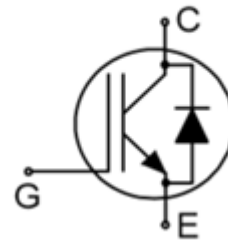


Trench Field-Stop Technology IGBT

Features

- 1200V, 75A
- $V_{CE(sat)(typ.)} = 1.95V @ V_{GE}=15V, I_C=75A$
- Low Switching Losses
- Low switching surge and noise
- Low EMI



Applications

- Solar Converters
- Uninterrupted Power Supply
- Energy Storage
- Welding machine
- EV Charger

Order codes	V_{CE}	I_C	$V_{CEsat}, T_{vj}=25^{\circ}C$	T_{vjmax}	Marking	Package
XD075H120A1S4-A	1200V	75A	1.95V	175°C	D75H120A1A	TO247plus-3

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current ($T_C=25^{\circ}C$)	150	A
	Continuous Collector Current ($T_C=100^{\circ}C$)	75	A
I_{CM}	Pulsed Collector Current (Note 1)	300	A
I_F	Diode Continuous Forward Current ($T_C=25^{\circ}C$)	150	A
	Diode Continuous Forward Current ($T_C=100^{\circ}C$)	75	A
P_D	Maximum Power Dissipation (IGBT)	420	W
	Maximum Power Dissipation (FWD)	300	W
T_J	Operating Junction Temperature Range	-40 to 175	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT	0.24	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diodes	0.43	°C/W

Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=500\mu A$	1200	---	---	V	
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200V, V_{GE}=0V$	---	---	200	μA	
I_{GES}	Gate Leakage Current, Forward	$V_{GE}=30V, V_{CE}=0V$	---	---	200	nA	
	Gate Leakage Current, Reverse	$V_{GE}=-30V, V_{CE}=0V$	---	---	-200	nA	
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=2.6mA$	5.0	5.8	6.6	V	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=75A$	---	1.95	2.4	V	
Q_G	Total Gate Charge	$V_{CC}=960V, V_{GE}=15V$ $I_C=75A$	---	590	---	nC	
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $V_{GE}=\pm 15V$ $I_C=75A$ $R_G=0.6\Omega$ Inductive Load $T_C=25^\circ\text{C}$	---	42	---	ns	
t_r	Turn-on Rise Time		---	146	---	ns	
$t_{d(off)}$	Turn-off Delay Time		---	122	---	ns	
t_f	Turn-off Fall Time		---	105	---	ns	
E_{on}	Turn-on Switching Loss		---	4.0	---	mJ	
E_{off}	Turn-off Switching Loss		---	2.4	---	mJ	
E_{ts}	Total Switching Loss		---	6.4	---	mJ	
C_{ies}	Input Capacitance		$V_{CE}=25V$	---	19.5	---	nF
C_{oes}	Output Capacitance		$V_{GE}=0V$	---	240	---	pF
C_{res}	Reverse Transfer Capacitance	$f=1MHz$	---	130	---	pF	

Diode Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F=75A$	---	2.2	3.0	V
t_{rr}	Diode Reverse Recovery Time	$V_{CE}=600V$ $I_F=75A$ $di_F/dt=680A/\mu s$	---	210	---	ns
I_{rr}	Diode Peak Reverse Recovery Current		---	26	---	A
Q_{rr}	Diode Reverse Recovery Charge		---	2.9	---	μC

