

GCP15GX120SGT1

General Description

GRECON IGBT Power Discrete provides ultra low conduction loss as well as low switching loss. They are designed for the applications such as general inverters and UPS.RoHS compliant

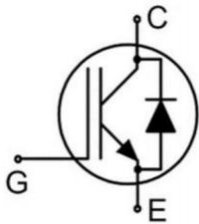
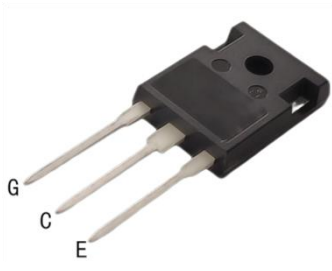
V_{CES}	1200	V
I_C	15	A
$V_{cesat}(T_C=25^{\circ}C)$	1.55	V
$P_{tot}(T_C=25^{\circ}C)$	235	W

Typical Applications

- Solar Inverter
- AC and DC servo drive amplifier
- Uninterruptible power supply

Electrical Features

- Low Switching Losses
- Maximum junction temperature 175°C
- V_{CESat} with positive Temperature Coefficient
- Low V_{CESat}
- external insulation



Device	Package	Marking
GCP15GX120SGT1	TO-247-3L	GCP15GX120SGT1

Maximum Rated Values

Parameter	Symbol	Conditions	Value	Unit
Collector-emitter voltage	V_{CES}	$T_{vj}=25^{\circ}\text{C}$	1200	V
Gate-emitter peak voltage	V_{GES}		± 20	V
DC collector current, limited by $T_{vj \max}$	I_C	$T_C=25^{\circ}\text{C}$, $T_{vj \max}=175^{\circ}\text{C}$	30	A
		$T_C=100^{\circ}\text{C}$, $T_{vj \max}=175^{\circ}\text{C}$	15	
Pulse collector current, t_p limited by $T_{vj \max}$	I_{Cpulse}		45	A
DC forward current, limited by $T_{vj \max}$	I_F	$T_C=25^{\circ}\text{C}$, $T_{vj \max}=175^{\circ}\text{C}$	30	A
		$T_C=100^{\circ}\text{C}$, $T_{vj \max}=175^{\circ}\text{C}$	15	
Pulse forward current, t_p limited by $T_{vj \max}$	I_{Fpulse}		45	A
power dissipation	P_D	$T_C=25^{\circ}\text{C}$, $T_{vj \max}=175^{\circ}\text{C}$	235	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$
Operating junction temperature	$T_{vj \text{ op}}$		-40 to +175	$^{\circ}\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^{\circ}\text{C}$
Maximum Temperature for Soldering	T_L		260	$^{\circ}\text{C}$

Thermal Characteristic

Parameter	Symbol	Value	Unit
Thermal resistance, junction to case for IGBT	R_{thJC}	0.640	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to case for Diode	R_{thJC}	1.140	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction-ambient	R_{thJA}	40	$^{\circ}\text{C}/\text{W}$

