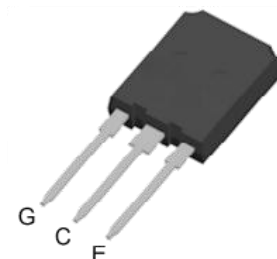


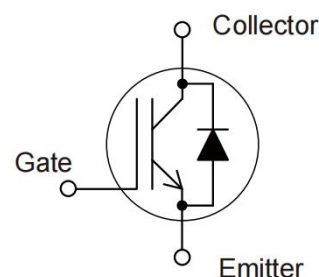
Features:

Low Switching Power Loss
Low Switching Surge And Noise
Advanced Field Stop Technology
Low EMI
Maximum Junction Temperature 175°C
Qualified According To JEDEC For Target Applications
Pb-free Lead Plating, Halogen-free Mold Compound, RoHS Compliant



Applications:

Industrial UPS
Welding Machine
Solar Converters
Energy Storage
EV Charger



Key Performance and Package Parameters

Type	V _{CE}	I _C	V _{CEsat} , T _{vj} =25°C	T _{vjmax}	Marking	Package
CI75T120X	1200V	75A	1.96V	175°C	CI75T120X	TO-247PLUS-3L

Maximum Ratings and Characteristics

Absolute Maximum Ratings at T_{vj}= 25°C (unless otherwise specified)

Items	Symbols	Value	Units
Collector-emitter voltage	V _{CEs}	1200	V
Gate-emitter voltage	V _{GES}	±20	V
Transient gate-emitter voltage (t _p ≤ 10μs, D < 0.010)		±30	V
DC collector current, limited by T _{vjmax} T _c = 25°C T _c = 100°C	I _C	115 82	A
Pulsed collector current, t _p limited by T _{vjmax}	I _{CP}	300	A
Turn-off safe operating area V _{ce} ≤ 1200V, T _j ≤ 175°C, t _p = 1μs	-	300	A
Diode forward current, limited by T _{vjmax} T _c = 25°C T _c = 100°C	I _F	150 75	A
Diode pulsed collector current, t _p limited by T _{vjmax}	I _{FP}	300	A
IGBT max. power dissipation	P _{D_IGBT}	625	W
FWD max. power dissipation	P _{D_FWD}	349	W
Operating junction temperature	T _{vj}	-40 ~ +175	°C
Storage temperature	T _{stg}	-55 ~ +150	°C

Electrical Characteristics at $T_{vj} = 25^{\circ}\text{C}$ (unless otherwise specified)

Description	Symbols	Conditions	Characteristics			Unit
			Min	Typ	Max	
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE} = 0V, I_C = 0.50mA$	1200	-	-	V
Zero gate voltage collector current	I_{CES}	$V_{CE} = 1200V, V_{GE} = 0V$	-	-	200	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	± 200	nA
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 250\mu A$	5.0	5.9	6.6	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15V, I_C = 75A$	-	1.96	2.40	V
		$T_{vj} = 25^{\circ}\text{C}$	-	2.72	-	
		$T_{vj} = 175^{\circ}\text{C}$	-	-	-	
Input capacitance	C_{ies}	$V_{CE} = 25V, V_{GE} = 0V$ $f = 1MHz$	-	19.5	-	nF
Output capacitance	C_{oes}		-	240	-	pF
Reverse transfer capacitance	C_{res}		-	130	-	pF
Gate charge	Q_G	$V_{CC} = 960V, I_C = 75A, V_{GE} = 15V$	-	570	-	nC
Forward voltage drop	V_F	$I_F = 75A$	-	2.3	3.0	V
		$T_{vj} = 25^{\circ}\text{C}$	-	1.8	-	
		$T_{vj} = 175^{\circ}\text{C}$	-	-	-	