Note 1: Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Characteristics

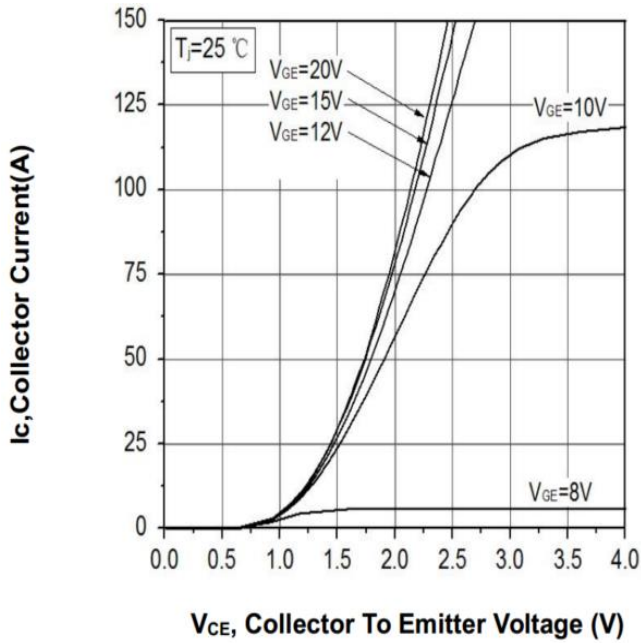


Fig. 1 Typical IGBT Output Characteristics at $T_J=25^\circ\text{C}$

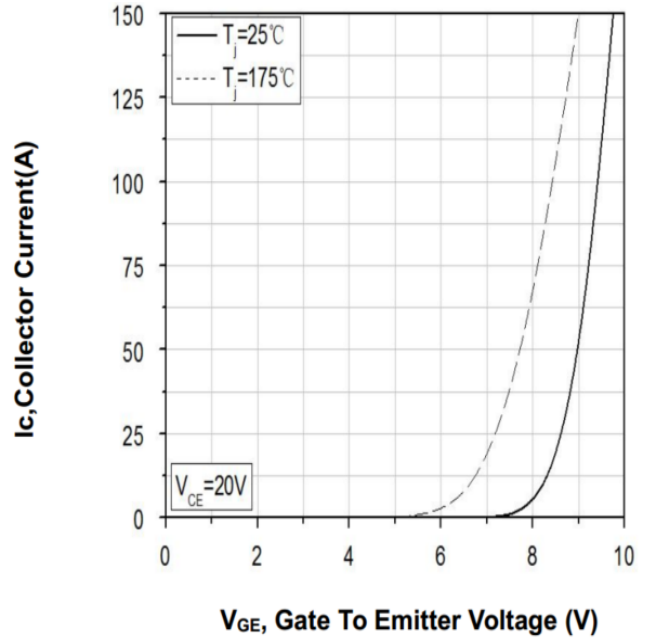


Fig. 2 Typical Transfer Characteristics at $V_{CE}=20\text{V}$

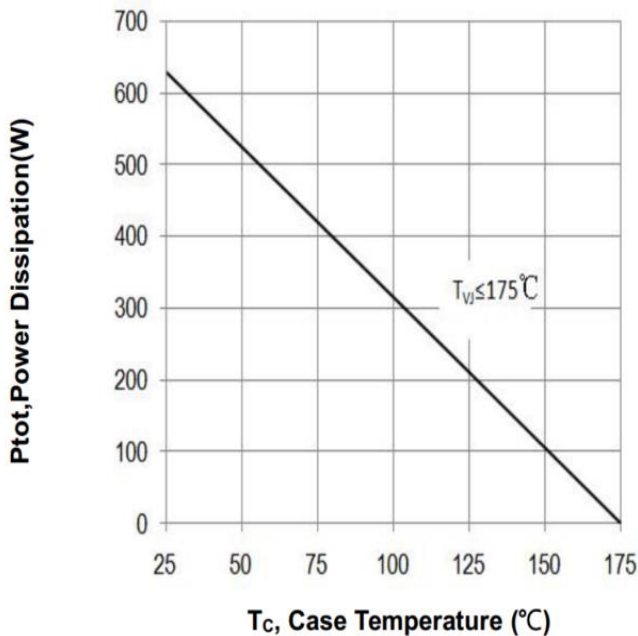


Fig. 3 Power dissipation vs. case temperature ($T_{vj} \leq 175^\circ\text{C}$)

