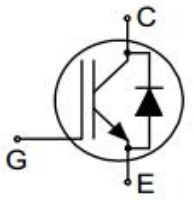
IGBT

Features

- 650V,30A
- $V_{CE(sat)(typ.)}$=1.7V@V_{GE}=15V,I_C=30A
- High ruggedness performance
- 10μs short circuit capability
- High efficiency for motor control
- Excellent current sharing in parallel operation



Applications

- Home appliances
- Motor drives
- General inverter

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Continuous Collector Current (T_C=25℃)	60	A
	Continuous Collector Current (T_C=100℃)	30	A
I_{CM}	Pulsed Collector Current (Note 1)	120	A
I_F	Diode Continuous Forward Current (T_C=100℃)	30	A
I_{FM}	Diode Maximum Forward Current (Note 1)	80	A
t_{sc}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation (T_C=25℃)	50	W
	Maximum Power Dissipation (T_C=100℃)	25	W
T_J	Operating Junction Temperature Range	-40 to +175	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	3.0	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	4.5	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	50	℃/ W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	650	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 650V, V_{GE}= 0V	-	-	50	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=±20V, V_{CE}= 0V	-	-	±100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 1mA	5.2	5.7	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 30A	-	1.7	-	V
Q_g	Total Gate Charge	V_{CC}=520V V_{GE}=15V I_C=30A	-	103	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=400V V_{GE}=15V I_C=30A R_G=10Ω Inductive Load T_C=25 ℃	-	30	-	ns
t_r	Turn-on Rise Time		-	39	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	151	-	ns
t_f	Turn-off Fall Time		-	29	-	ns
Eon	Turn-on Switching Loss		-	0.95	-	mJ
Eoff	Turn-off Switching Loss		-	0.60	-	mJ
Ets	Total Switching Loss		-	1.55	-	mJ
C_{ies}	Input Capacitance	V_{CE}=30V V_{GE}=0V f = 1MHz	-	1978	-	pF
C_{oes}	Output Capacitance		-	100	-	pF
C_{res}	Reverse Transfer Capacitance		-	23	-	pF

Electrical Characteristics of Diode (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=30A	-	1.4	-	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 400V I_F = 30A dif/dt = 550A/us	-	105	-	ns
I_{rr}	Diode peak Reverse Recovery Current		-	16	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	876	-	nC

Notes:

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

Typical performance characteristics

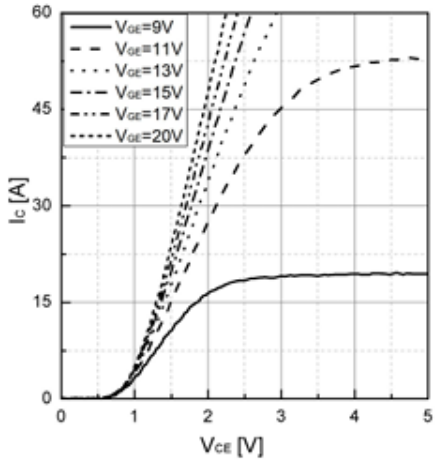


Fig 1. Typical output characteristic (T_{vj}=25℃)

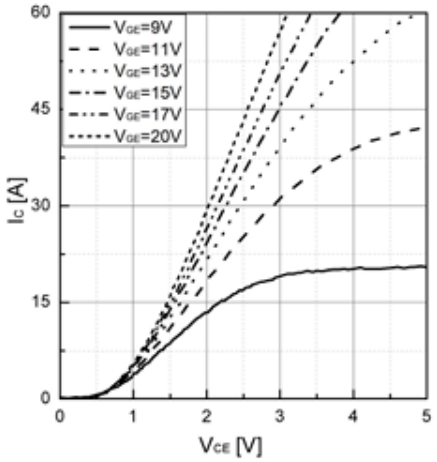


Fig 2. Typical output characteristic(T_{vj}=175℃)

