CIF25P120P

25A 1200V Field Stop Trench IGBT

■Features

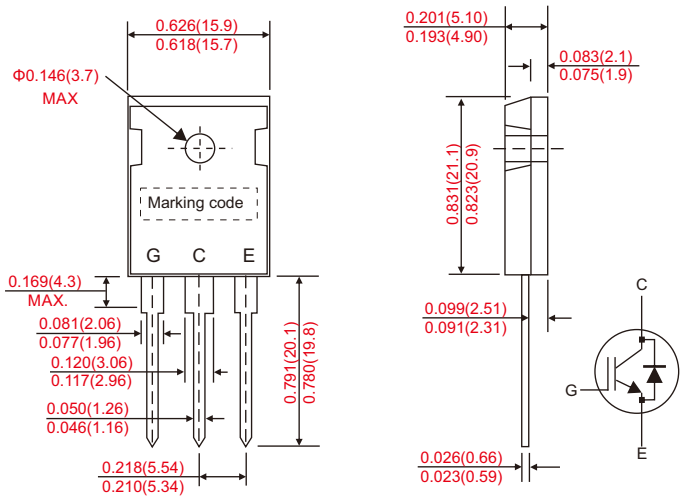
- Positive temperature Co-efficient for easy parallel operation.
- High current capability.
- High input impedance.
- Suffix "G" indicates Halogen-free part, ex.CIF25P120PG.

■ Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : JEDEC TO-247 molded plastic body over passivated chip.
- Lead : Axial leads, solderable per MIL-STD-202, Method 208 guranteed.
- Polarity: Color band denotes cathode end .
- Mounting Position : Any .
- Weight : Approximated 5.60 gram .

■Outline

TO-247



Dimensions in inches and (millimeters)

■Maximum ratings

Rating at 25 °C ambient temperature unless otherwise specified.

Parameter	Conditions	Symbol	CIF25P120P	UNIT
Marking code			CIF25P120P	
Collector to Emitter Voltage		V_{CE}	1200	V
Collector Current	T_C = 25°C T_C = 100°C	I_C	50 25	A
Pulsed collector current		I_{Cpuls}	75*[2]	A
RBSOA current	V_{CE} < 1200V, T_J ≤ 150°C	I_{Cpeak}	75*	A
Diode Forward Current	T_C = 25°C T_C = 100°C	I_F	30 15	A
Pulsed doide current		I_{Fpuls}	40*	A
Gate to Emitter Voltage		V_{GE}	±20	V
Power dissipation	T_C = 25°C T_C = 100°C	P_{tot}	298 119	W
Operating Junction Temperature		T_J	-55 ~ +150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°C

Note : 1.Test Standard to follow JESD-022 .
2.Mark(*) is to estimate numerical value.
3.Test Cycle<1000 ; Test Timing>1s.

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■Thermal characteristics

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Thermal Resistance	Junction to Case	$R_{\theta JC}$			0.42	K/W
Diode thermal resistance	chip case	$R_{\theta JCD}$			1.2	
Thermal Resistance	Junction to Ambient	$R_{\theta JA}$			40	

■Electrical characteristics(AT T_A =25 °C unless otherwise noted)

On characteristivs

PARAMETER	CONDITIONS		Symbol	MIN.	TYP.	MAX.	UNIT
Collector to Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1.5mA		$V_{(BR)CES}$	1200			V
Collector to Emitter Saturation Voltage	V_{GE} = 15V, I_C = 25A	T_J= 25 °C	$V_{CE(sat)}$		2.25	2.4	
		T_J= 150 °C			2.6		
Diode forward voltage	V_{GE} = 0V, I_F= 15A	T_J= 25 °C	V_F		1.87		
		T_J= 150 °C			1.5		
Gate threshold voltage	I_C = 1mA, V_{CE} = V_{GE}		$V_{GE(th)}$	5.0	6.1	7.0	
Collector Cut-Off Current	V_{CE} = 1200V, V_{GE} = 0V	T_J= 25 °C	I_{CES}			0.1	mA
		T_J= 150 °C				2	
G-E Leakage Current	V_{CE} = 0V, V_{GE} = 20V		I_{GES}			100	nA
Transconductance	V_{CE} = 20V, I_C = 25A		gFS		10.5		S

Dynamic characteristivs

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Input Capacitance	V_{CE} = 25V	C_{iss}		3480		pF
Output Capacitance	V_{GE} = 0V	C_{oss}		99		
Reverse Transfer Capacitance	f = 1MHz	C_{rss}		55		
Total Gate Charge	V_{CC} = 900V, I_C = 25A, V_{GE} = 15V	Q_G		tbd		nC

