PTDC15120BY

1200V 15A Si IGBT Discrete

PowerCubeSemi, Inc.
Potential · Convergence · Smart

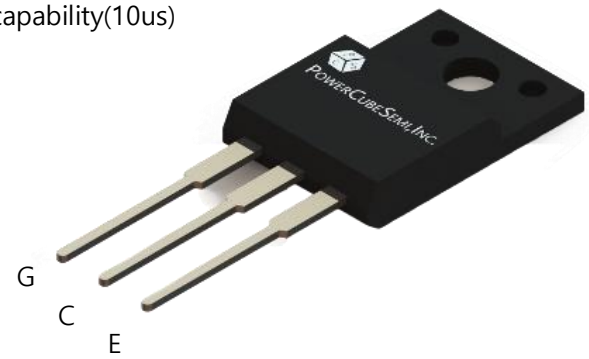
Features

Si IGBT Discrete

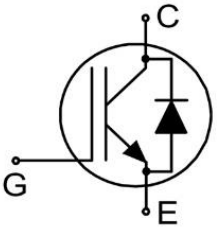
- Rated to 1200V at 15Amps @T_J = 25℃
- $V_{CE(sat)}$=1.85V @ I_C=15A
- Low $V_{CE(sat)}$ Trench-FS IGBT Technology
- Maximum Junction Temperature 175℃
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability(10us)

Application

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply



PKG type : TO-247



Halogen-Free

RoHS

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage		1200	V
I_C	DC Collector Current	T_C=25℃	30	A
		T_C=100℃	15	
$I_{C, Pulse}$	Pulsed Collector Current		60	A
I_F	Diode Forward Current	T_C=25℃	30	A
		T_C=100℃	15	
$I_{F, Pulse}$	Diode Pulsed Current		60	A
V_{GE}	Continuous Gate-Emitter Voltage		±20	V
V_{GE}	Transient Gate-Emitter Voltage		±30	
P_D	Power Dissipation	T_C=25℃	200	W
t_{SC}	Short circuit withstand time		10	μs
T_{vj}	Operating Junction Temperature Range		-40 to 175	℃
T_{stg}	Storage Temperature Range		-55 to 150	

Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Tape width	Quantity
PTDC15120BY	PTDC15120	TO-247	TUBE	-	30

Electrical Characteristics

T_J=25℃ Unless Otherwise Specified

Static Characteristics

Symbol	Parameter	Test Condition		Numerical			Unit
				Min	Typ	Max	
BV_{CES}	Collector-Emitter Breakdown Voltage	I_C=250uA, V_{GE}=0V		1200	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=15A, V_{GE}=15V	T_j=25℃	-	1.85	2.35	V
			T_j=125℃	-	2.20	-	
			T_j=150℃	-	2.30	-	
$V_{GE(TH)}$	Gate-Emitter Threshold Voltage	V_{CE}=V_{GE}, I_C=500uA		5.1	5.8	6.4	V
I_{CES}	Zero Gate Voltage Collector Current	V_{CE}=1200V, V_{GE}=0V	Tj=25℃	-	-	0.25	mA
			Tj=150℃	-	-	5.00	
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V		-	-	100	nA

Dynamic Characteristics

Symbol	Parameter	Test Condition		Numerical			Unit
				Min	Typ	Max	
Q_G	Total Gate Charge	V_{CC}=960V, I_C=15A, V_{GE}=15V		-	0.14	-	uC
V_F	Diode Forward Voltage	I_F=15A	Tj=25℃	-	2.00	2.40	V
			Tj=125℃	-	1.80	-	
			Tj=150℃	-	1.70	-	
C_{IES}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=1MHz		-	1.2	-	nF
C_{RES}	Reverse Transfer Capacitance			-	0.04	-	
$I_{C\ (SC)}$	Short circuit collector current	V_{GE}=15V, t_{SC}≤10μs, V_{CC}=900V, T_j≤150℃		-	60	-	A