Switching Characteristics at $T_{vj} = 25^{\circ}\text{C}$

Description	Symbols	Conditions	Characteristics			Unit
			Min	Typ	Max	
IGBT Characteristics						
Turn-on delay time	t _{d(on)}	V _{CC} = 600V I _C = 75A V _{GE} = 15V R _G = 10Ω	-	118	-	ns
Rise time	t _r		-	138	-	ns
Turn-off delay time	t _{d(off)}		-	472	-	ns
Fall time	t _f		-	82	-	ns
Turn-on energy	E _{on}		-	4.97	-	mJ
Turn-off energy	E _{off}		-	3.52	-	mJ
Total switching energy	E _{ts}		-	8.49	-	mJ
Diode Characteristics						
Diode reverse recovery time	t _{rr}	V _{CC} = 600V	-	127.9	-	ns
Diode reverse recovery charge	Q _{rr}	I _F = 75A	-	2.97	-	μC
Diode peak reverse recovery current	I _{rrm}	di _F /dt= 1000A/μs	-	66.18	-	A

Switching Characteristics at $T_{vj} = 175^{\circ}\text{C}$

Description	Symbols	Conditions	Characteristics			Unit
			Min	Typ	Max	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC}= 600V$ $I_C= 75A$ $V_{GE}= 15V$ $R_G= 10\Omega$	-	100	-	ns
Rise time	t_r		-	128	-	ns
Turn-off delay time	$t_{d(off)}$		-	534	-	ns
Fall time	t_f		-	104	-	ns
Turn-on energy	E_{on}		-	4.86	-	mJ
Turn-off energy	E_{off}		-	4.04	-	mJ
Total switching energy	E_{ts}		-	8.9	-	mJ
Diode Characteristics						
Diode reverse recovery time	t_{rr}	$V_{CC}= 600V$	-	301.3	-	ns
Diode reverse recovery charge	Q_{rr}	$I_F= 75A$	-	12.78	-	μC
Diode peak reverse recovery current	I_{rrm}	$di_F/dt= 1000A/\mu s$	-	86.19	-	A

Thermal Resistance

Items	Symbols	Characteristics			Unit
		Min	Typ	Max	
Thermal resistance, junction-ambient	$R_{th(j-a)}$	-	-	50	°C/W
Thermal resistance, IGBT junction to case	$R_{th(j-c)}$	-	-	0.24	
Thermal resistance, diodes junction to case	$R_{th(j-c)}$	-	-	0.43	

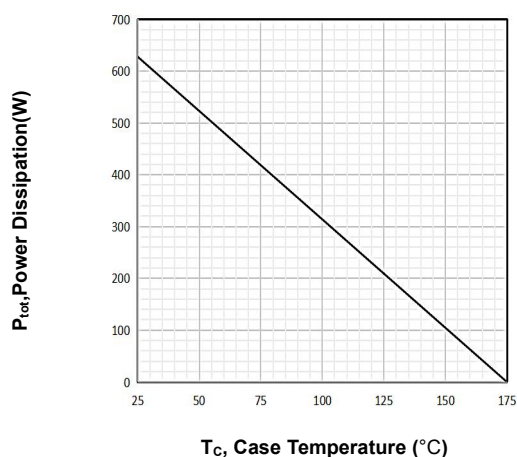


Figure 1. Power dissipation vs. case temperature
($T_{vj} \leq 175^{\circ}\text{C}$)

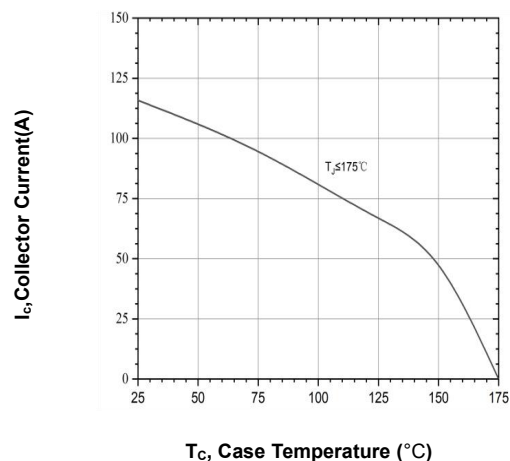


Figure 2. DC Collector current vs. Case temperature
($V_{GE} \leq 15\text{V}$, $T_{vj} \leq 175^{\circ}\text{C}$)

