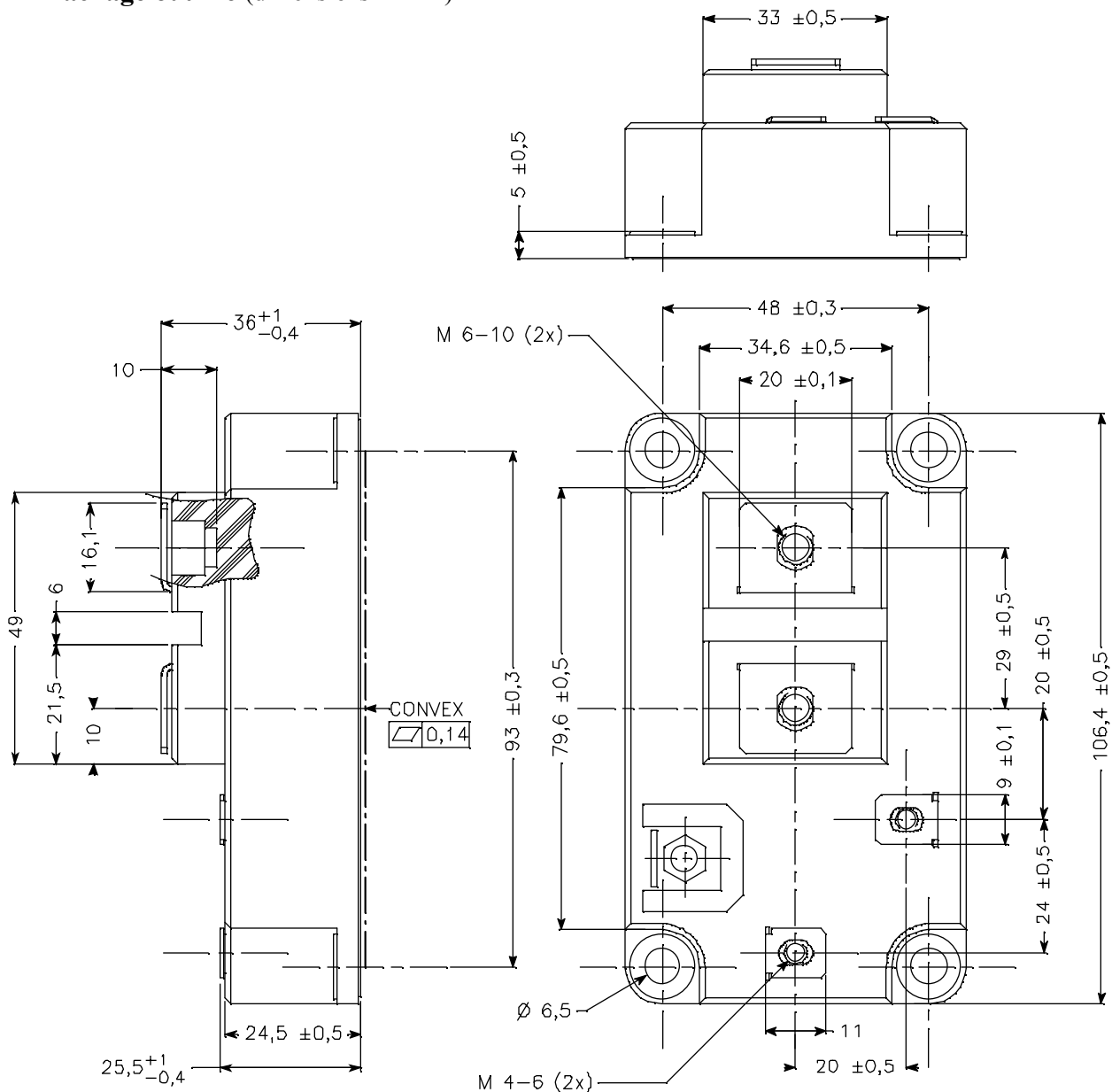
Thermal and package characteristics

Symbol Characteristic

Min Typ Max Unit

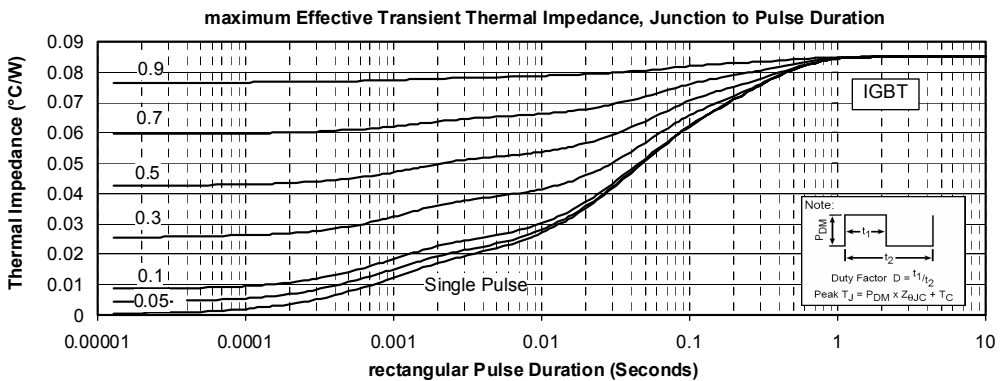
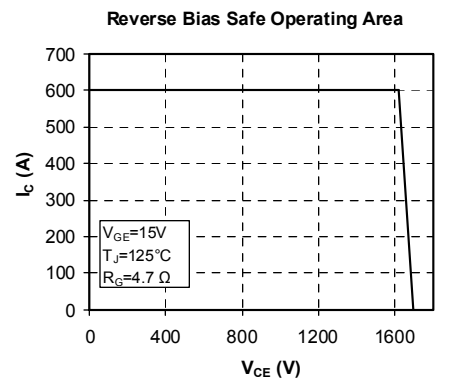
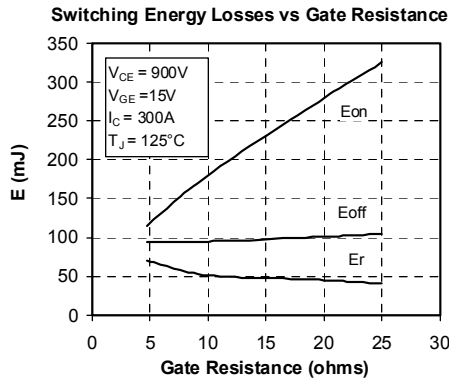
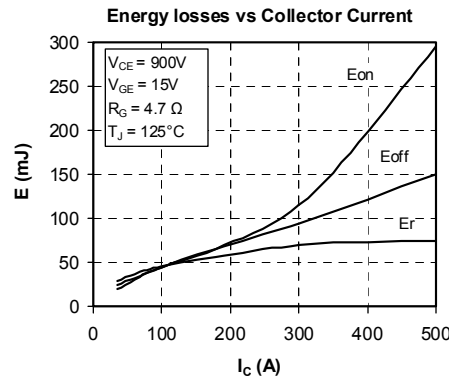
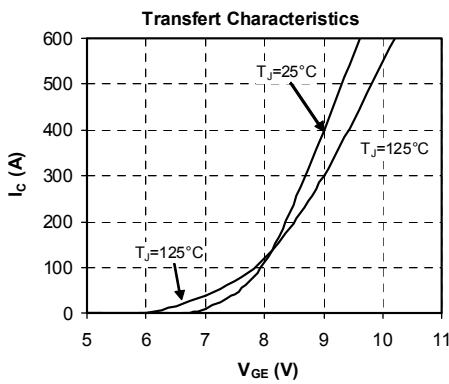
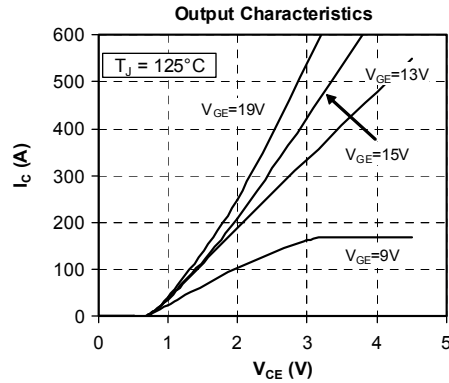
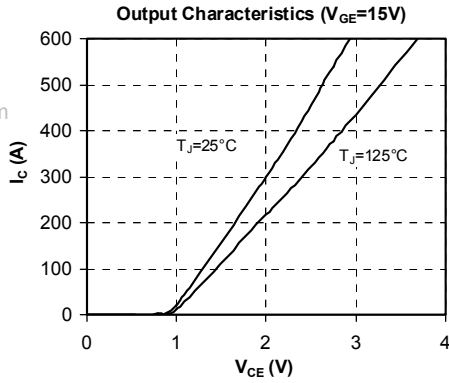
<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.085	°C/W
		Diode		0.13	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	3500			V
T _J	Operating junction temperature range	-40		150	°C
T _{STG}	Storage Temperature Range	-40		125	
T _C	Operating Case Temperature	-40		125	
Torque	Mounting torque	M6	3	5	N.m
		M4	1	2	
Wt	Package Weight			420	g