Electrical Characteristics

T_j=25℃ Unless Otherwise Specified

Switching Characteristics

Symbol	Parameter	Test Condition		Numerical			Unit
				Min	Typ	Max	
$t_{d(on)}$	Turn-On Delay Time	V_{GE}=-15~15V, V_{CC}=600V, I_C=15A, R_G=33Ω	T_j=25℃	-	45	-	ns
				-	50	-	
				-	52	-	
t_r	Turn-On Rise Time			-	52	-	
			T_j=125℃	-	55	-	
				-	58	-	
$t_{d(off)}$	Turn-Off Delay Time			-	128	-	
			T_j=150℃	-	160	-	
				-	170	-	
t_f	Turn-Off Fall Time			-	186	-	
				-	135	-	
				-	138	-	
E_{on}	Turn-On Switching Energy			-	1.5	-	mJ
				-	2.2	-	
				-	2.4	-	
E_{off}	Turn-Off Switching Energy			-	0.9	-	
				-	1.3	-	
				-	1.45	-	
E_{rec}	Reverse Recovery Energy	I_F=15A, V_R=600V, -dI/dt=240A/μs	T_j=25℃	-	0.60	-	mJ
				-	0.90	-	
				-	1.00	-	
I_{rr}	Reverse Recovery Current			-	7.5	-	A
			T_j=125℃	-	9.0	-	
				-	7.5	-	
Q_{rr}	Reverse Recovery Charge			-	1.8	-	uC
				-	2.4	-	
			T_j=150℃	-	2.6	-	

Thermal Characteristics

Symbol	Parameter	Numerical	Unit
$R_{\theta(J-A)}$	Thermal Resistance Junction-to-Ambient	40	K/W
$R_{\theta(J-C)}$	Thermal Resistance Junction-to-Case for IGBT	0.75	
$R_{\theta(J-C)}$	Thermal Resistance Junction-to-Case for Diode	1.35	

Typical Characteristics

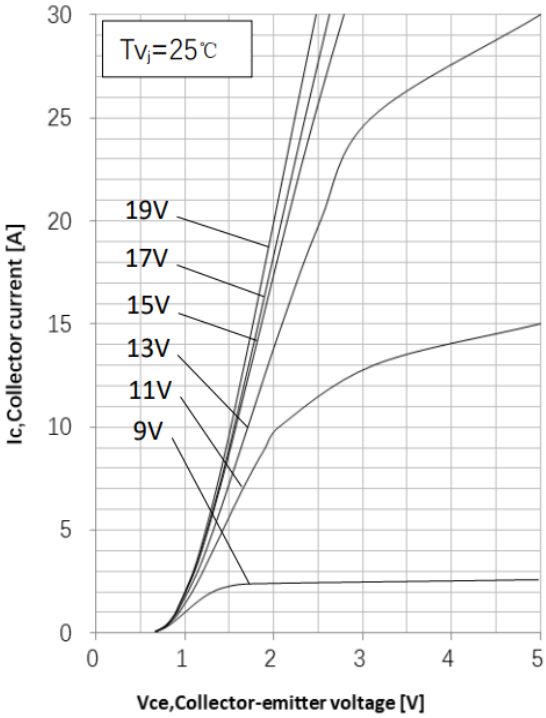


Figure 1. Output Characteristics (T_J=25℃)

