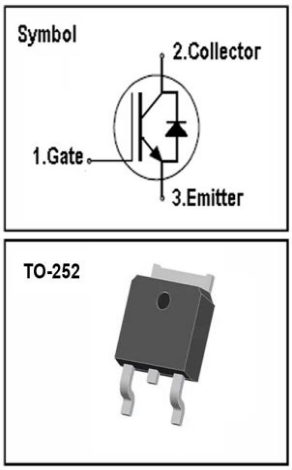
佳恩半导体
JIAENSEMI

JNG5T65DS1

IGBT

Features



- 650V,5A
- $V_{CE(sat)(typ.)}$=1.8V@V_{GE}=15V,I_C=5A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA using NPT technology

General Description

JIAEN Trench IGBTs offer lower losses and higher energy efficiency for application general inverter and Motor control

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25 ℃)	10	A
	Continuous Collector Current (T_C=100℃)	5	A
I_{CM}	Pulsed Collector Current (Note 1)	15	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	5	A
I_{FM}	Diode Maximum Forward Current (Note 1)	15	A
t_{sc}	Short Circuit Withstand Time	⩽10	us
P_D	Maximum Power Dissipation (T_C=25 ℃)	67.5	W
	Maximum Power Dissipation (T_C=100℃)	27	W
T_J	Operating Junction Temperature Range	-40~150	℃
T_{STG}	Storage Temperature Range	-55~150	℃
T_L	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	1.85	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	5.5	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	55	℃/ 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	-	-	100	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}= 30V, V_{CE}= 0V	-	-	100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V	-	-	100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	4.5	-	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}= 15V, I_C= 5A	-	1.8	2.35	V
Qg	Total Gate Charge	V_{CC}=480V V_{GE}=15V I_C=5A	-	10.9		nC
Qge	Gate-Emitter Charge		-	1.95		nC
Qgc	Gate-Collector Charge		-	6.08		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=400V V_{GE}=15V I_C=5A R_G=15Ω Inductive Load 100uH T_C=25 ℃	-	9	-	ns
t_r	Turn-on Rise Time		-	10	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	36	-	ns
t_f	Turn-off Fall Time		-	49	-	ns
Eon	Turn-on Switching Loss		-	137.8	-	uJ
Eoff	Turn-off Switching Loss		-	71.5	-	uJ
Ets	Total Switching Loss		-	209.3	-	uJ
Cies	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 1MHz	-	244	-	pF
Coes	Output Capacitance		-	21	-	pF
Cres	Reverse Transfer Capacitance		-	4.7	-	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= 5A	-	1.4	2.0	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 400V I_F= 5A R_G=15Ω	-	44	-	ns
I_{rr}	Diode peak Reverse Recovery Current		-	5.3	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	223.8	-	nC

