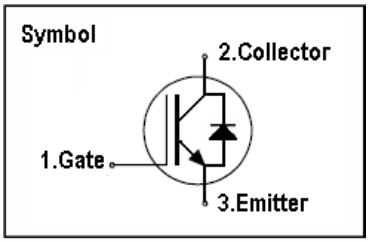
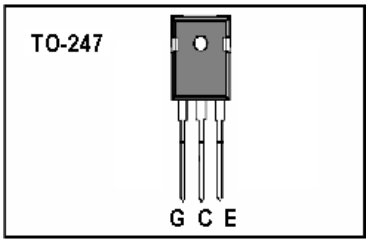
IGBT

Features

- 1200V,40A
- $V_{CE(sat)(typ.)}$= 1.85V@V_{GE}= 15V,I_C= 40A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms





General Description

JIAEN Trench IGBTs offer lower losses and higher energy efficiency for application such as induction heating，UPS, AC & DC motor controls and general purpose inverter .

Absolute Maximum Ratings (Tc = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25℃)	80	A
	Continuous Collector Current (T_C=100℃)	40	A
I_{CM}	Pulsed Collector Current (Note 1)	160	A
I_F	Diode Continuous Forward Current (T_C=100℃)	40	A
I_{FM}	Diode Maximum Forward Current (Note 1)	160	A
t_{sc}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation (T_C=25℃)	415	W
	Maximum Power Dissipation (T_C=100℃)	165	W
T_J	Operating Junction Temperature Range	-50 to +150	℃
T_{STG}	Storage Temperature Range	-50 to +150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.29	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.65	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/ 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	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 1200V, 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= 40A	-	1.85	2.5	V
		V_{GE}=15V, I_C= 40A Tc = 125 ℃		2.05		
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=15V I_C=40A R_G=15Ω Inductive Load T_C=25 ℃	-	85	-	ns
t_r	Turn-on Rise Time		-	50	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	470	-	ns
t_f	Turn-off Fall Time		-	210	-	ns
Eon	Turn-on Switching Loss		-	2.8	-	mJ
Eoff	Turn-off Switching Loss		-	3.6	-	mJ
Ets	Total Switching Loss		-	6.4	-	mJ
Cies	Input Capacitance	V_{CE}=30V V_{GE}=0V f = 1MHz	-	4500	-	pF
Coes	Output Capacitance		-	190	-	pF
Cres	Reverse Transfer Capacitance		-	90	-	pF
Qg	Total Gate Charge	V_{CC} =600V V_{GE} =15V I_C = 40A	-	380		nC
Qge	Gate-Emitter Charge		-	25		nC
Qgc	Gate-Collector Charge		-	215		nC

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= 40A	-	2.0	2.8	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 400V I_F= 40A dIF/dt = 200A/us	-	200		ns
I_{rr}	Diode peak Reverse Recovery Current		-	16		A
Q_{rr}	Diode Reverse Recovery Charge		-	1800		nC