Characteristic Values Of The IGBT

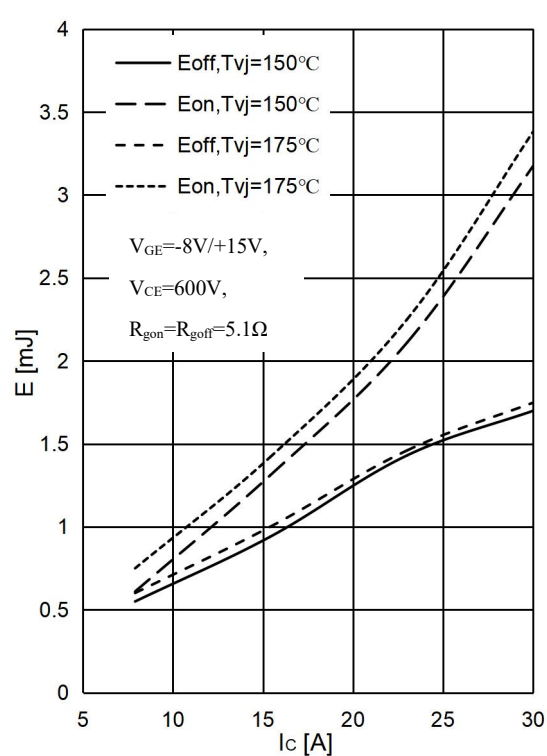
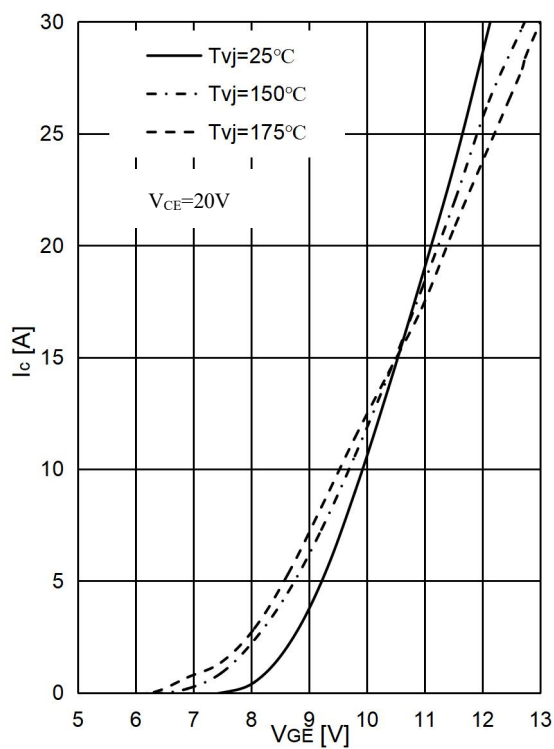
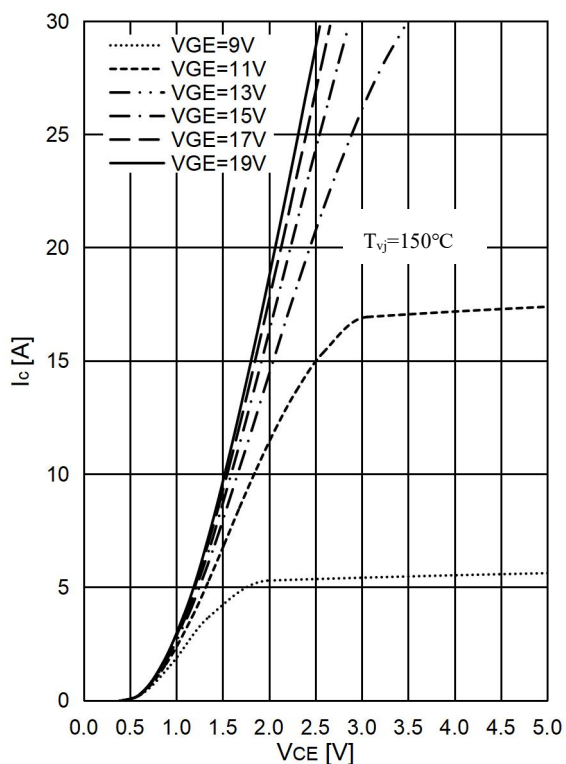
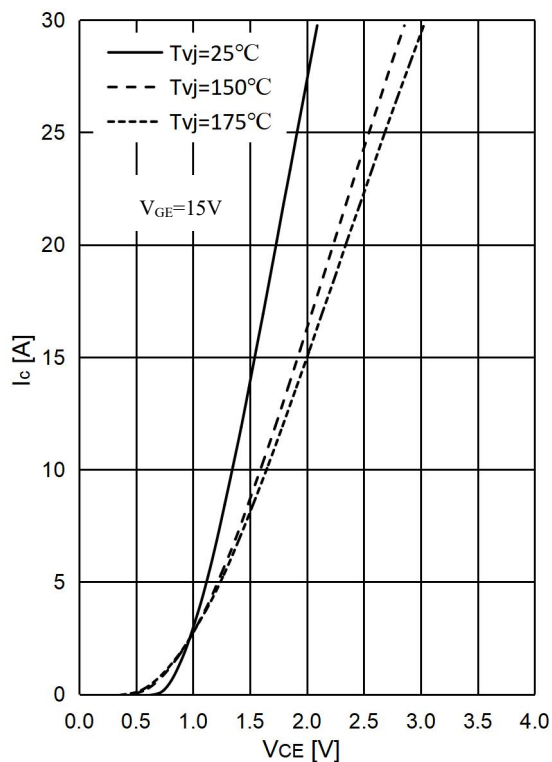
Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Gate threshold voltage	V_{GEth}	$V_{GE}=V_{CE}$, $I_C=0.8mA$	$T_{vj}=25^{\circ}C$		6.5	7.1	V
Gate-emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$	$T_{vj}=25^{\circ}C$			100	nA
Collector-emitter cut-off current	I_{CES}	$V_{CE}=1200V$, $V_{GE}=0V$	$T_{vj}=25^{\circ}C$			1	mA
Collector-emitter saturation voltage	$V_{CE sat}$	$I_C=15A$, $V_{GE}=15V$	$T_{vj}=25^{\circ}C$		1.55	1.90	V
			$T_{vj}=150^{\circ}C$		1.95		
			$T_{vj}=175^{\circ}C$		2.05		
Internal gate resistance	R_{gint}	$f=1MHz$	$T_{vj}=25^{\circ}C$		1.38		Ω
Gate charge	Q_G	$V_{CC}=600V$, $I_C=15A$, $V_{GE}=15V$	$T_{vj}=25^{\circ}C$		90		nC
Input capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$	$T_{vj}=25^{\circ}C$		3.90		nF
Output capacitance	C_{oes}				0.10		
Reverse transfer capacitance	C_{res}				0.03		
Turn-on delay time , inductive load	t_{don}	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		21.8		ns