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Switching characteristivs

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Turn-On Delay Time	T_J= 25 °C	$t_{d(on)}$		45		ns
Rise Time	V_{CC} = 600V, I_C = 25A	t_r		50		
Turn-Off Delay Time	V_{GE} = 15/0V	$t_{d(off)}$		165		
Fall Time	R_G = 15Ω	t_f		98		
Turn-On Switching Loss	L_{load} = 500μH	E_{on}		1.33		mJ
Turn-Off Switching Loss		E_{off}		0.82		
Total Switching Loss		E_{ts}		2.15		
Turn-On Delay Time	T_J= 150 °C	$t_{d(on)}$		35		ns
Rise Time	V_{CC} = 600V, I_C = 25A	t_r		52		
Turn-Off Delay Time	V_{GE} = 15/0V	$t_{d(off)}$		200		
Fall Time	R_G = 15Ω	t_f		225		
Turn-On Switching Loss	L_{load} = 500μH	E_{on}		1.35		mJ
Turn-Off Switching Loss		E_{off}		1.60		
Total Switching Loss		E_{ts}		2.95		

Switching characteristivs

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Reverse recovery time	T_J= 25 °C	t_{rr}		280		ns
Reverse recovery charge	V_{CC} = 600V, I_F = 15A	Q_{rr}		5.5		nC
Repetitive Peak Reverse Current	di_F/dt = 600A/μs	I_{rrm}		40		A
Reverse recovery time	T_J= 150 °C	t_{rr}		120		ns
Reverse recovery charge	V_{CC} = 600V, I_F = 15A	Q_{rr}		1.30		nC
Repetitive Peak Reverse Current	di_F/dt = 500A/μs	I_{rrm}		20		A

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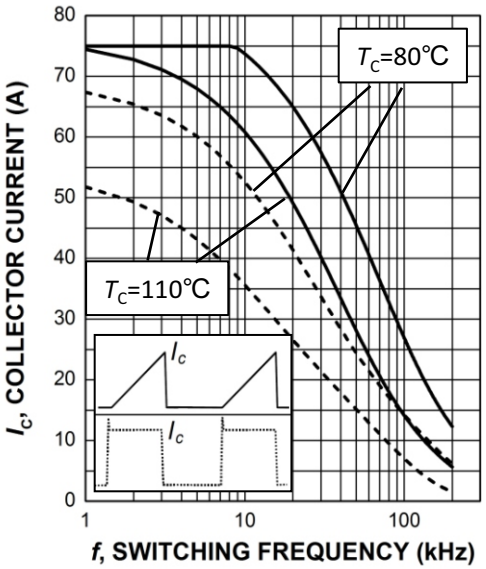

Figure 1. Collector current as a function of switching frequency
(T_j≤150℃, D = 0.5, V_{CE} = 600V, V_{GE} = 0/+15V, R_G = 15Ω)

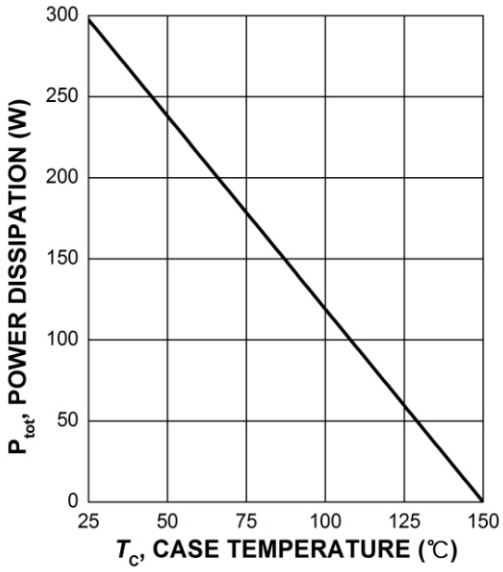

Figure 2. Maximum power dissipation as a function of case temperature
(T_j ≤ 150℃)