Notes：

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

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

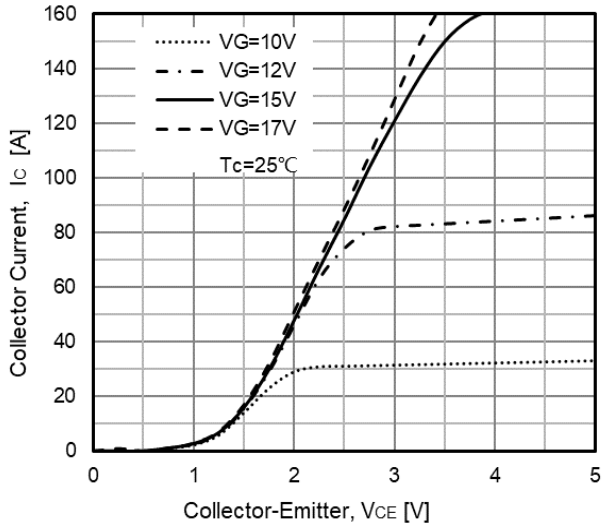


Figure 2. Typical Saturation Voltage Characteristics

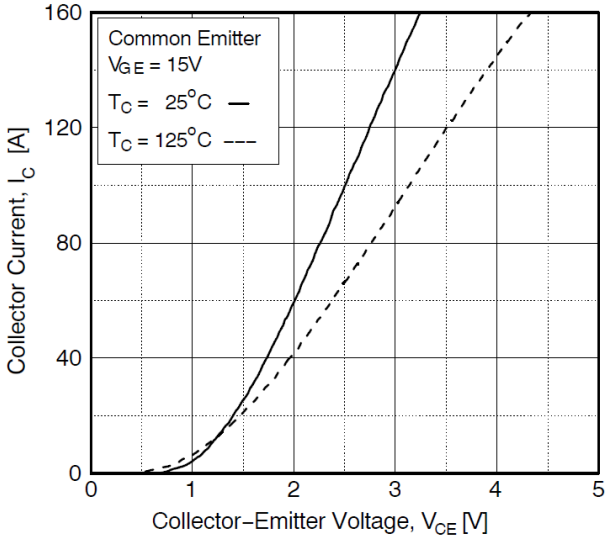


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

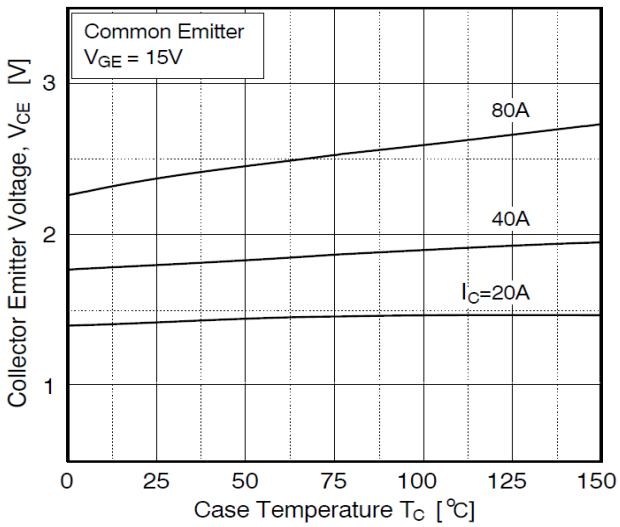
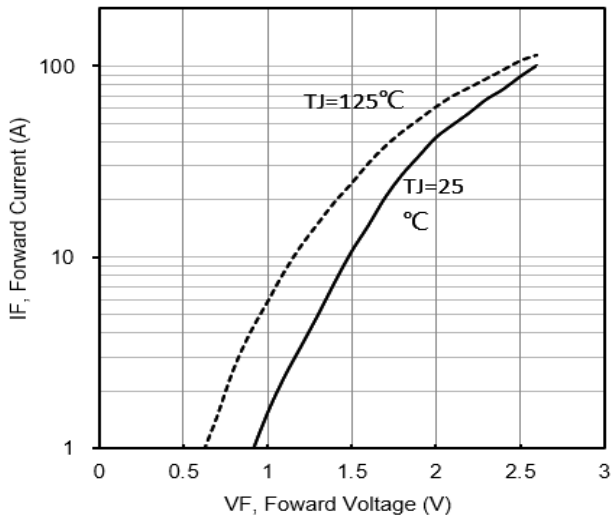