			$T_{vj}=150^{\circ}C$		20.5		
			$T_{vj}=175^{\circ}C$		21.4		
Rise time , inductive load	t_r	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		8.4		ns
			$T_{vj}=150^{\circ}C$		9.6		
			$T_{vj}=175^{\circ}C$		9.6		
Turn-off delay time , inductive load	t_{doff}	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		119.8		ns
			$T_{vj}=150^{\circ}C$		130.6		
			$T_{vj}=175^{\circ}C$		134.1		
Fall time , inductive load	t_f	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		146.6		ns
			$T_{vj}=150^{\circ}C$		130.6		
			$T_{vj}=175^{\circ}C$		134.1		
Turn-on energy loss per pulse	E_{on}	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		0.79		mJ
			$T_{vj}=150^{\circ}C$		1.33		
			$T_{vj}=175^{\circ}C$		1.42		
Turn-off energy loss per pulse	E_{off}	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		0.80		mJ
			$T_{vj}=150^{\circ}C$		1.01		
			$T_{vj}=175^{\circ}C$		1.09		
Total energy loss per pulse	E_{ts}	$I_C=15A$, $V_{cc}=600V$, $V_{GE}=-8/15V$, $R_{gon}=5.1\Omega$, $R_{goff}=5.1\Omega$	$T_{vj}=25^{\circ}C$		1.59		mJ
			$T_{vj}=150^{\circ}C$		2.34		
			$T_{vj}=175^{\circ}C$		2.51		