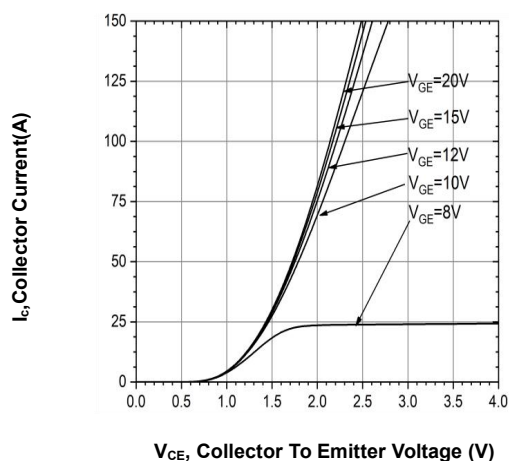


Figure 3. Typical output characteristic
($T_{vj} = 25^{\circ}\text{C}$)

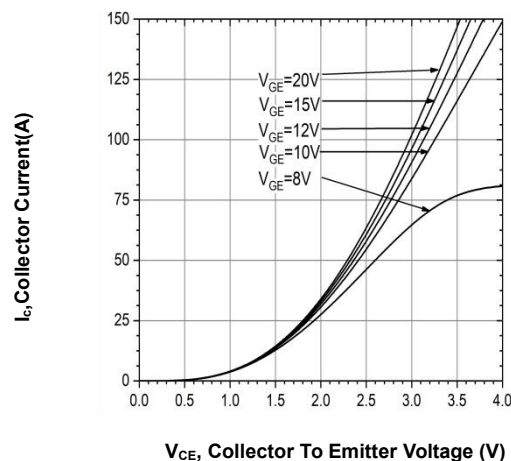


Figure 4. Typical output characteristic
($T_{vj} = 175^{\circ}\text{C}$)

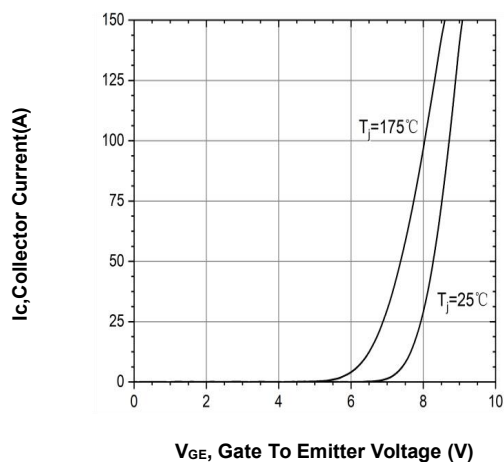


Figure 5. Typical transfer characteristic
($V_{CE} = 20\text{V}$)

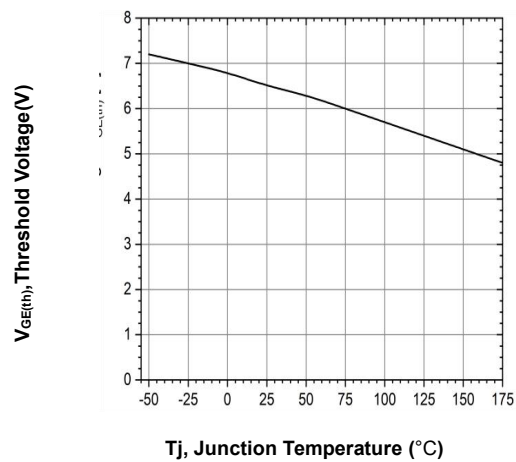


Figure 6. Gate threshold voltage
($I_c = 75\text{mA}$, $V_{CE} = 20\text{V}$)

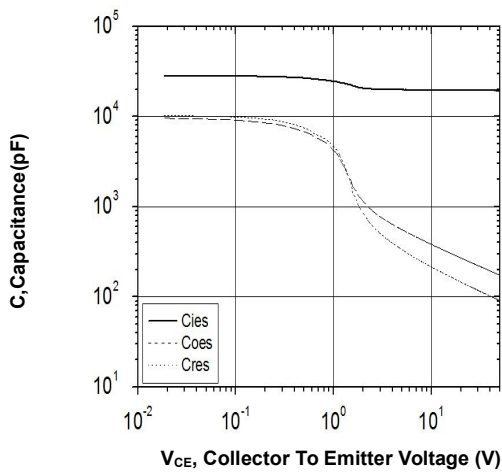


Figure 7. Typical capacitance vs. collector-emitter voltage ($V_{GE}=0V$, $f=1MHz$)