Notes：

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

Typical Performance Characteristics

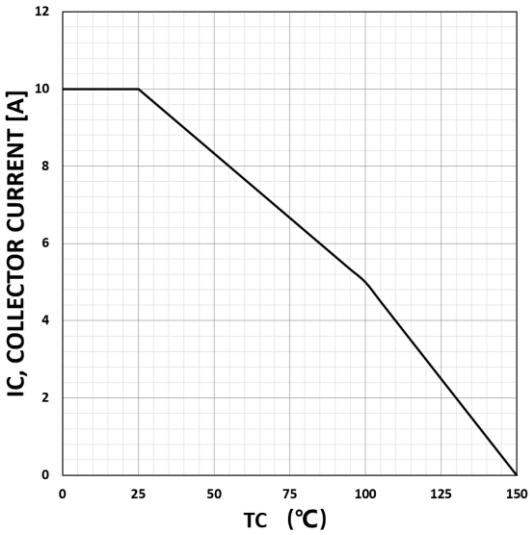


Figure 1. Maximum DC collector current VS. case temperature

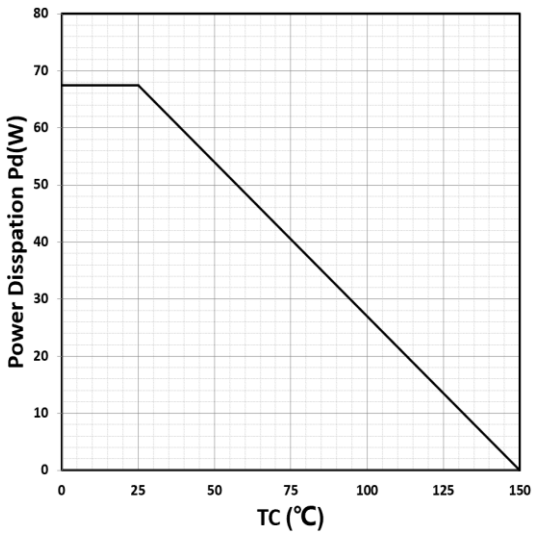


Figure 2. Power dissipation VS. case temperature

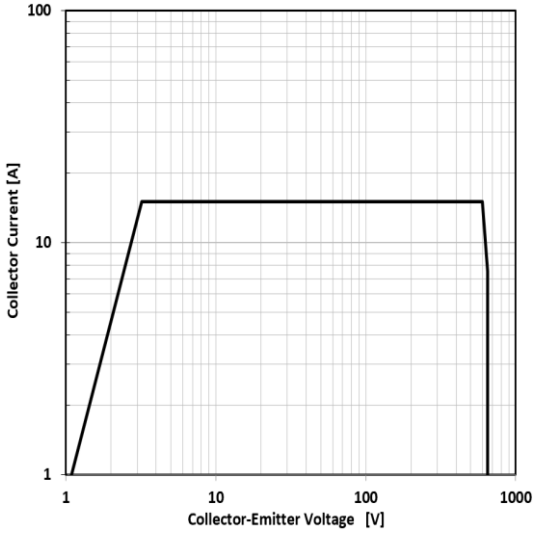


Figure 3. Reverse bias SOA, Tj=125℃,Vge=15V

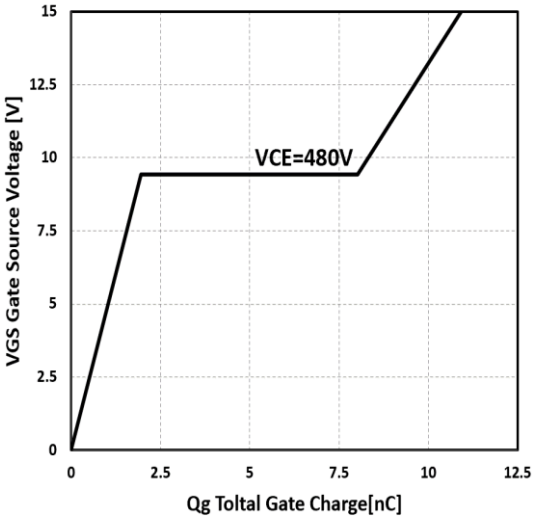


Figure4:Typical gate charge VS. VGE, IC=5A

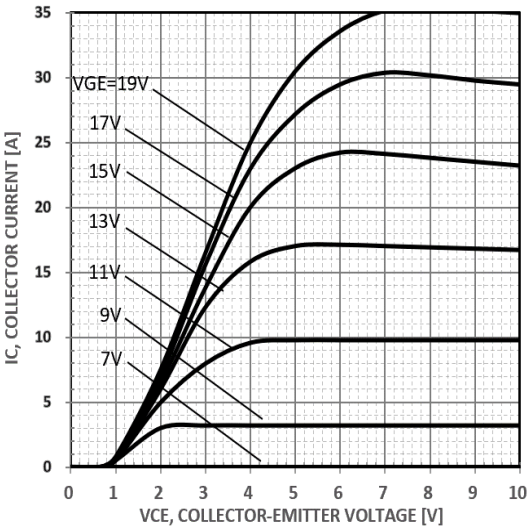


Figure 5. Typical output characteristics
tp=300us Tc=25℃

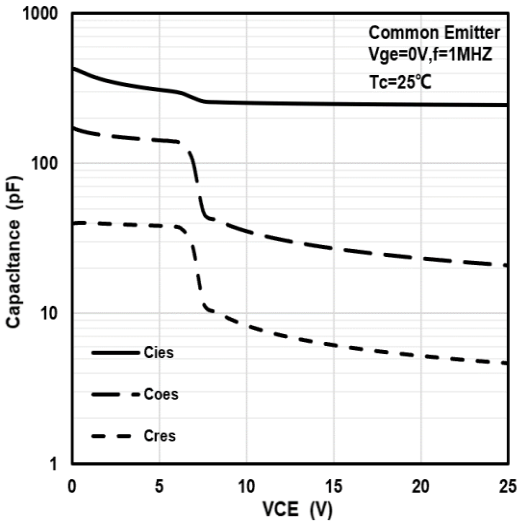


