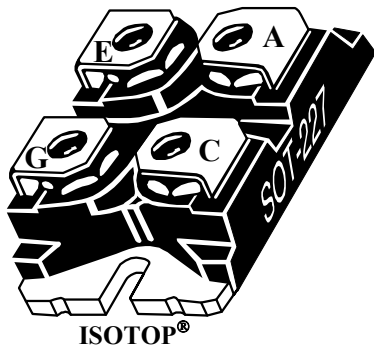
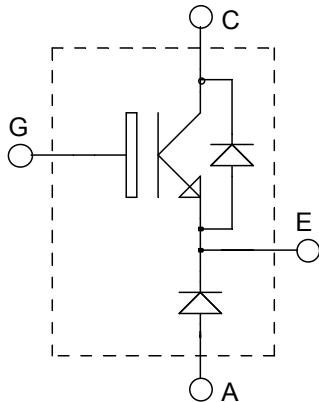


**ISOTOP® buck chopper
High speed Trench + Field
Stop IGBT4 Power Module**

**$V_{CES} = 650V$
 $I_C = 100A^* @ T_c = 80^\circ C$**



Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- **High speed Trench + Field Stop IGBT 4**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
- ISOTOP® Package (SOT-227)
- Very low stray inductance

Benefits

- Low conduction losses
- Stable temperature behavior
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CEsat}
- RoHS Compliant

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Voltage	650	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	165*
		$T_C = 80^\circ C$	100*
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	270
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Power Dissipation	430	W

* Specification of IGBT device but output current must be limited due to size of output pins.

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{CEs}	Zero Gate Voltage Collector Current	V _{GE} = 0V, V _{CE} = 650V			50	μA
V _{CE(sat)}	Collector Emitter Saturation Voltage	V _{GE} = 15V I _C = 100A	1.4	1.85 2.2	2.3	V
V _{GE(th)}	Gate Threshold Voltage	V _{GE} = V _{CE} , I _C = 1.6 mA	4.2	5.1	5.6	V
I _{GES}	Gate – Emitter Leakage Current	V _{GE} = 20V, V _{CE} = 0V			150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{ies}	Input Capacitance	V _{GE} = 0V		6100		pF
C _{oes}	Output Capacitance	V _{CE} = 25V		232		
C _{res}	Reverse Transfer Capacitance	f = 1MHz		180		
Q _G	Gate charge	V _{GE} = 15V, I _C = 100A V _{CE} = 480V		630		nC
T _{d(on)}	Turn-on Delay Time	Inductive Switching (25°C) V _{GE} = ±15V V _{Bus} = 400V I _C = 100A R _G = 3.6Ω		19		ns
T _r	Rise Time			33		
T _{d(off)}	Turn-off Delay Time			197		
T _f	Fall Time			21		
T _{d(on)}	Turn-on Delay Time	Inductive Switching (150°C) V _{GE} = ±15V V _{Bus} = 400V I _C = 100A R _G = 3.6Ω		19		ns
T _r	Rise Time			29		
T _{d(off)}	Turn-off Delay Time			227		
T _f	Fall Time			22		
E _{on}	Turn on Energy	V _{GE} = ±15V V _{Bus} = 400V I _C = 100A		2.4		mJ
E _{off}	Turn off Energy	R _G = 3.6Ω		2		
R _G	Integrated gate resistor			2		Ω
I _{sc}	Short Circuit data	V _{GE} ≤ 15V ; V _{Bus} = 400V t _p ≤ 5μs ; T _j = 150°C		700		A
R _{thJC}	Junction to Case Thermal Resistance				0.35	°C/W

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Peak Repetitive Reverse Voltage				650	V
I _{RM}	Reverse Leakage Current	V _R = 650V			50	μA
I _F	DC Forward Current	T _c = 60°C		50		A
V _F	Diode Forward Voltage	I _F = 50A V _{GE} = 0V		1.6 1.5	2	V
t _{rr}	Reverse Recovery Time	I _F = 50A V _R = 300V di/dt = 1800A/μs		100 150		ns
Q _{rr}	Reverse Recovery Charge			2.6 5.4		
E _{rr}	Reverse Recovery Energy			0.6 1.2		mJ
R _{thJC}	Junction to Case Thermal Resistance					