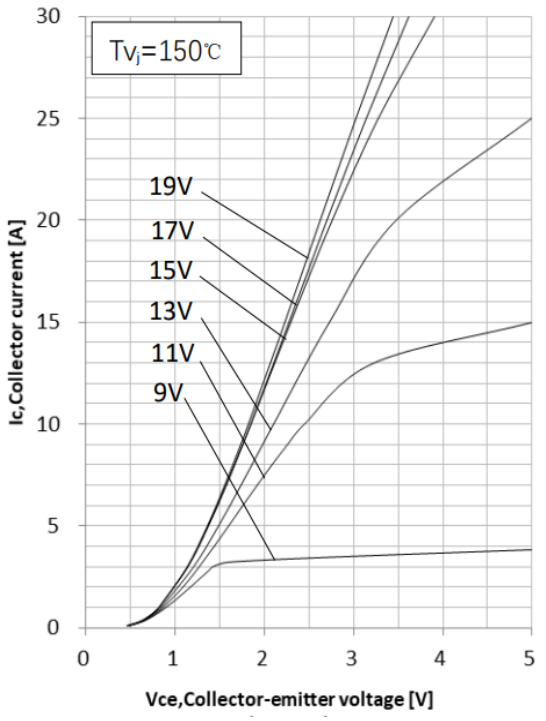


Figure 2. Output Characteristics (T_J=150℃)