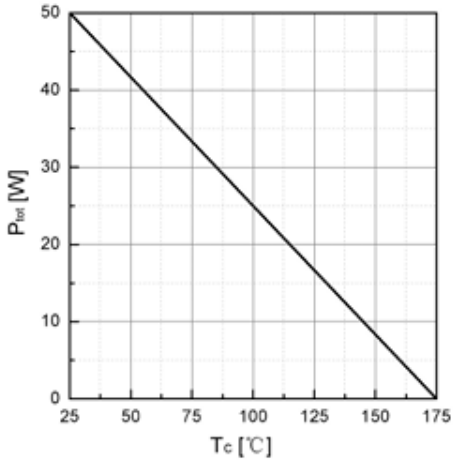


Fig 3. Power dissipation as a function of T_C

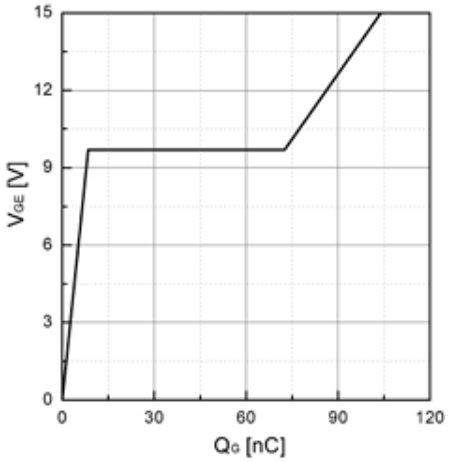


Fig 4. Typical Gate charge

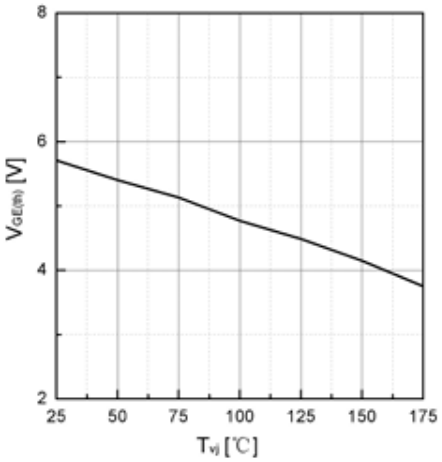


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj} (I_C=1mA)