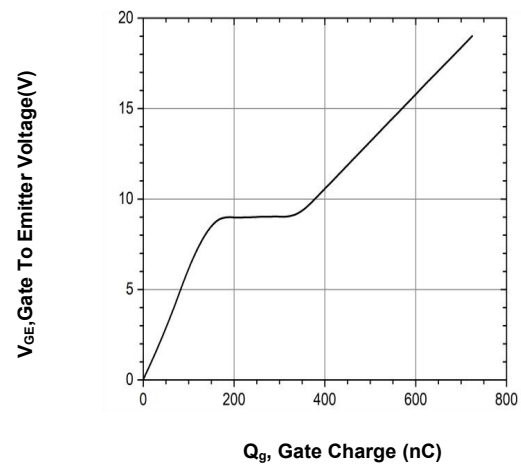


Figure 8. Typical gate charge
($I_C=75A$, $V_{CE}=960V$, $T_{vj}=25^{\circ}C$)

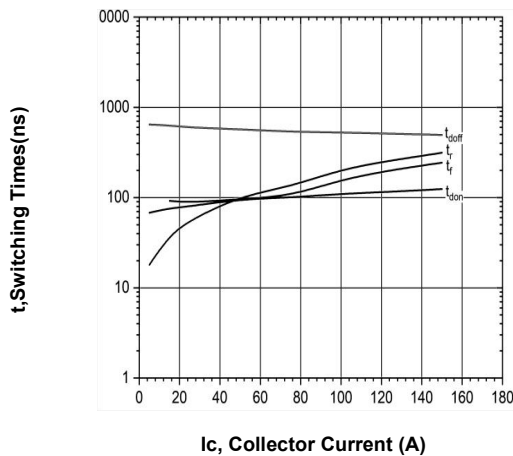


Figure 9. Typical switching times vs. collector current ($T_{vj}=175^{\circ}C$, $V_{CE}=600V$, $V_{GE}=15V$, $R_g=10\Omega$)

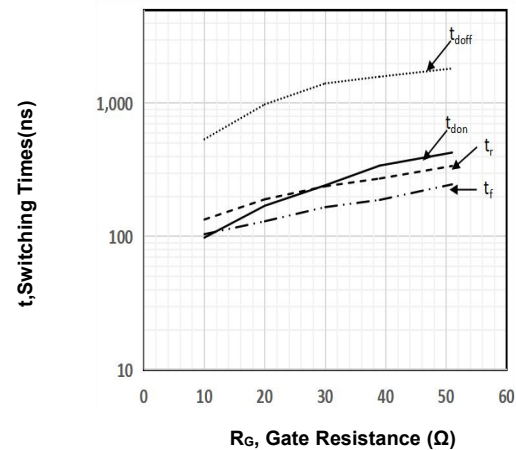


Figure 10. Typical switching times vs. gate resistor
($T_{vj}=175^{\circ}C$, $V_{CE}=600V$, $V_{GE}=15V$, $I_C=75A$)

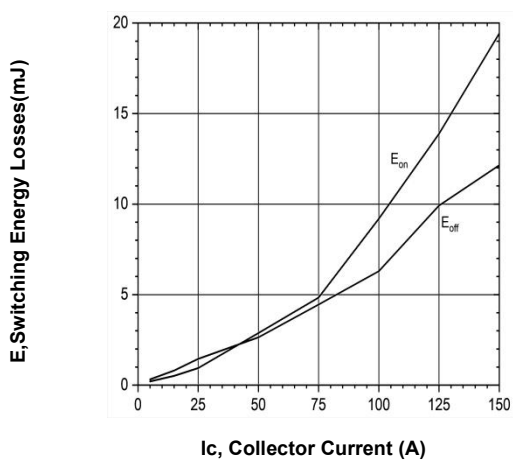


Figure 11. Typical switching losses vs. Collector current
($T_{vj}=175^{\circ}C$, $V_{CE}=600V$, $V_{GE}=15V$, $R_g=10\Omega$)