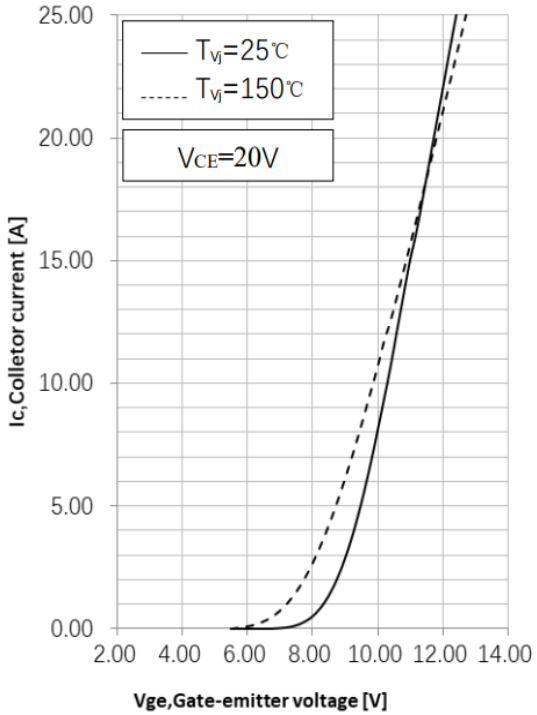


Figure 3. Transfer Characteristics

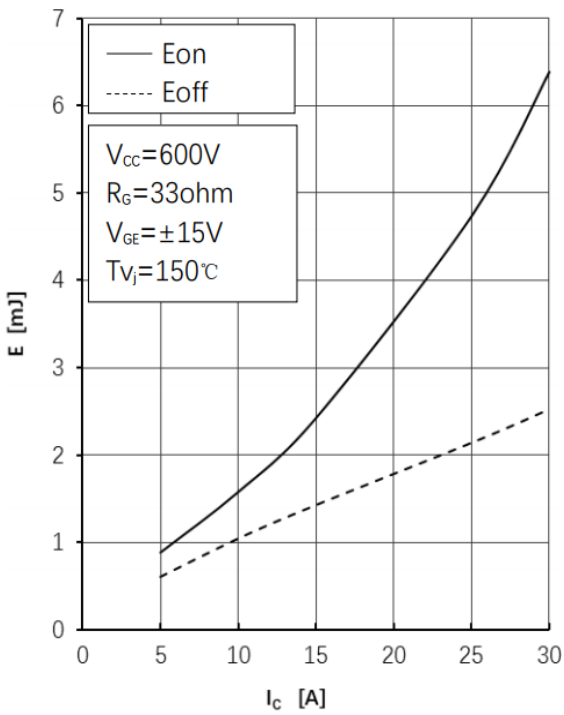


Figure 4. IGBT switching loss vs. I_C

Typical Characteristics

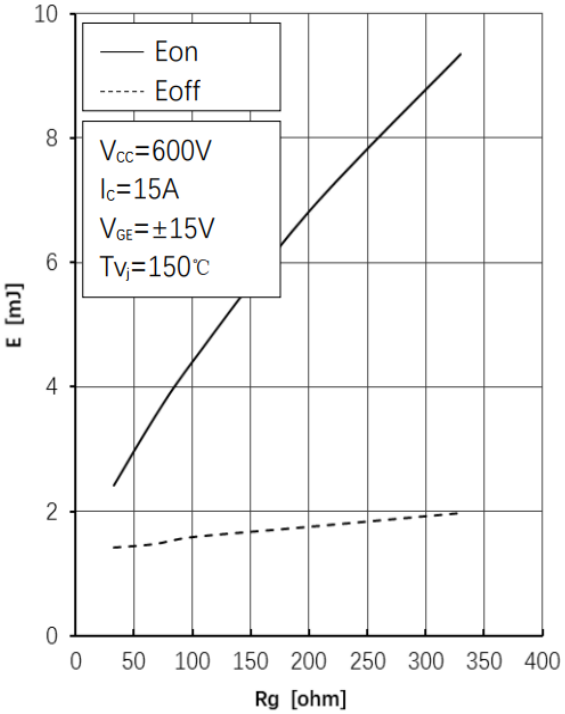


Figure 5. IGBT Switching Loss vs. R_G

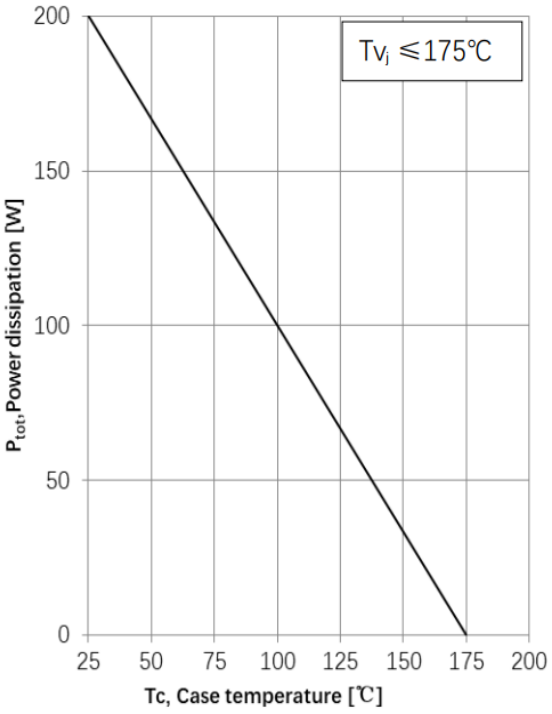


Figure 6. Power dissipation as a function of case temperature