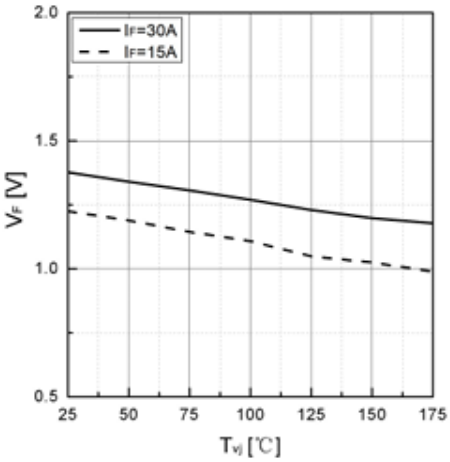


Fig 6. Typical V_F as a function of T_{vj}

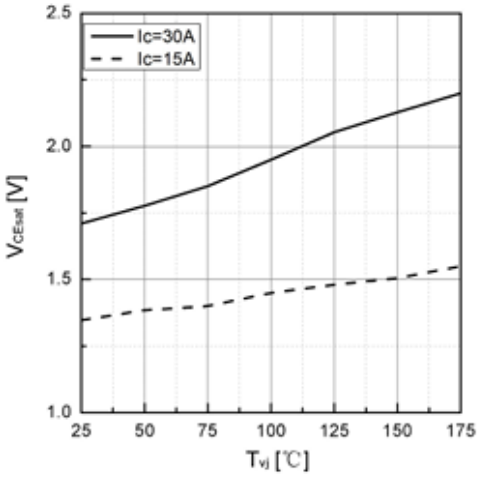


Fig 7. Typical V_{CEsat} as a function of T_{vj}

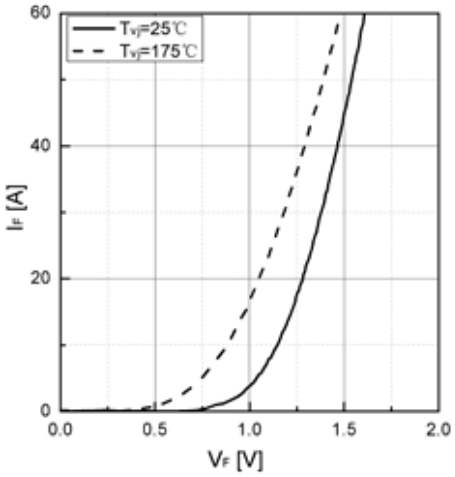


Fig 8. Typical I_F as a function of V_F

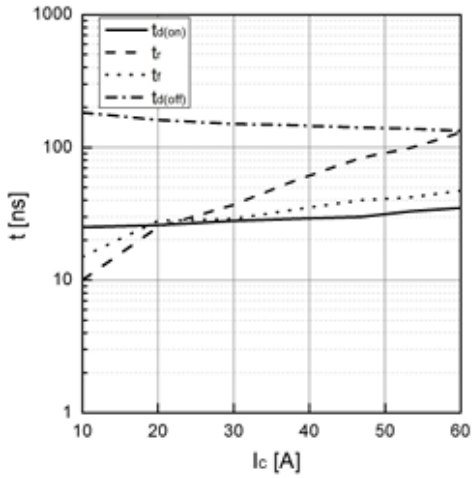


Fig 9. Typical switching time as a function of I_C

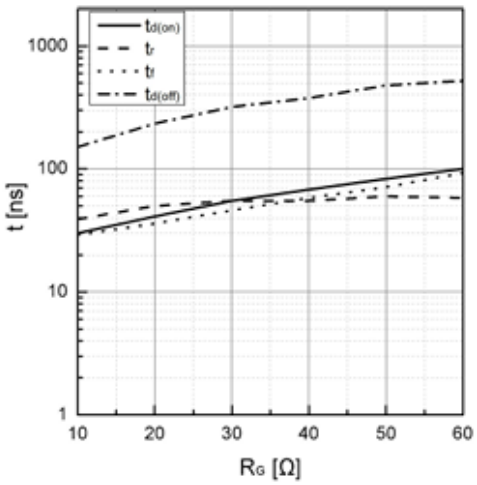


Fig 10. Typical switching times as a function of R_G

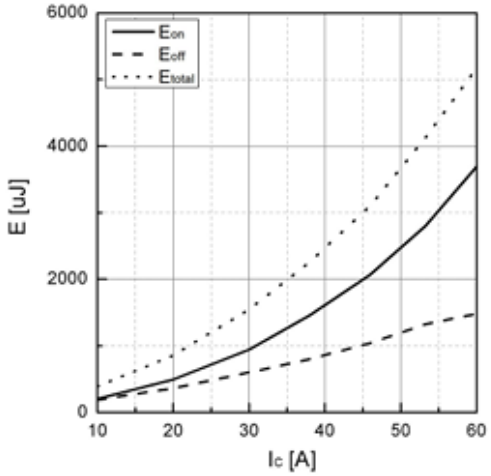


Fig 11. Typical switching energy losses as a function of I_C

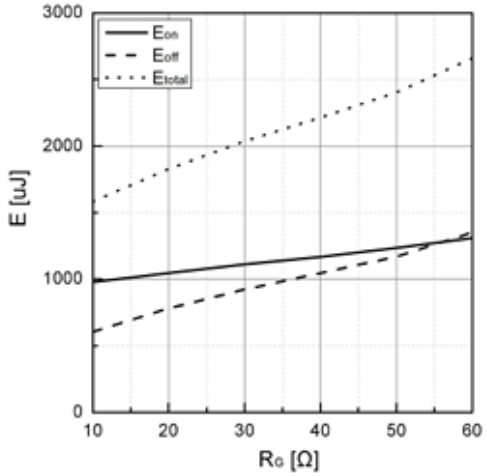


Fig 12. Typical switching energy losses as a function of R_G

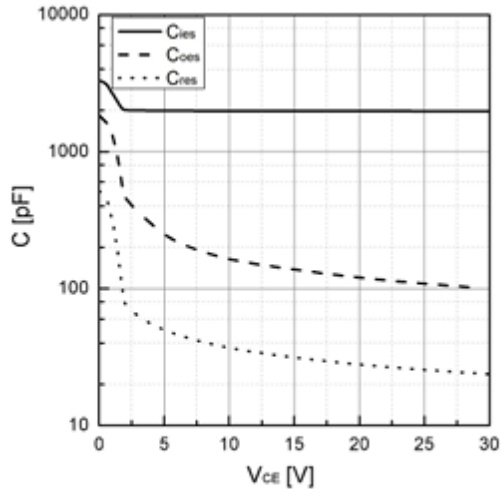
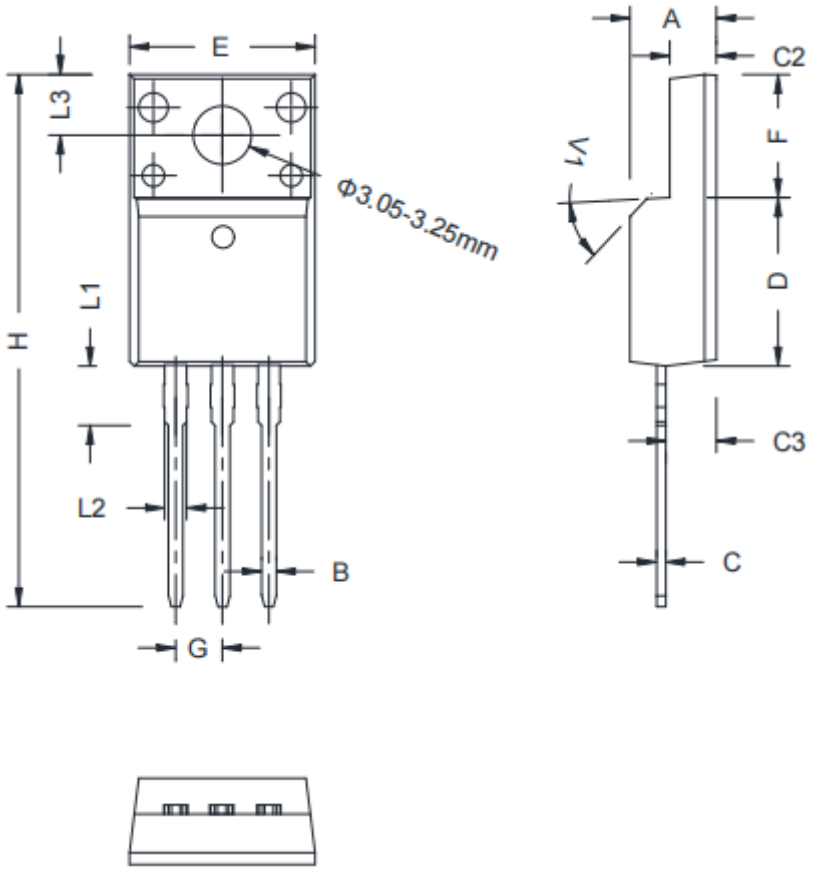


Fig 13. Typical capacitance as a function of V_{CE}
(f=1Mhz, V_{GE}=0V)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50	-	4.90	0.177	-	0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47	-	0.66	0.019	-	0.026
C2	2.45	-	2.75	0.096	-	0.108
C3	2.60	-	3.00	0.102	-	0.118
D	8.80	-	9.30	0.346	-	0.366
E	9.80	-	10.40	0.386	-	0.410
F	6.40	-	6.80	0.252	-	0.268
G	2.40	-	2.70	0.094	-	0.106
H	28.0	-	29.80	1.102	-	1.173
L1	-	3.63	-	-	0.143	-
L2	1.14	-	1.70	0.045	-	0.067
L3	-	3.30	-	-	0.130	-
V1	-	45°	-	-	45°	-

Disclaimers

JIAEN Semiconductor Co., Ltd reserves the right to make changes without notice in order to improve reliability, function or design and to discontinue any product or service without notice. Customers should obtain the latest relevant information before orders and should verify that such information is current and complete. All products are sold subject to JIAEN's terms and conditions supplied at the time of order acknowledgement.

JIAEN Semiconductor Co., Ltd warrants performance of its hardware products to the specifications at the time of sale, Testing, reliability and quality control are used to the extent JIAEN deems necessary to support this warrantee. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

JIAEN Semiconductor Co., Ltd does not assume any liability arising from the use of any product or circuit designs described herein. Customers are responsible for their products and applications using JIAEN's components. To minimize risk, customers must provide adequate design and operating safeguards.

JIAEN Semiconductor Co., Ltd does not warrant or convey any license either expressed or implied under its parent rights, nor the rights of others. Reproduction of information in JIAEN's datasheets or data books sis permissible only if reproduction is without modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice. JIAEN Semiconductor Co., Ltd is not responsible or liable for such altered documentation.

Resale of JIAEN's products with statements different from or beyond the parameters stated by JIAEN Semiconductor Co., Ltd for that product or service voids all express or implied warrantees for the associated JIAEN's product or service and is unfair and deceptive business practice. JIAEN Semiconductor Co., Ltd is not responsible or liable for any such statements.