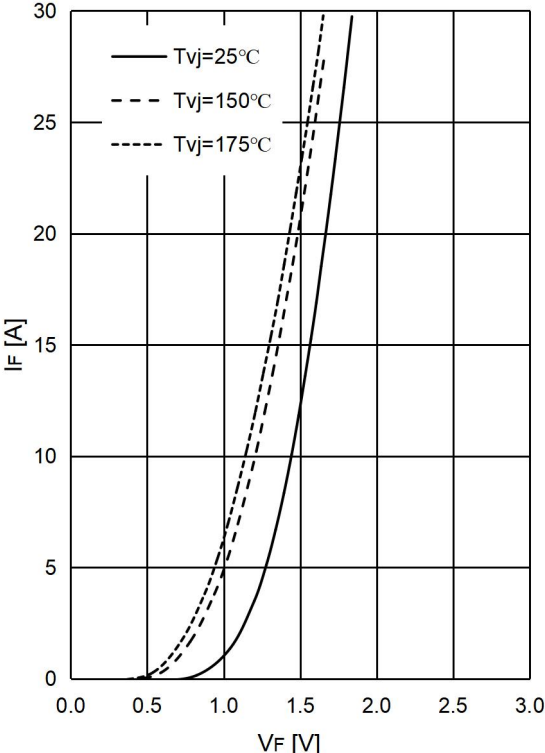
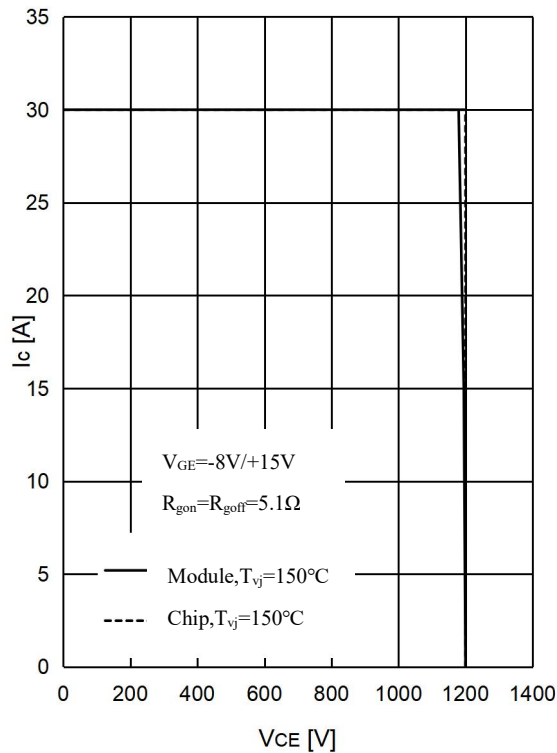
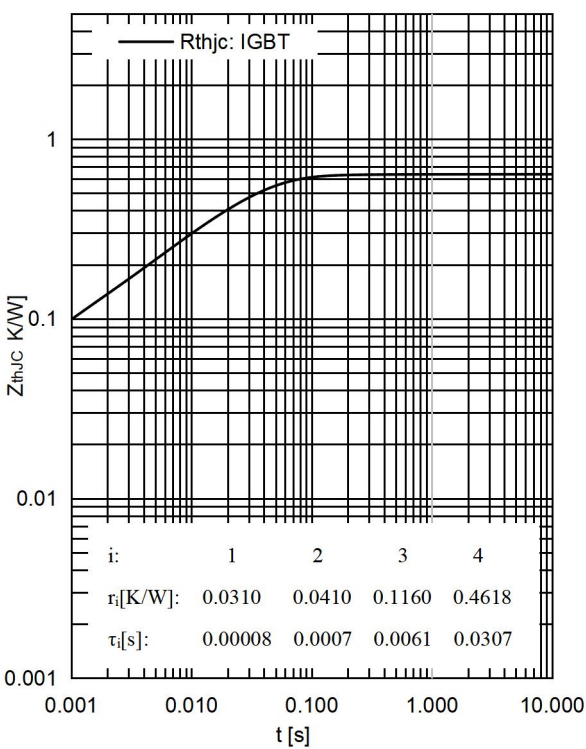
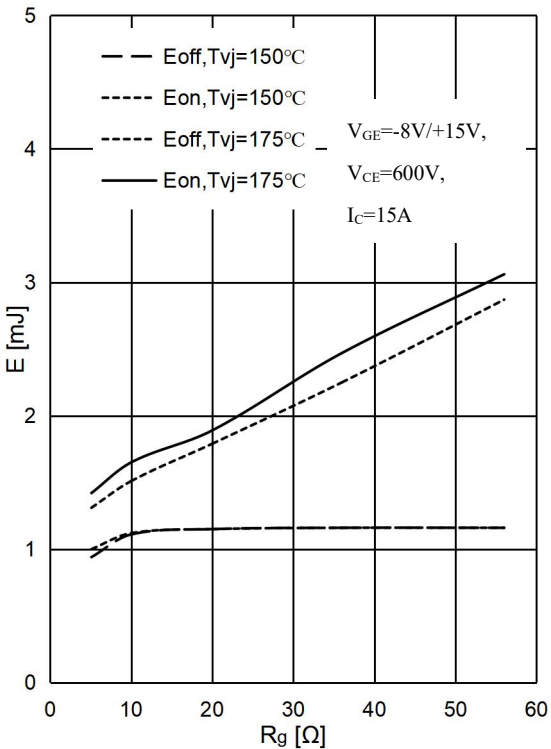
Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
SC data	I _{SC}	t _p ≤10us, V _{GE} =15V, V _{cc} =800V, V _{CEM} ≤1200V	T _{vj} =25°C		85		A
		t _p ≤8us, V _{GE} =15V, V _{cc} =800V, V _{CEM} ≤1200V,	T _{vj} =150°C		70		