Figure 4. Forward Characteristics



Typical Performance Characteristics

Figure 5. Saturation Voltage vs. VGE

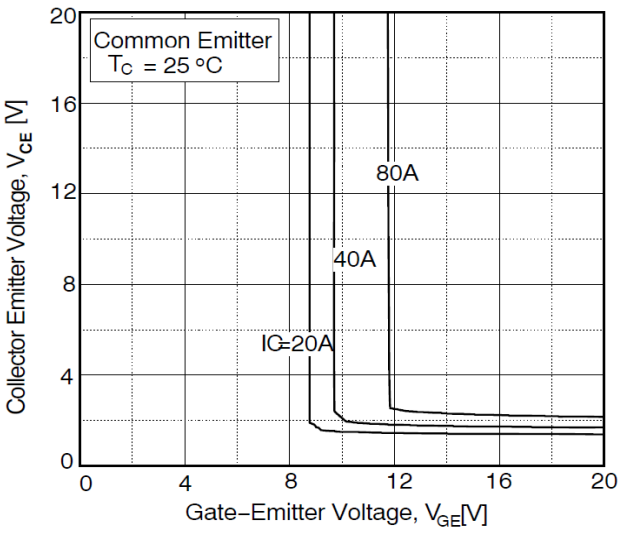


Figure 6. Saturation Voltage vs. VGE

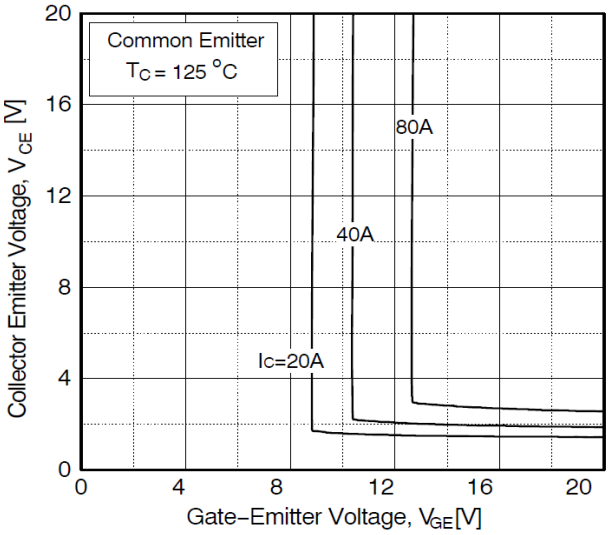


Figure 7.Switching Loss vs. Gate Resistance

（VCC=600V, VGE= ±15V, IC=40A, TC=25℃）

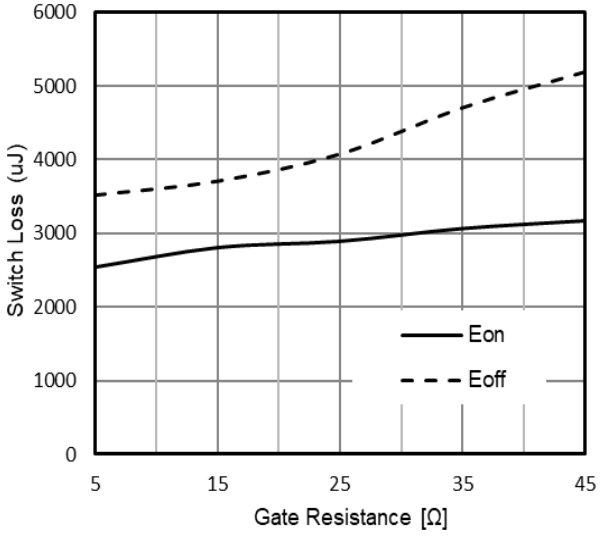
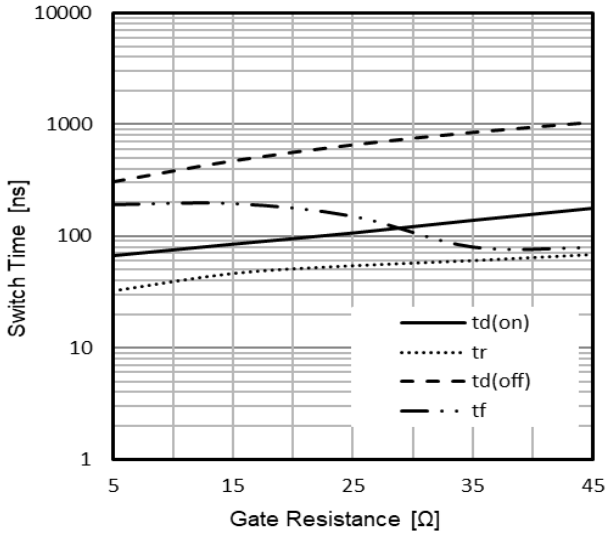