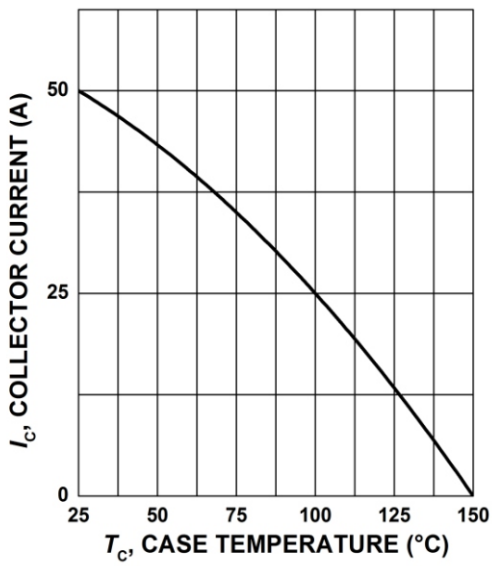

Figure 3. Maximum collector current as a function of case temperature
(V_{GE}≥ 15V, T_j ≤ 150℃)

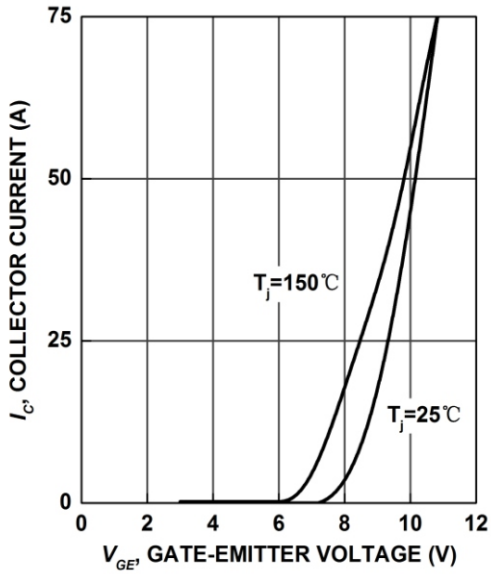

Figure 4. Typical transfer characteristic
(V_{CE}=15V)

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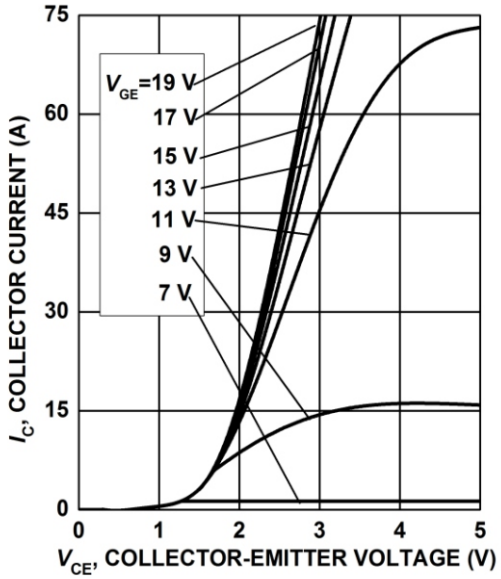

Figure 5. Typical output characteristic
(T_j = 25°C)

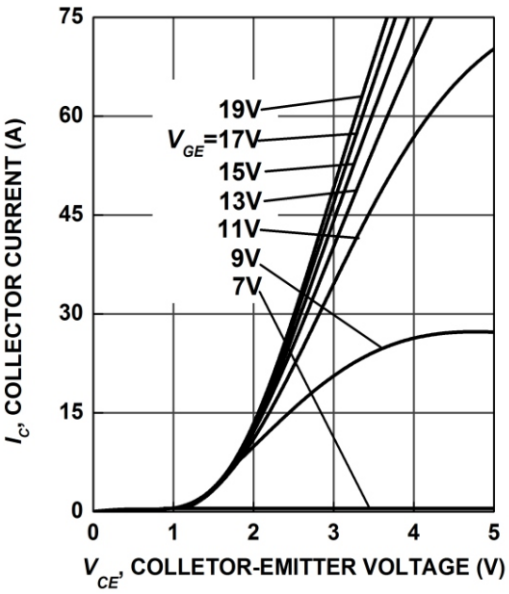

Figure 6. Typical output characteristic
(T_j = 150°C)

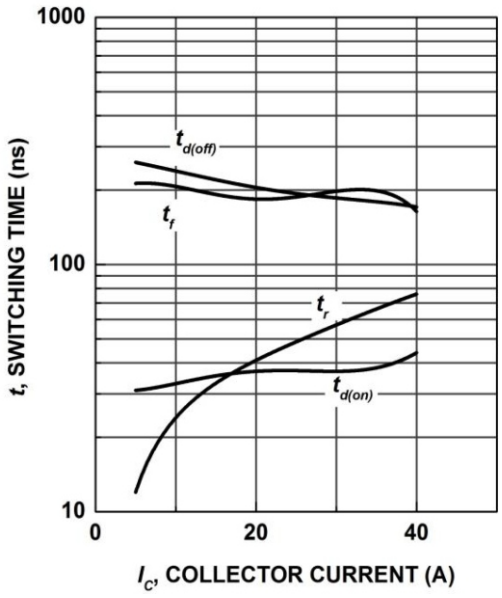

Figure 7. Typical switching times as a function of collector current
(inductive load, T_j=150°C, V_{CE}=600V, V_{GE}=0/15V, R_G=15Ω,
Dynamic test circuit in Figure D)