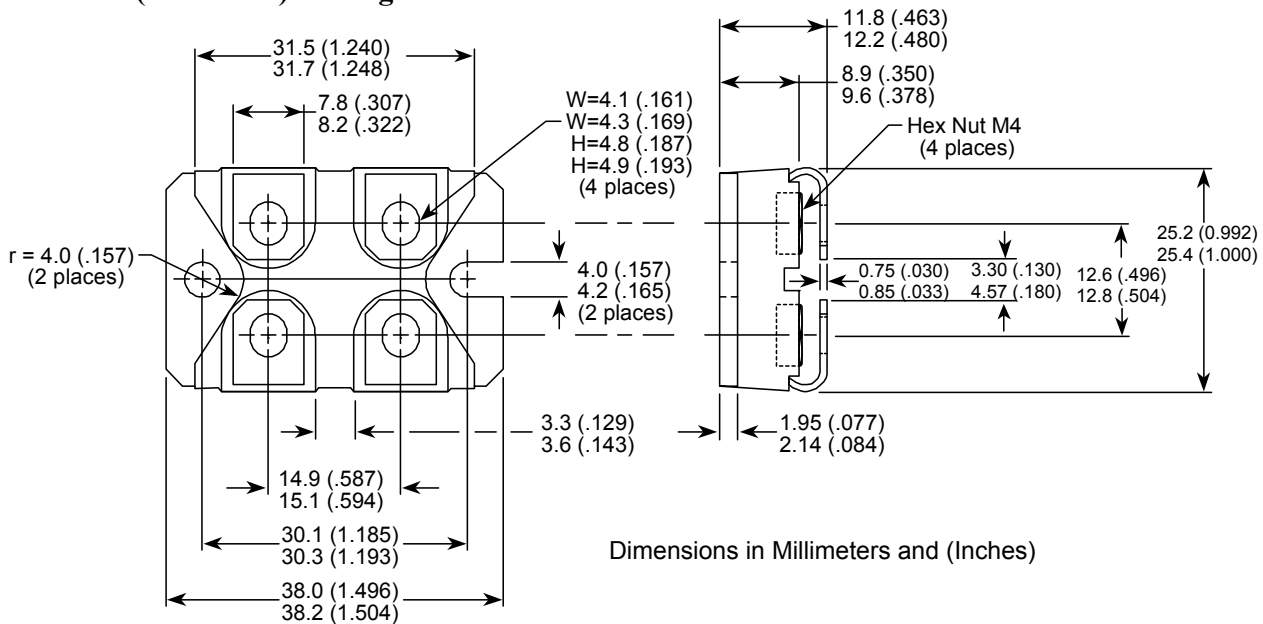
IGBT parallel diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Peak Repetitive Reverse Voltage				650	V
I _{RM}	Reverse Leakage Current	V _R = 650V			50	μA
I _F	DC Forward Current	T _c = 60°C		20		A
V _F	Diode Forward Voltage	I _F = 20A V _{GE} = 0V	T _j = 25°C	1.6	2	V
			T _j = 150°C	1.5		
t _{rr}	Reverse Recovery Time	I _F = 20A V _R = 300V di/dt = 1600A/μs	T _j = 25°C	100		ns
			T _j = 150°C	150		
Q _{rr}	Reverse Recovery Charge	I _F = 20A V _R = 300V di/dt = 1600A/μs	T _j = 25°C	1.1		μC
			T _j = 150°C	2.3		
E _{rr}	Reverse Recovery Energy	I _F = 20A V _R = 300V di/dt = 1600A/μs	T _j = 25°C	0.23		mJ
			T _j = 150°C	0.50		
R _{thJC}	Junction to Case Thermal Resistance				2.6	°C/W