Figure 6. Typical capacitance VS. VCE,
VGE=0V,f=1MHz

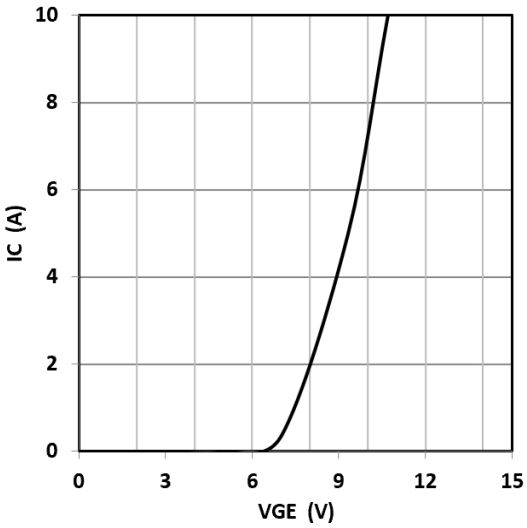


Figure 7. Typical gate threshold voltage

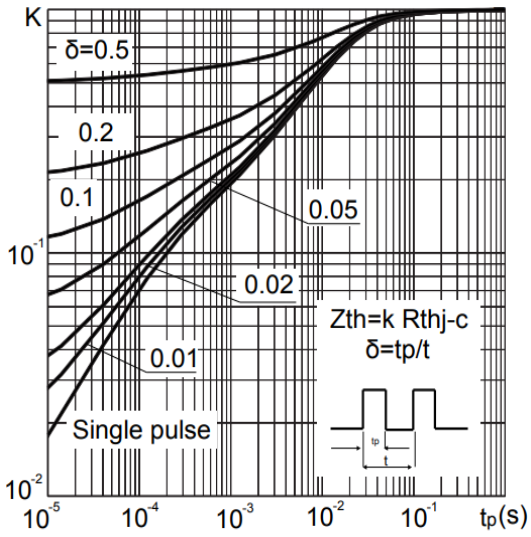


Figure 8. Normalized Maximum Transient
Thermal Impedance for IGBT

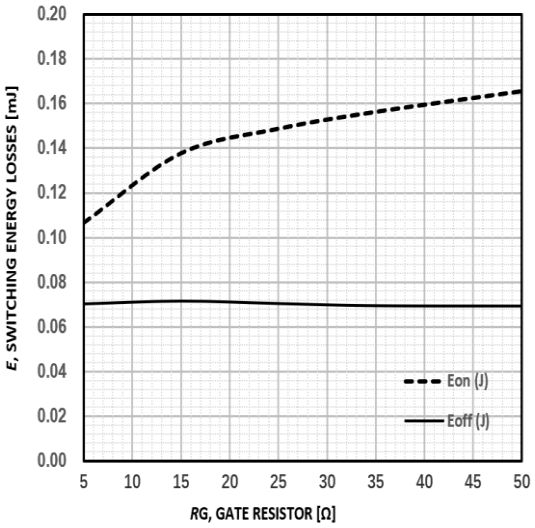


Figure9: Typical energy loss VS. Rg,TC=25℃,

VCE=400V, VGE=15V ,IC=5A

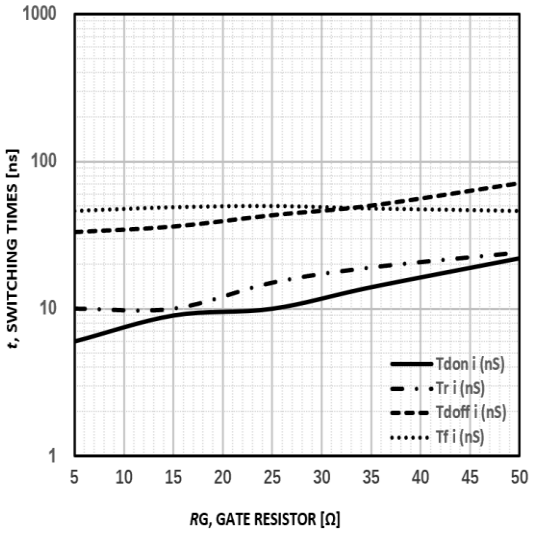


Figure10: Typical switching time VS. Rg,TC=25℃,

VCE=400V, VGE=15V ,IC=5A

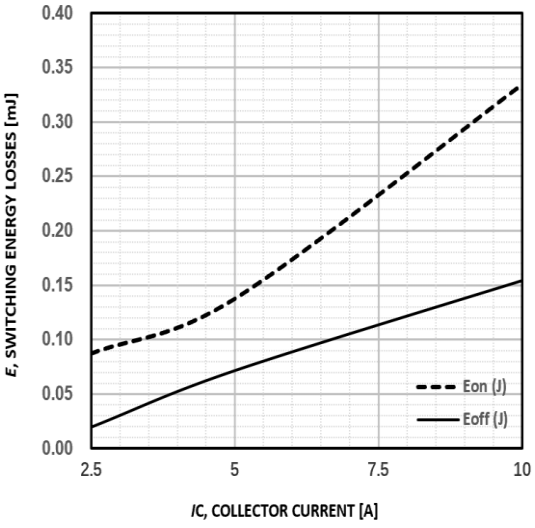


Figure11: Typical energy loss VS. IC, TC=25℃,