Characteristic Values Of The Diode

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Forward voltage	V _F	I _F =15A, V _{GE} =0V	T _{vj} =25°C		2.30		V
			T _{vj} =150°C		1.85		
			T _{vj} =175°C		1.70		
Recovered charge	Q _{rr}	I _F =15A, V _R =600V, R _{gon} =5.1Ω, V _{GE} =-8V	T _{vj} =25°C		1.41		uC
			T _{vj} =150°C		2.46		
			T _{vj} =175°C		2.62		
Peak reverse recovery current	I _{rrm}	I _F =15A, V _R =600V, R _{gon} =5.1Ω, V _{GE} =-8V	T _{vj} =25°C		23.4		A
			T _{vj} =150°C		21.6		
			T _{vj} =175°C		20.2		
reverse recovery time	t _{rr}	I _F =15A, V _R =600V, R _{gon} =5.1Ω, V _{GE} =-8V	T _{vj} =25°C		152.4		ns
			T _{vj} =150°C		289.0		
			T _{vj} =175°C		322.0		
Diode peak rate of fall of reverse recovery current	di _{rr} /dt	I _F =15A, V _R =600V, R _{gon} =5.1Ω, V _{GE} =-8V	T _{vj} =25°C		1440		A/us
			T _{vj} =150°C		1300		
			T _{vj} =175°C		1280		
Reverse recovery energy	E _{rec}	I _F =15A, V _R =600V, R _{gon} =5.1Ω, V _{GE} =-8V	T _{vj} =25°C		0.51		mJ
			T _{vj} =150°C		0.81		
			T _{vj} =175°C		0.91		

Electrical Characteristics (curves)