Figure 8. Switch time vs. Gate Resistance

（VCC=600V, VGE= ±15V, IC=40A , TC=25℃）



Typical Performance Characteristics

Figure 9. Switch Time vs. Collector Current

（VGE=±15V, RG=5 Ohm, VCC=600V , TC=25℃ ）

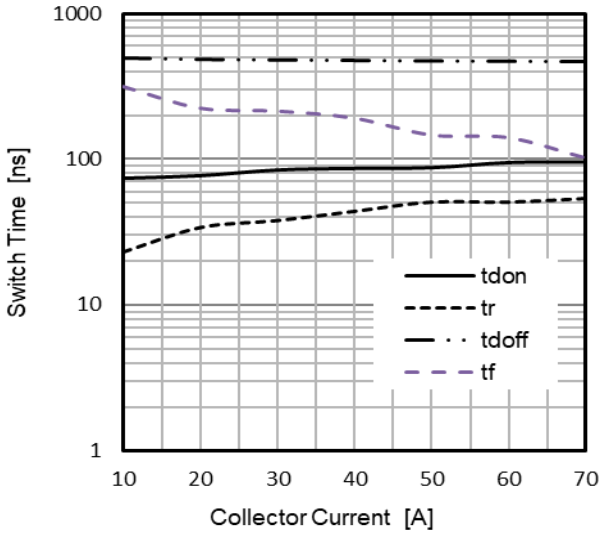


Figure 10. Capacitance Characteristics

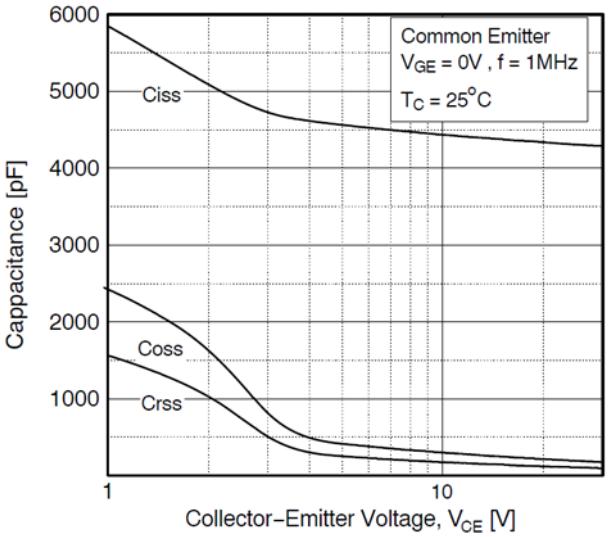