VCE=400V, VGE=15V ,RG=15Ω

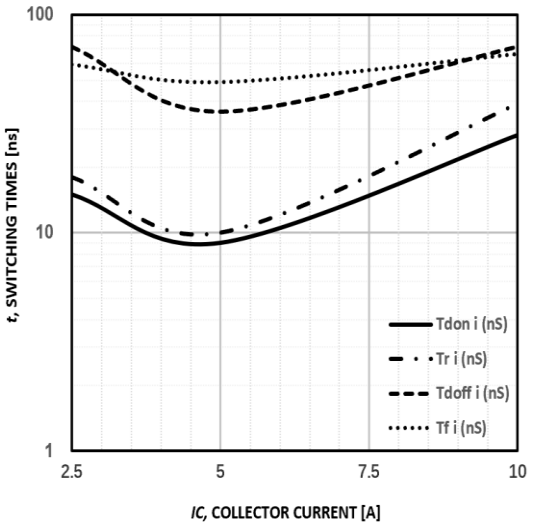


Figure12: Typical switching time VS. IC, TC=25℃,

VCE=400V, VGE=15V,RG=15Ω

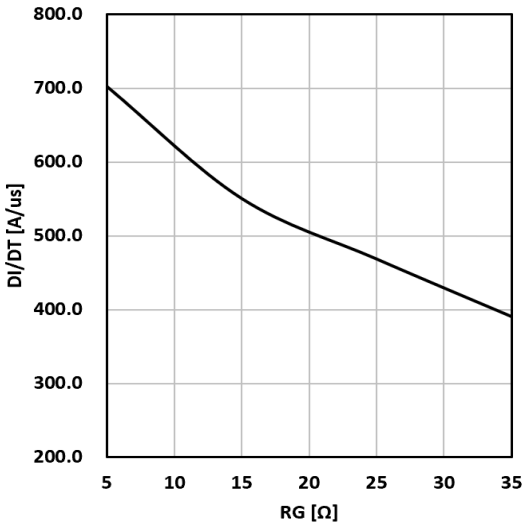


Figure 13. Typical diode di/dt vs rg Tc=25℃

VCE=400V VGE=15V IF=5A

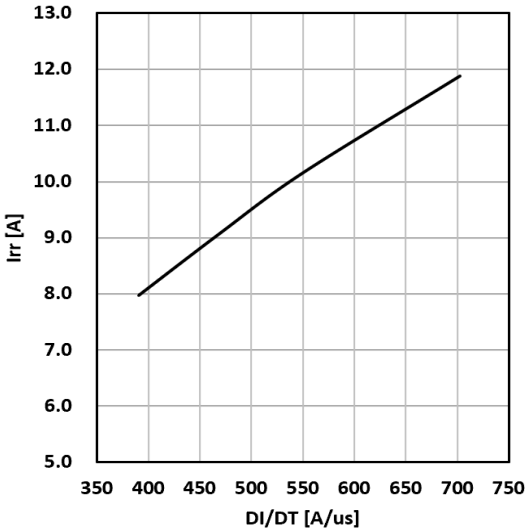


Figure 14. Typical diode irr vs di/dt Tc=25℃

VCE=400V VGE=15V IF=5A

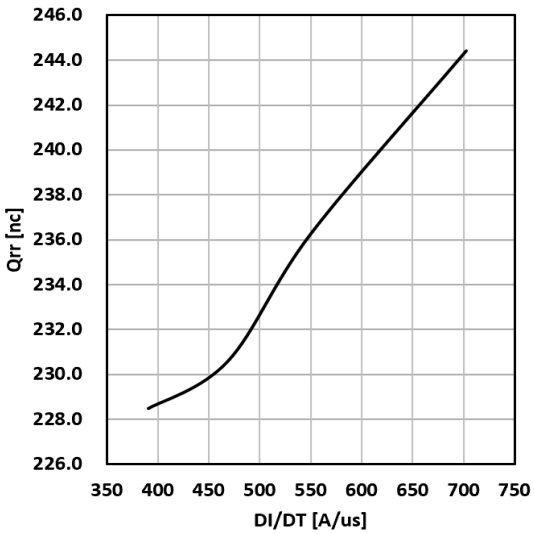


Figure 15. Typical diode Qrr vs di/dt Tc=25℃

VCE=400V VGE=15V IF=5A

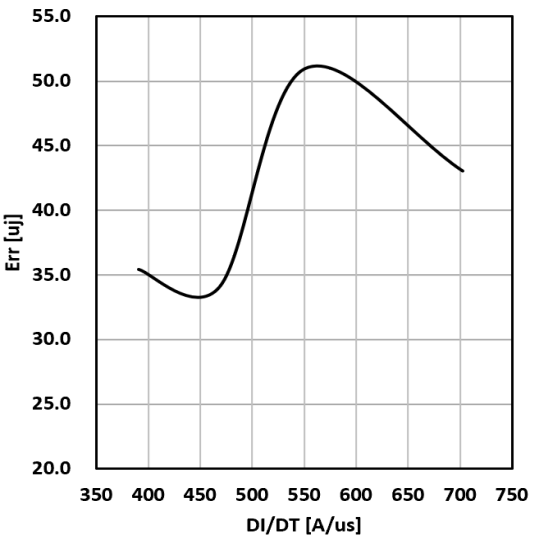
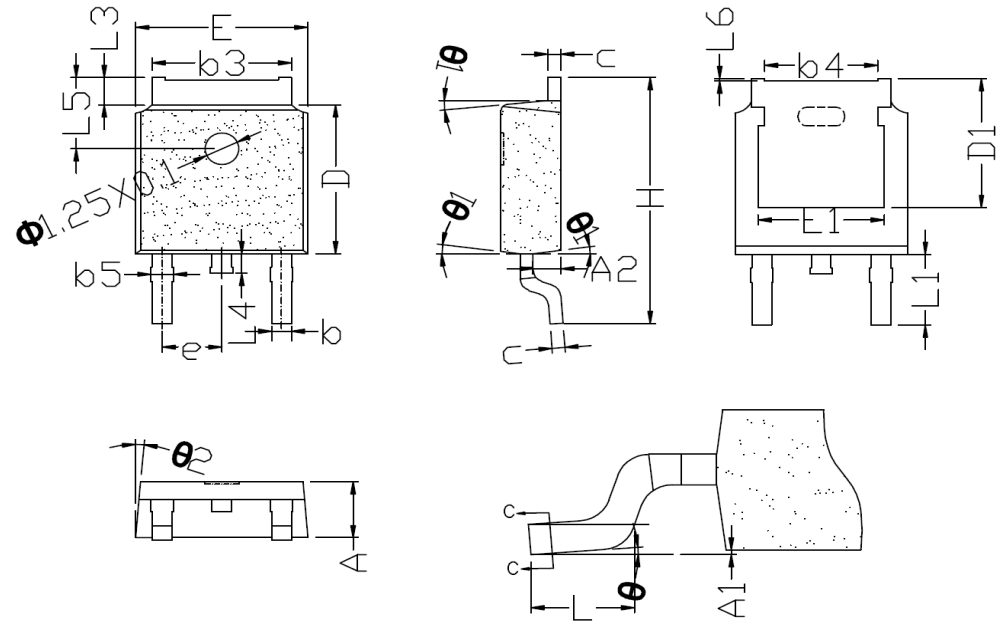
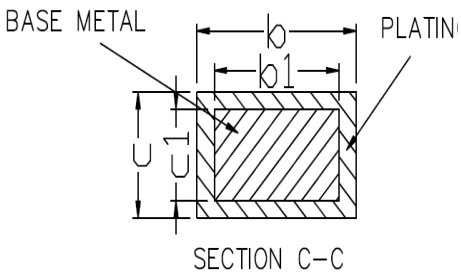


Figure 16. Typical diode Err vs di/dt Tc=25℃

VCC=400V VGE=15V IF=5A

TO252 PACKAGE OUTLINE





SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	—	0.15
A2	0.90	1.00	1.10
b	0.72	0.78	0.85
b1	0.71	0.76	0.83
b3	5.23	5.33	5.46
b4	4.27	4.32	4.37
b5	0.78	0.85	0.90
c	0.47	0.52	0.55
c1	0.46	0.50	0.53
D	6.00	6.10	6.20
D1		5.40REF	
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e		2.286BSC	
H	9.90	10.10	10.20
L	1.40	1.55	1.70
L1		2.90REF	
L3	0.90	—	1.20
L4	0.75	0.85	0.95
L5	1.70	1.80	1.90
L6	0.02	0.04	0.08
θ	0°	—	5°
θ1	5°	7°	9°
θ2	5°	7°	9°

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