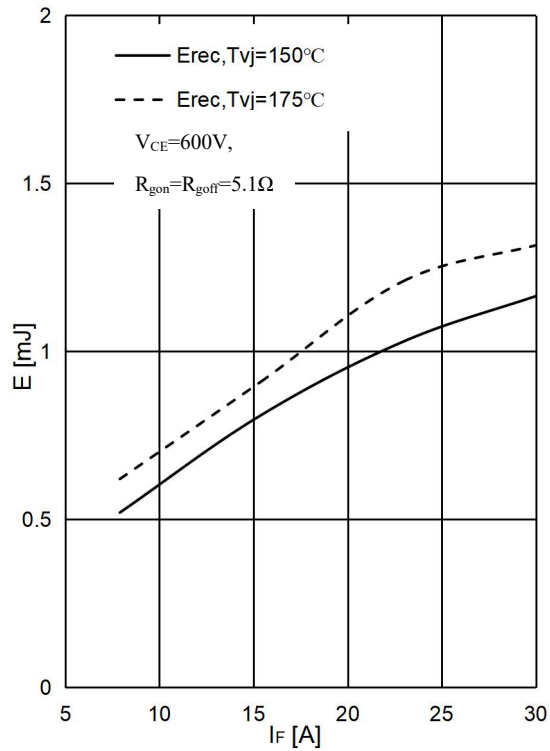


Fig 9. Diode Switching Loss E_{rec} vs. I_F

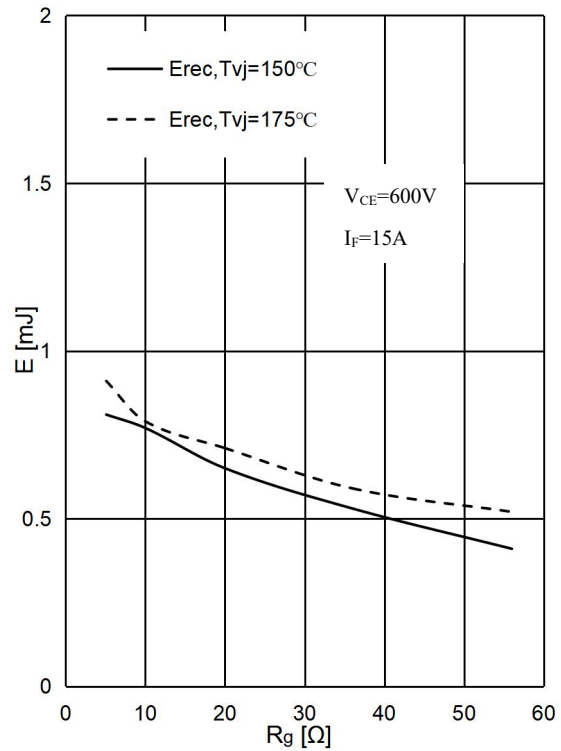


Fig 10. Diode Switching Loss E_{rec} vs. R_G

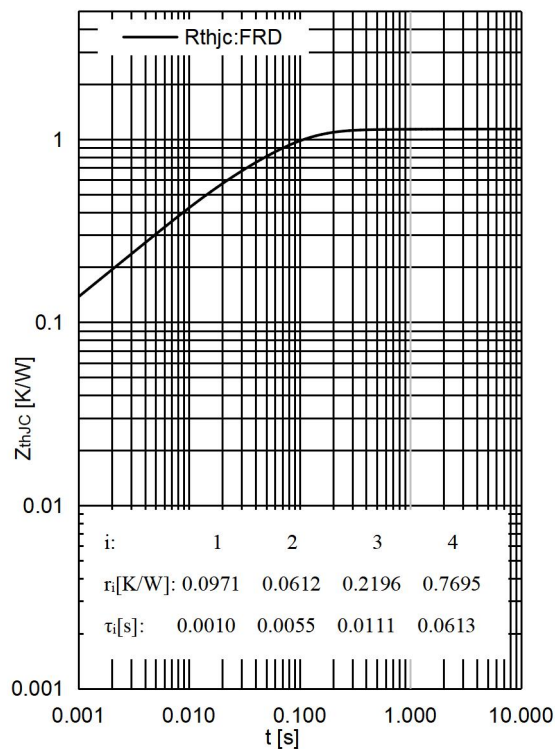


Fig 11. Diode Transient thermal impedance

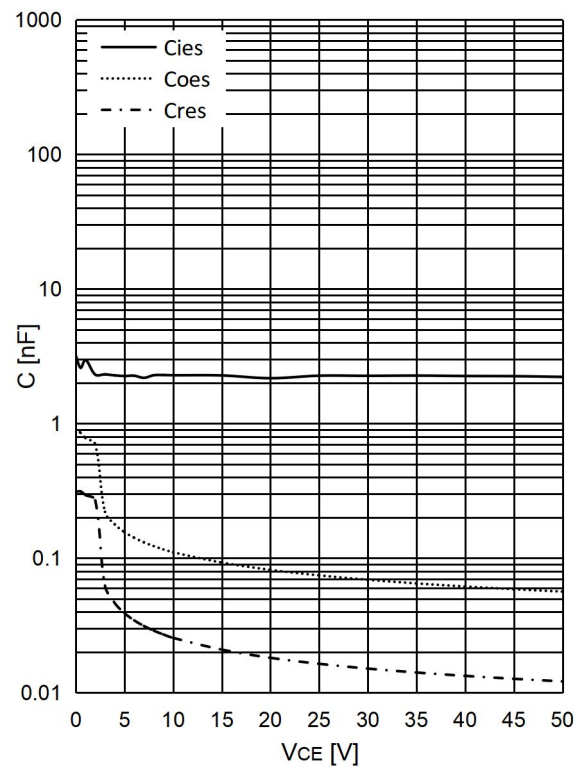
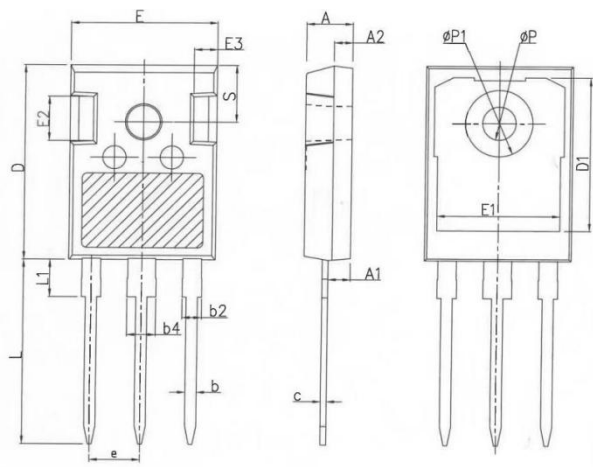


Fig 12. IGBT Capacity Characteristic

Package Dimensions



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ϕP	3.40	3.60	3.80
$\phi P1$	-	-	7.30
S	6.15BSC		

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- to perform joint Risk and Quality Assessments;
- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

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