Thermal and package characteristics

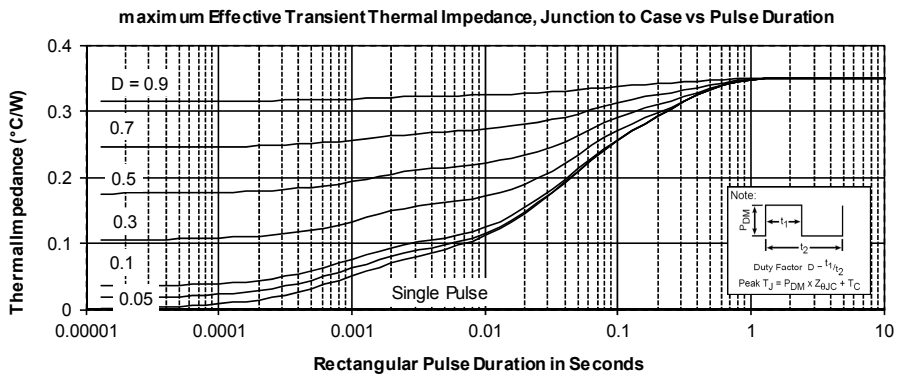
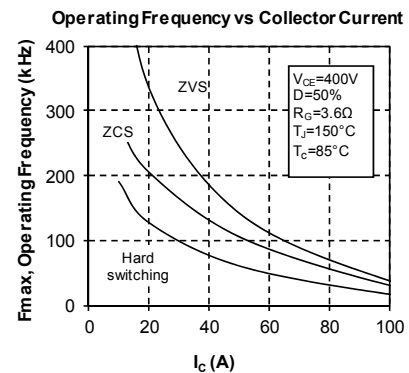
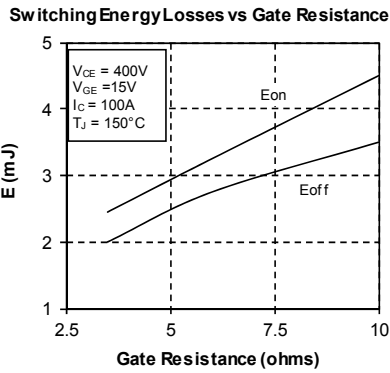
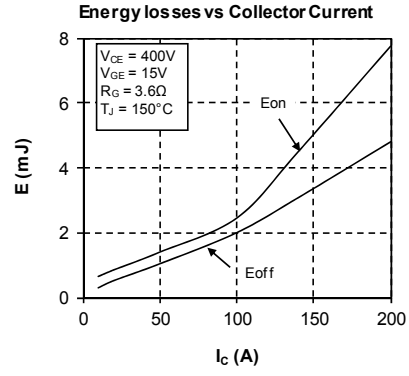
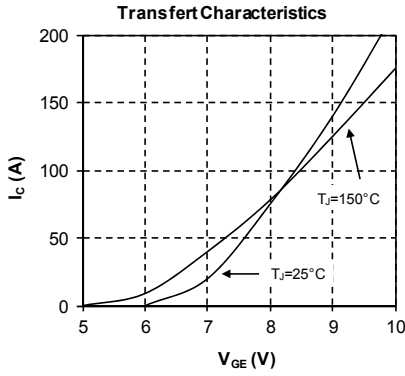
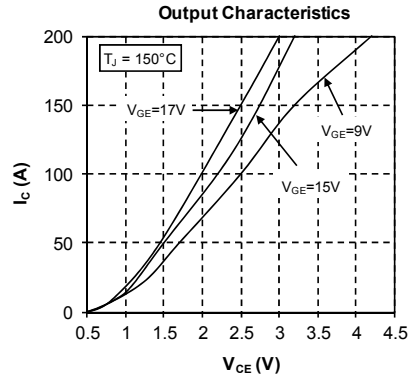
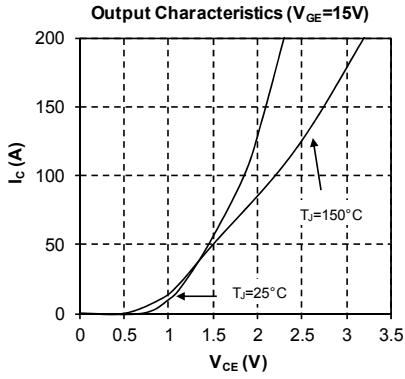
Symbol	Characteristic	Min	Typ	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	2500			V
T _J , T _{STG}	Storage Temperature Range	-55		175	°C
T _{JOP}	Recommended junction temperature under switching conditions	-55		T _j max -25	
T _L	Max Lead Temp for Soldering: 0.063" from case for 10 sec			300	
Torque	Mounting torque (Mounting = 8-32 or 4mm Machine and terminals = 4mm Machine)			1.5	N.m
Wt	Package Weight		29.2		g