D4 Package outline (dimensions in mm)

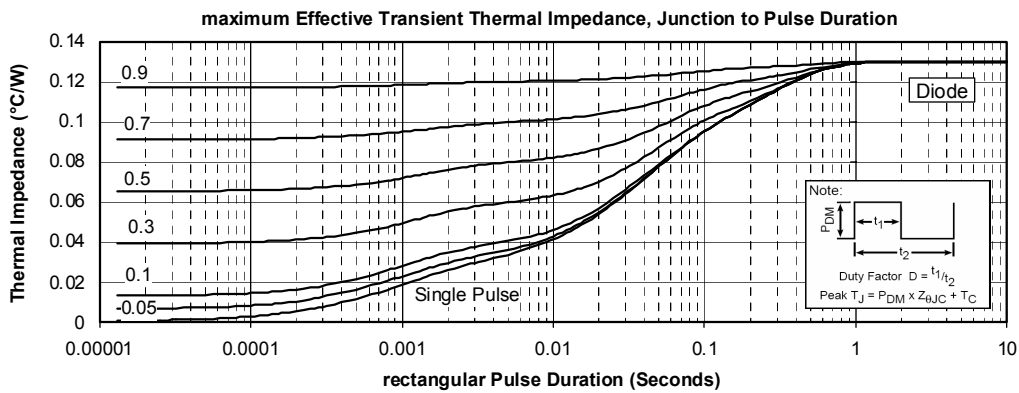
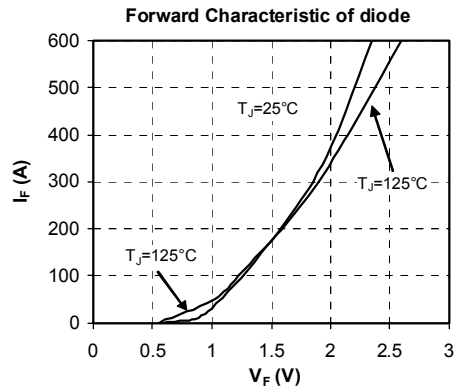
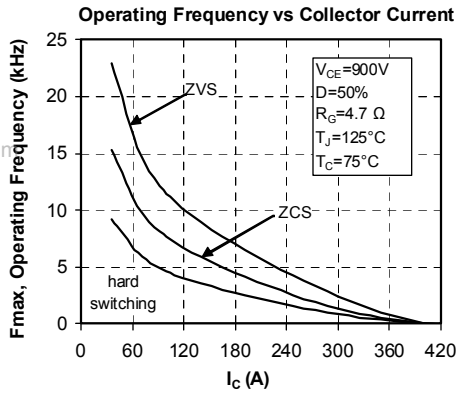


Typical Performance Curve

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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.