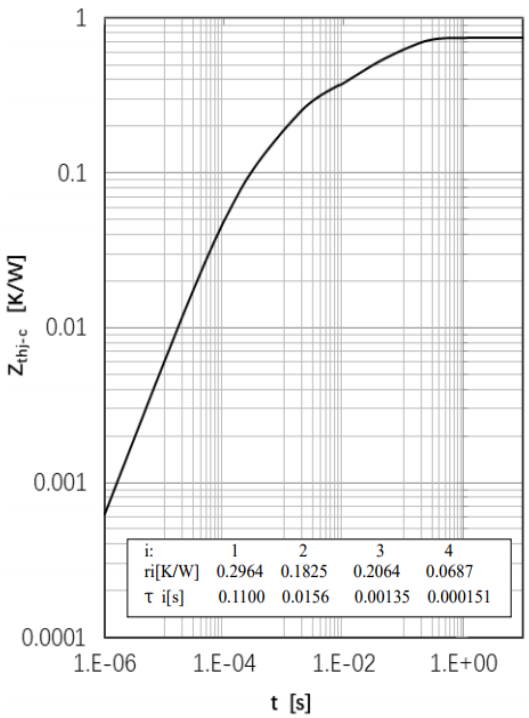


Figure 7. IGBT Transient thermal Impedance

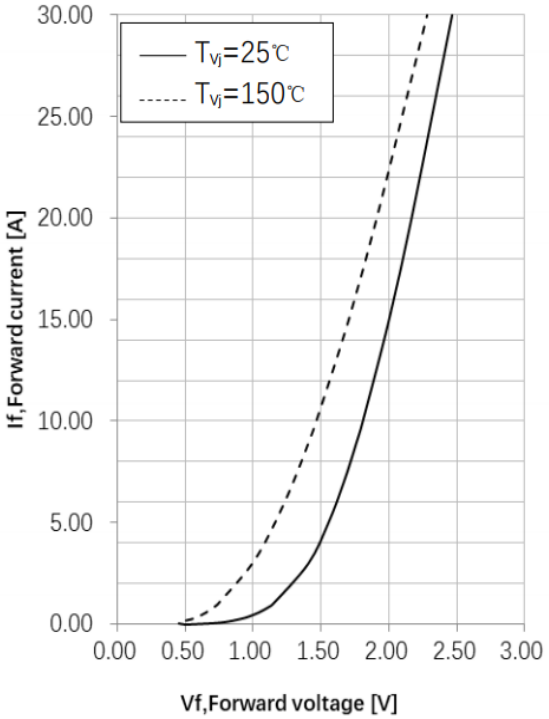


Figure 8. Diode forward current as a function of forward voltage

Typical Characteristics

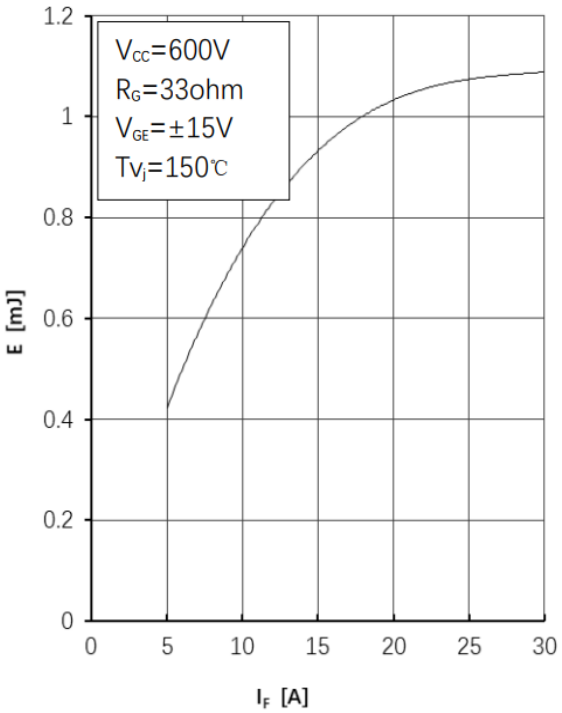


Figure 9. Diode switching loss(Erec) vs. I_F

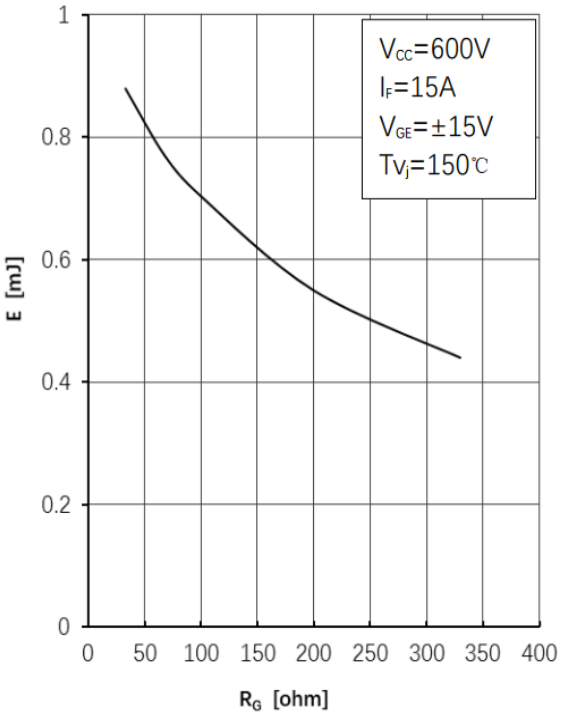