Figure 11. Gate Charge Characteristics

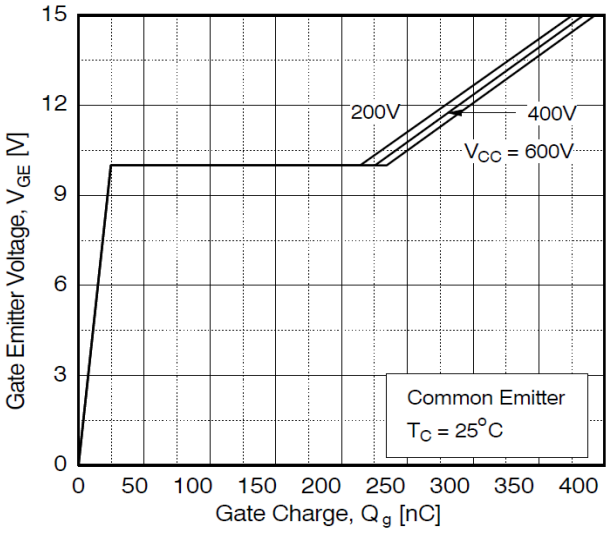
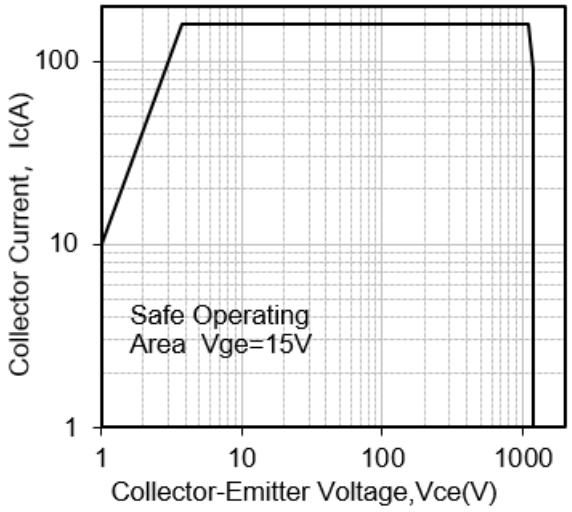


Figure 12. Turn Off SOA



Typical Performance Characteristics

Figure 13. SOA Characteristics

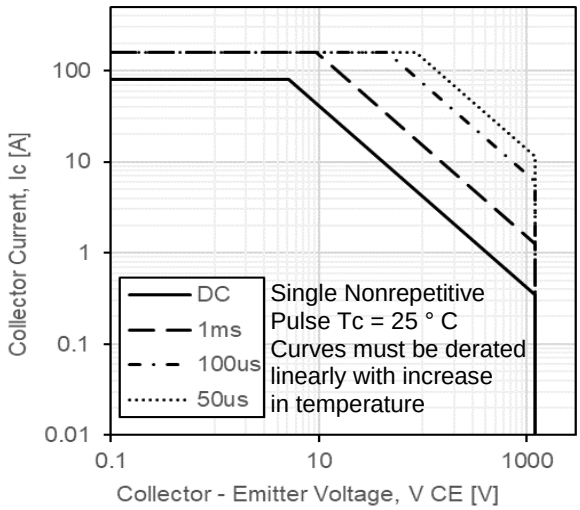
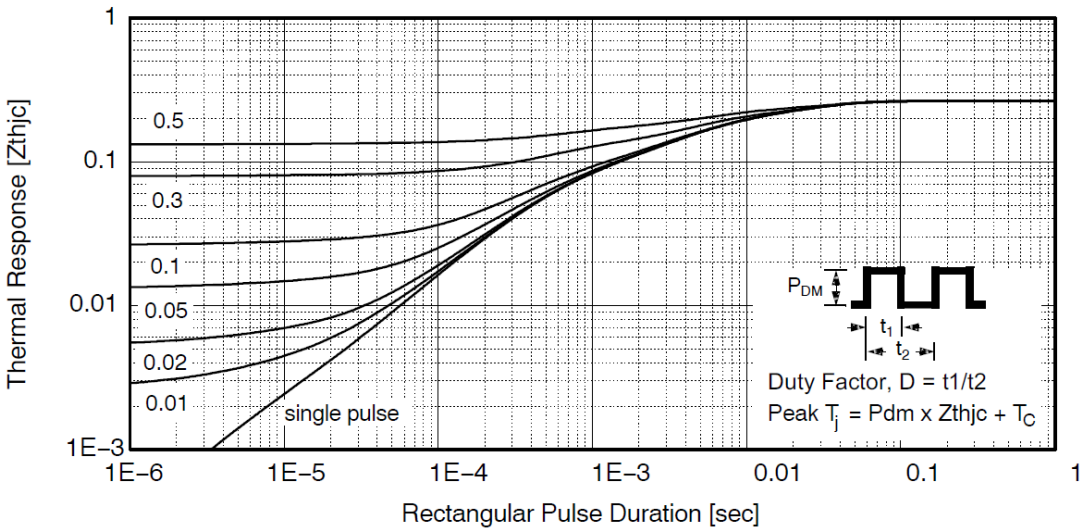