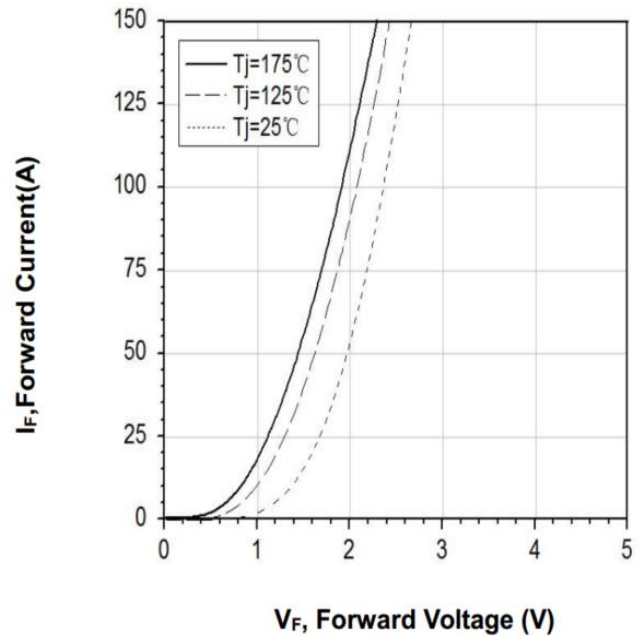


Fig. 4 Forward characteristic of Diode-Inverter

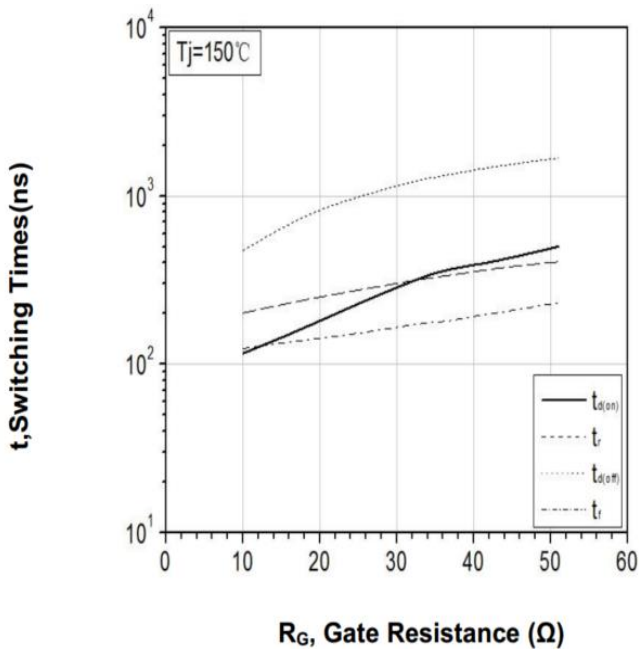


Fig. 5 Typical switching times vs. gate resistor
(Ind. Load, $T_{vj}=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$,
 $V_{GE}=15/0\text{V}$, $I_C=75\text{A}$)

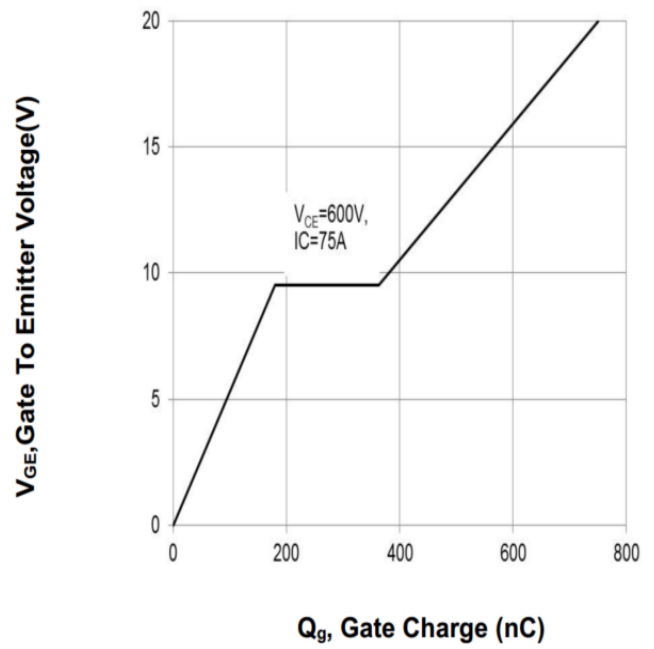


Fig. 6 Typical gate charge ($I_C=40\text{A}$)

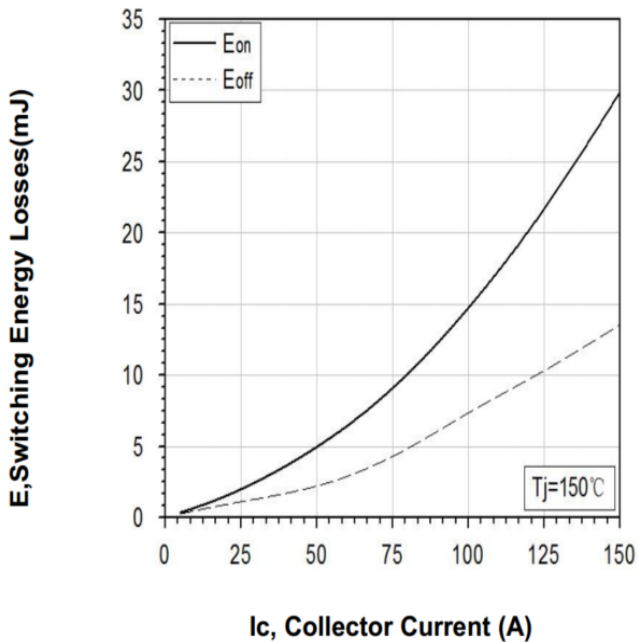


Fig. 7 Typical switching energy losses vs. collector current (Ind. load, $T_{vj}=175^{\circ}\text{C}$,
 $V_{CE}=600\text{V}$, $V_{GE}=15/0\text{V}$, $R_g=10\Omega$)