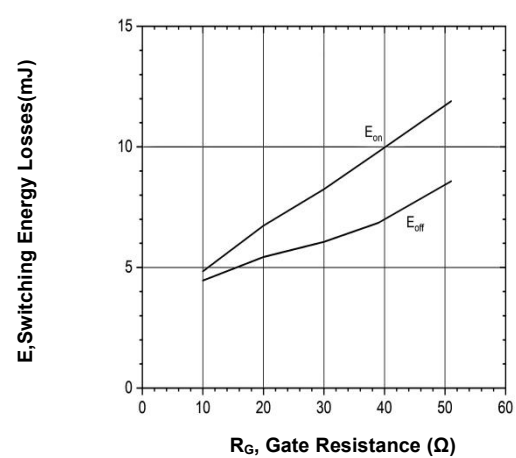


Figure 12. Typical capacitance vs. collector-emitter voltage
($T_{vj}=175^{\circ}C$, $V_{CE}=600V$, $V_{GE}=15V$, $R_g=10\Omega$)

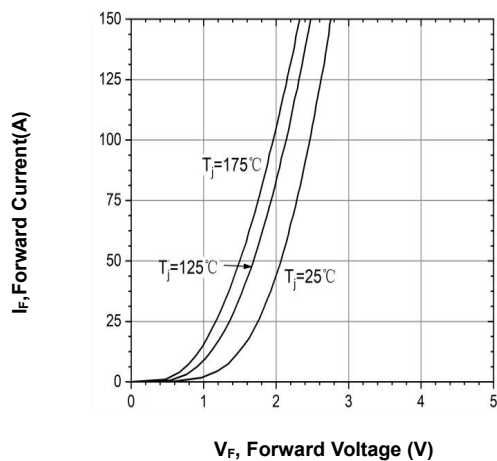


Figure 13. Typical forward characteristics of diode
($V_{CE} = 600\text{V}$, $V_{GE} = 15\text{V}$, $R_g = 10\Omega$)

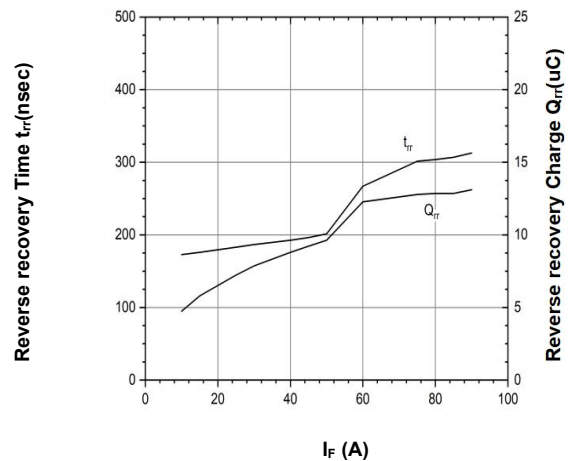


Figure 14. Typical reverse recovery characteristics vs. forward current of diode
($T_J = 175^\circ\text{C}$, $V_{CE} = 600\text{V}$, $V_{GE} = 15\text{V}$, $R_g = 10\Omega$)

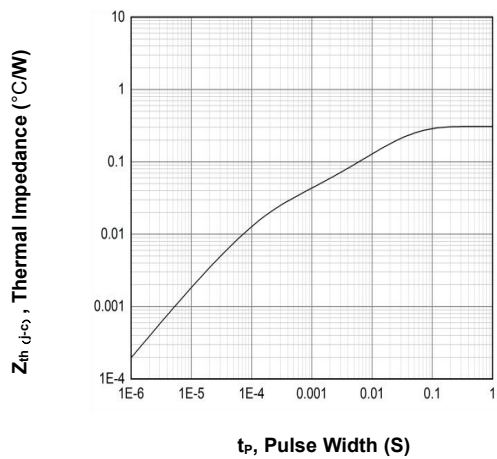


Figure 15. Transient thermal impedance of IGBT
($D = 0$)