SOT-227 (ISOTOP®) Package Outline

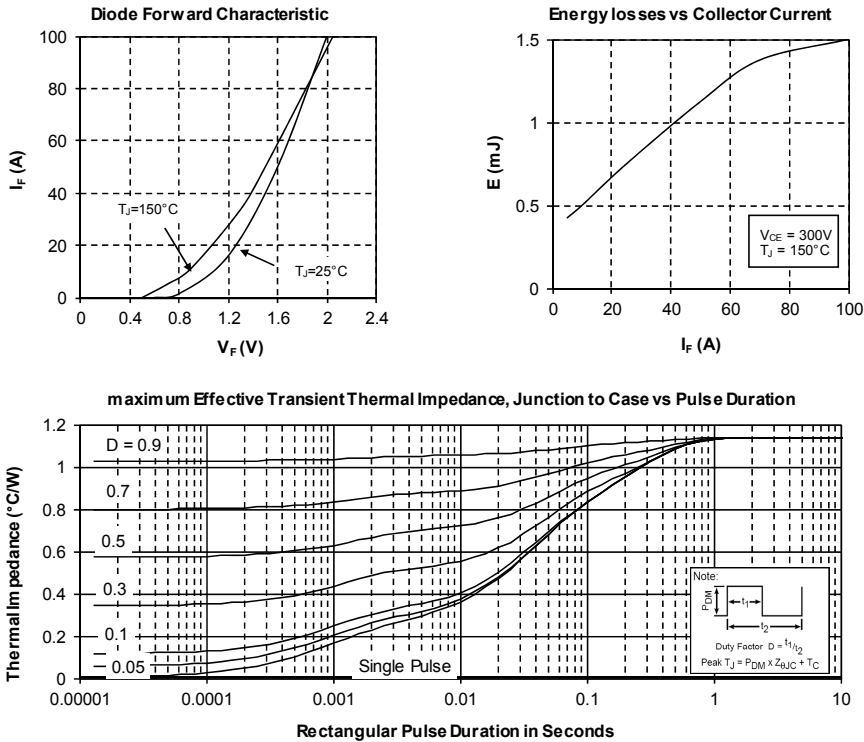


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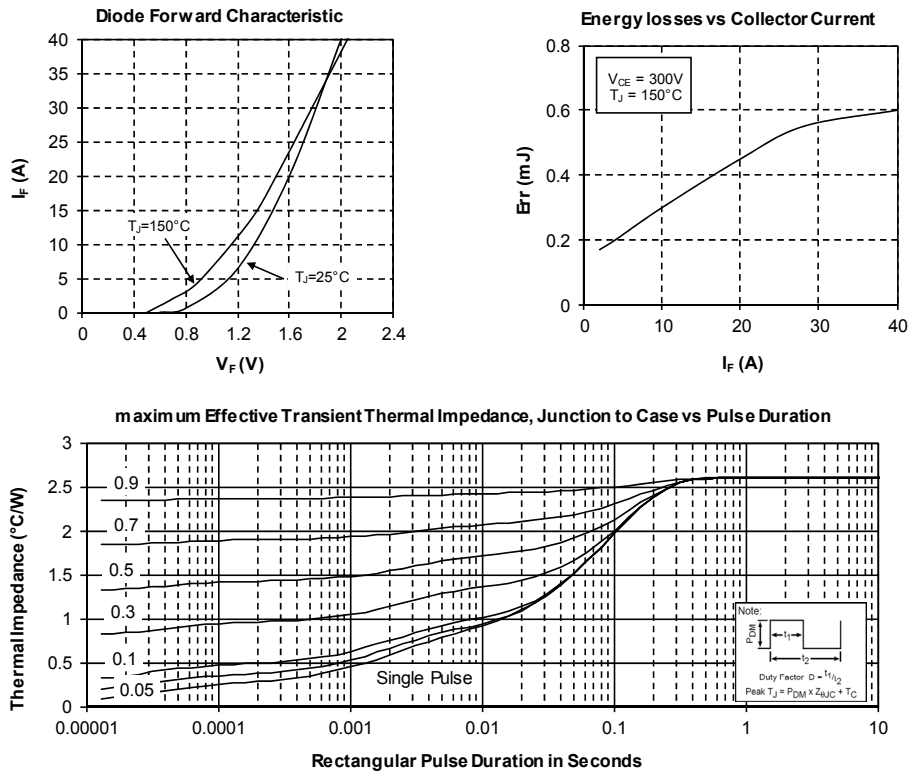
IGBT Typical Performance Curves



Chopper diode Typical Performance Curves



IGBT parallel diode Typical Performance Curves



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