Figure 10. Diode Switching loss(Erec) vs. R_G

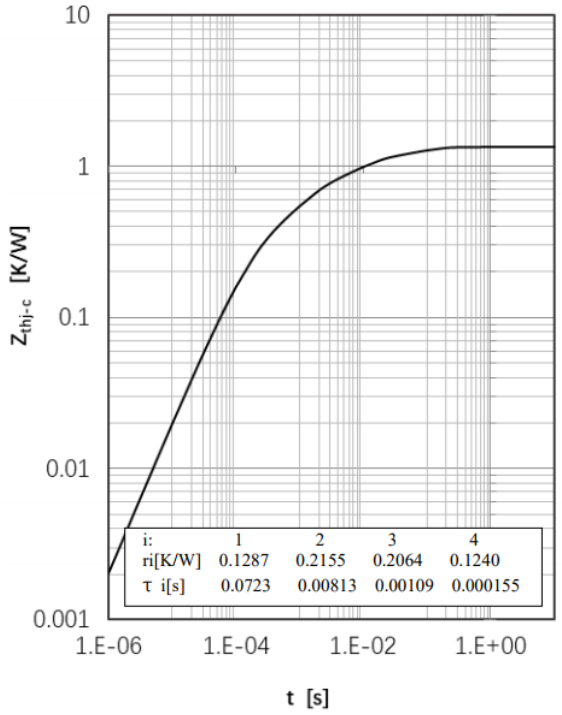
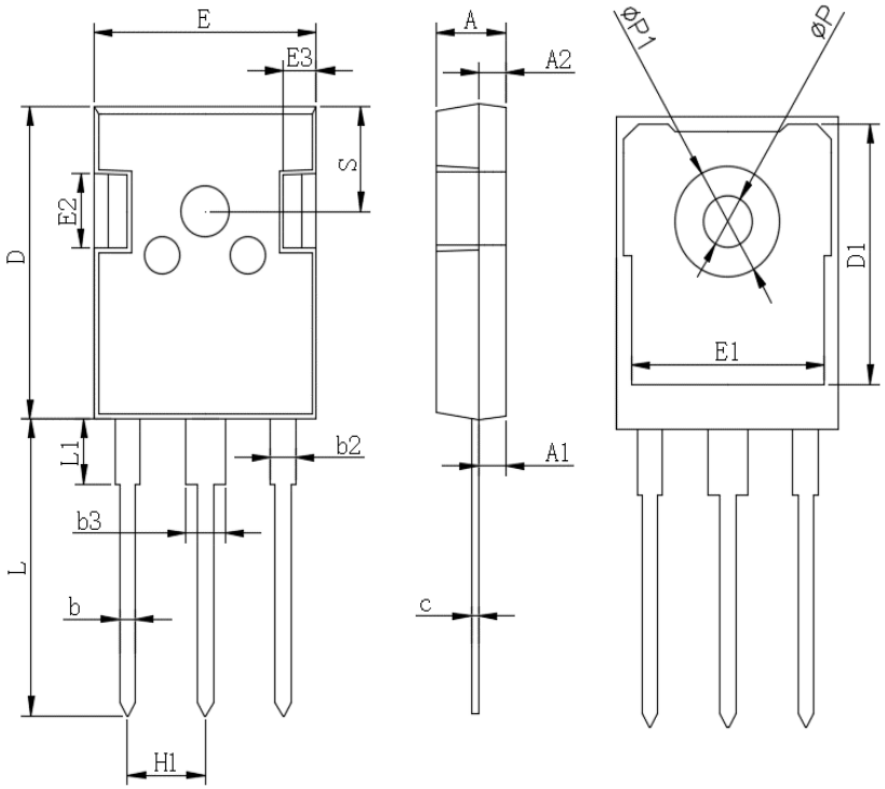


Figure 11. Diode transient thermal Impedance

Package Outline



Unit : mm

SYMBOL	DIMENSIONS	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
C	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
ΦP	3.40	3.80
ΦP1	-	7.30
S	6.15 Typ	
H1	5.44 Typ	
b3	2.80	3.20