Figure 14. Transient Thermal Impedance of IGBT



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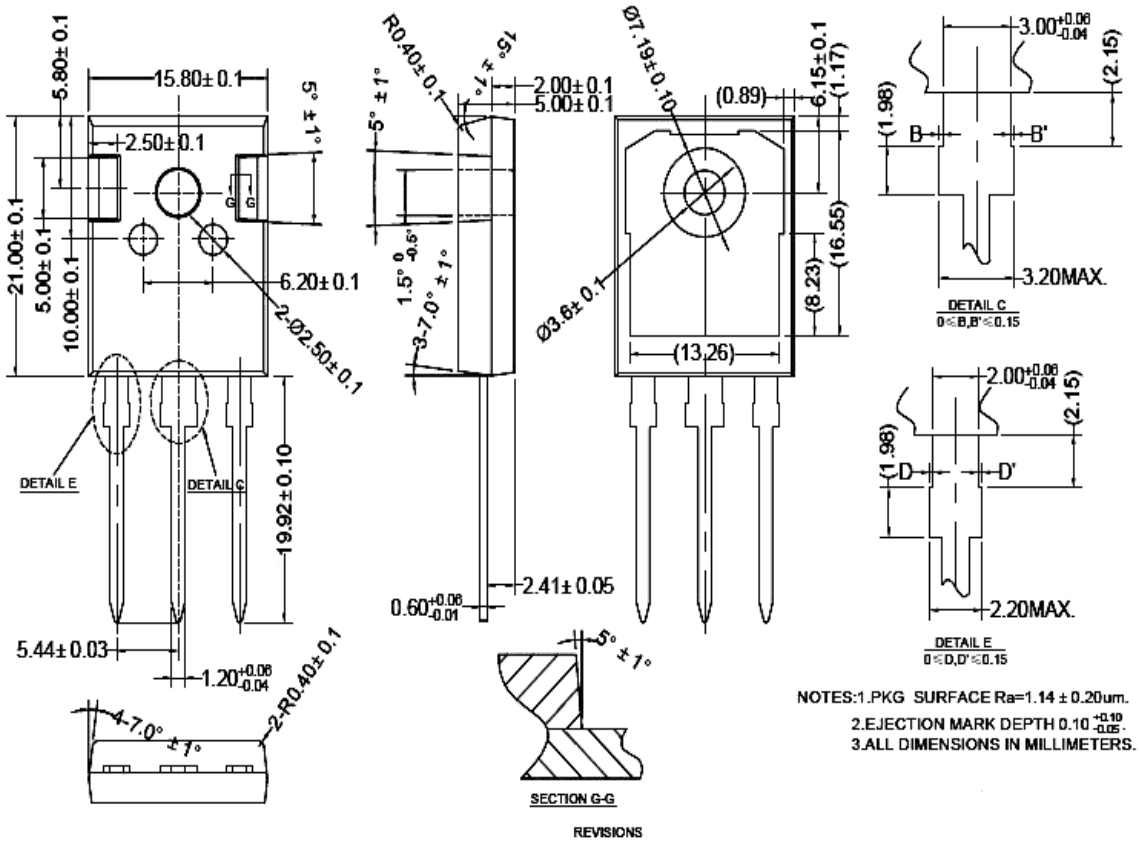

公差标注	公差值	表面粗糙度
0	±0.2	Ra3.2~6.3
0.0	±0.1	Ra1.6~3.2
0.00	±0.01	Ra0.8~1.6
0.000	±0.005	Ra0.4~0.8
0.0000	±0.002	Ra0.2~0.4

0≤D,D'≤0.15

NOTES:1.PKG SURFACE Ra=1.14 ± 0.20um.
2.EJECTION MARK DEPTH 0.10 +0.10 -0.05.
3.ALL DIMENSIONS IN MILLIMETERS.

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