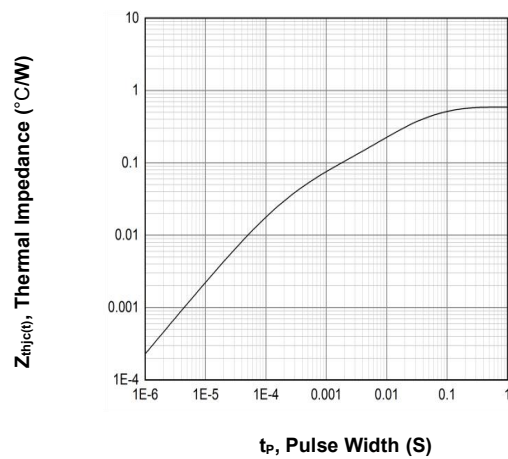


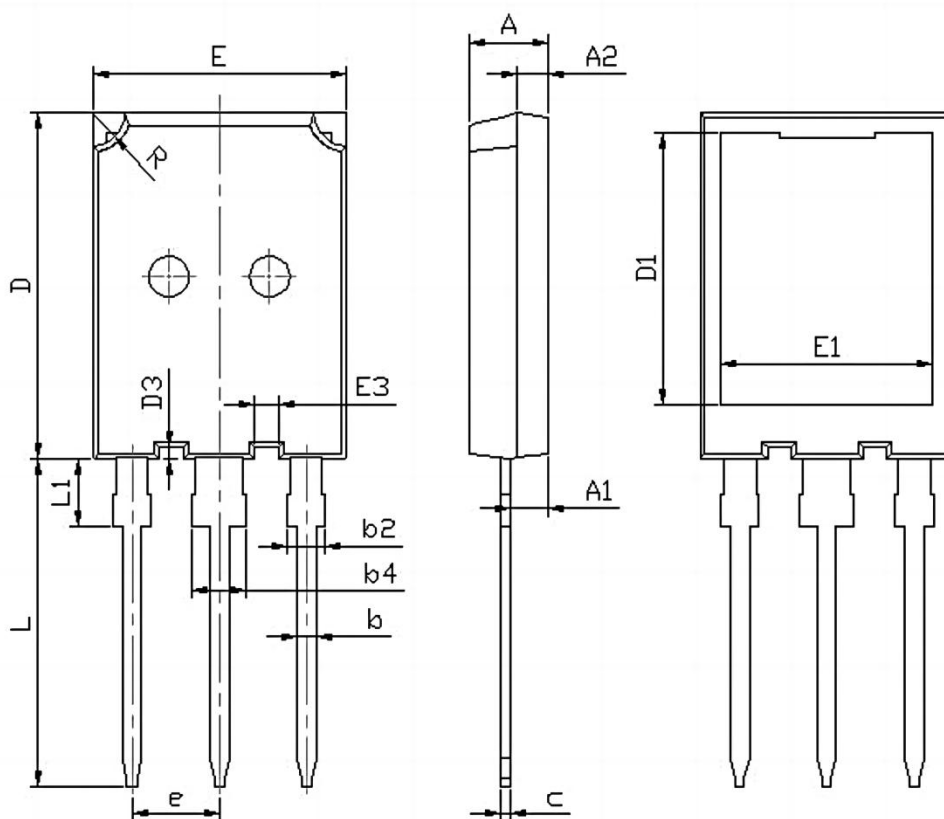
Figure 16. Transient thermal impedance of diode
($D = 0$)

TO-247PLUS-3 Package Outline

T0-247plus-3L MECHANICAL DATA

UNIT: mm

SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX
A	4.80	5.00	5.20	D3	0.53	0.68	0.83
A1	2.21	2.40	2.61	E	15.50	15.80	16.10
A2	1.85		2.15	E1	13.10	13.30	13.50
b	1.07	1.20	1.33	E3	1.30	1.45	1.60
b2	1.90		2.16	e		5.44	
b4	2.90		3.20	L	19.62	19.92	20.22
c	0.52	0.60	0.68	L1			4.30
D	20.70	21.00	21.30	R	1.85	2.00	2.15
D1	16.25	16.55	16.85				



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