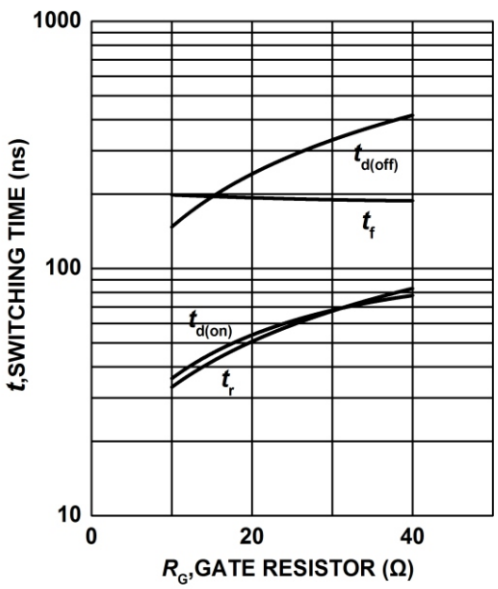

Figure 8. Typical switching times as a function of gate resistor
(inductive load, T_j=150°C, V_{CE}=600V, V_{GE}=0/15V, I_C=25A, Dynamic test circuit in Figure D)

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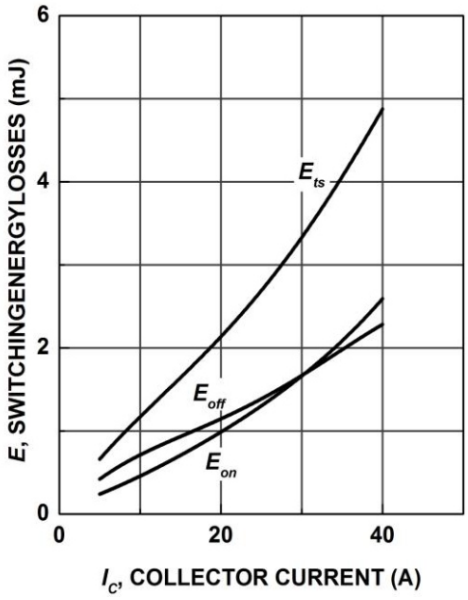

Figure 9. Typical switching energy losses as a function of collector current
(inductive load, T_j=150°C, V_{CE}=600V,
V_{GE}=0/15V, R_G=15Ω,
Dynamic test circuit in Figure D)

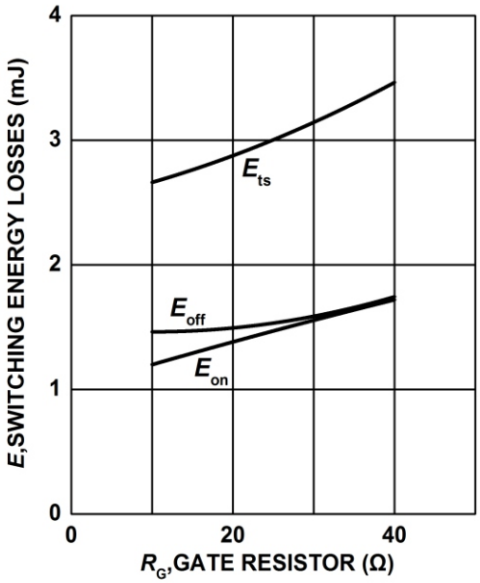

Figure 10. Typical switching energy losses as a function of gate resistor
(inductive load, T_j=150°C, V_{CE}=600V,
V_{GE}=0/15V, I_C=25A,
Dynamic test circuit in Figure D)