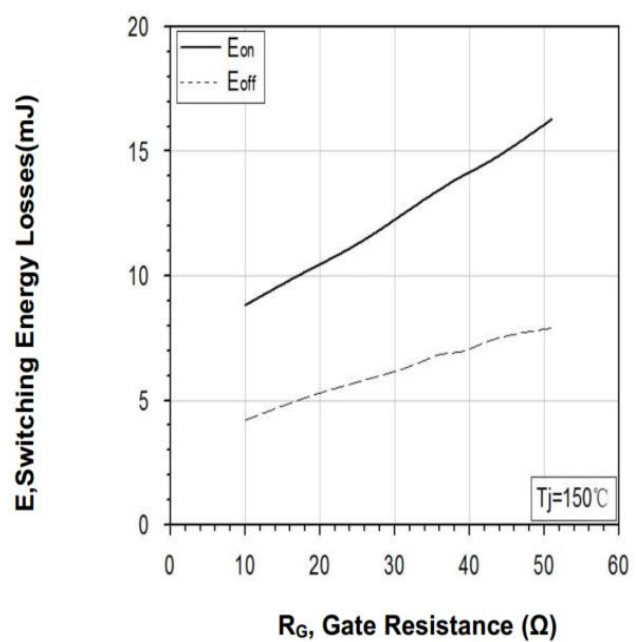


Fig. 8 Typical switching energy losses vs. gate resistor (Ind. load, $T_{vj}=175^{\circ}\text{C}$,
 $V_{CE}=600\text{V}$, $V_{GE}=15/0\text{V}$, $R_g=10\Omega$)

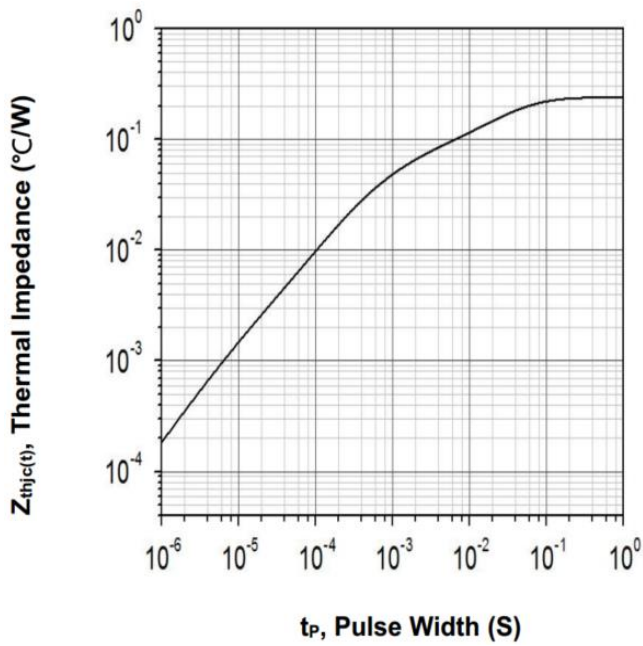


Fig. 9 Typical reverse recovery time vs. diode current

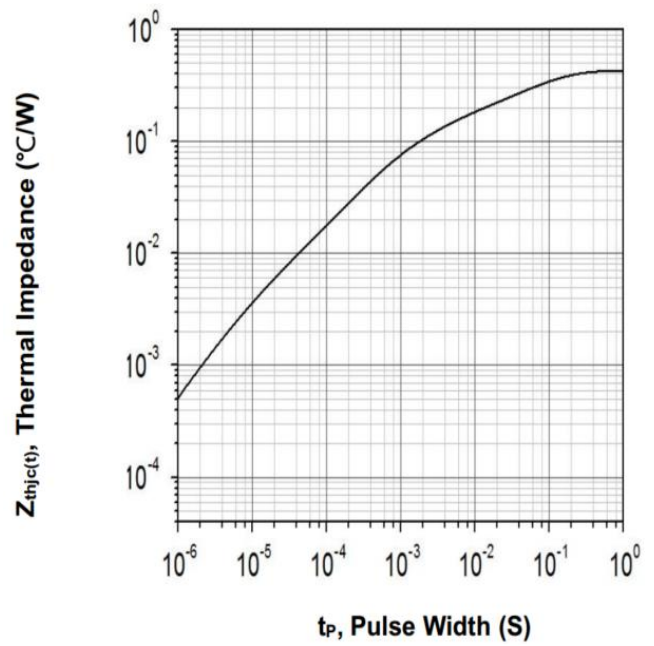


Fig. 10 Typical reverse recovery charge vs. diode current slope (VR=600V)

Package Information

TO-247plus

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				