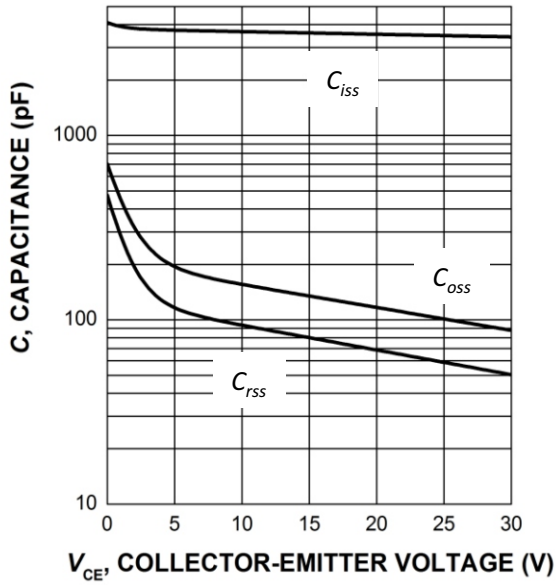

Figure 11. Typical capacitance as a function of collector-emitter voltage
(V_{GE}=0V, f = 1 MHz)

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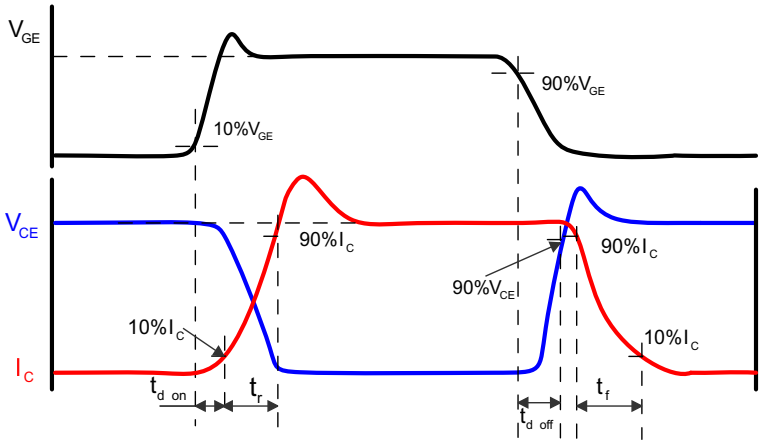

Figure A. Definition of switching times

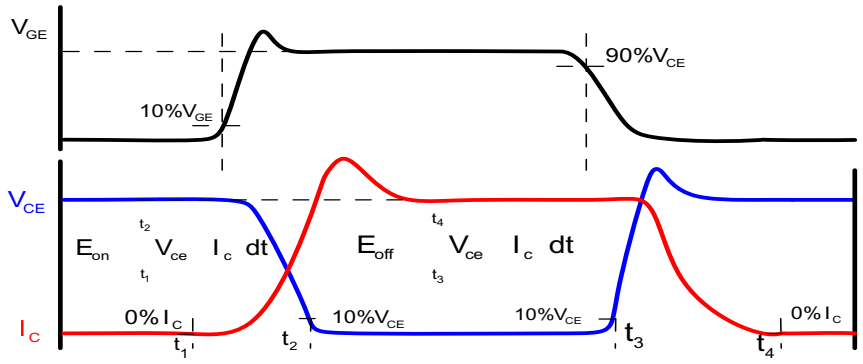

Figure B. Definition of switching losses

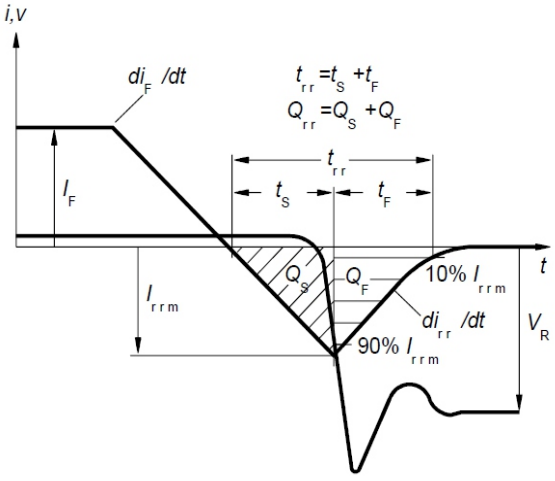

Figure C. Definition of diodes switching characteristics

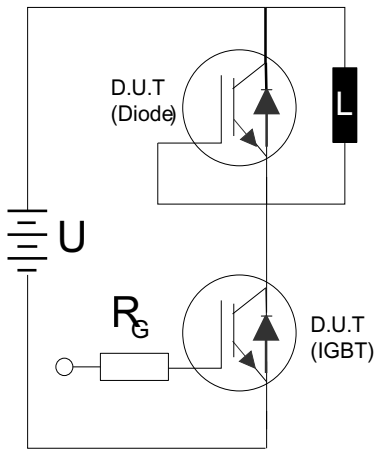

Figure D. Dynamic test circuit

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