

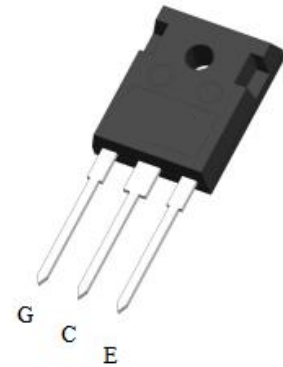
TPGW25N120LN

IGBT Discrete with Anti-Parallel Diode

General Description

Topdiode TPGW25N120LN 25A 1200V IGBT Discrete provides ultra-low conduction loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and UPS.

Package TO-247-3



Features

High Breakdown Voltage up to 1200V for Improved Reliability

Trench Field Stop Technology

High Ruggedness, Temperature Stable

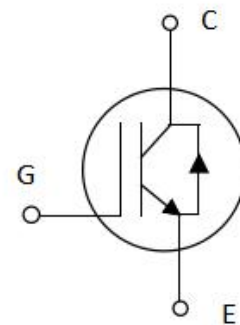
Low switching losses

Easy Parallel Switching Capability due to Positive

Temperature Coefficient in V_{CEsat}

Maximum junction temperature 175°C

Equivalent Schematic



Applications

Uninterruptible Power Supply

Inverter

Converter with High Switching Frequency

Summary

Symbol	Value
V_{CE}	1200V
I_C	25A
$V_{CE(sat)}$ $I_C=25A$	1.85V

Maximum Ratings ($T_C = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description		Value	Unit
V _{CE}	Collector-Emitter Breakdown Voltage		1200	V
I _C	DC Collector Current, Limited by T _{jmax}	T _C =25°C	50	A
		T _C =100°C	25	A
I _F	Diode Forward Current, Limited by T _{jmax}	T _C =25°C	50	A
		T _C =100°C	25	A
V _{GE}	Continuous Gate-Emitter voltage		± 20	V
V _{GE}	Transient Gate-Emitter voltage(tp≤10μs,D<0.010)		± 30	V
I _{CRM}	Repetitive peak collector current, t _p = 1ms		50	A
I _{CM}	Pulse Collector Current, V _{GE} =15V, t _p Limited by T _{jmax}		100	A
T _{SC}	Short Circuit Withstand Time,V _{GE} =15V,V _{CC} =900V,V _{CEM} ≤1200V		10	us
P _{tot}	Power Dissipation , T _j =25°C		326	W
T _j	Operating Junction Temperature		-40 to +175	°C
T _s	Storage Temperature		-55 to +150	°C
-	Soldering Temperature, Wave Soldering 1.6mm (0.063in.) from Case for 10s		260	°C

Thermal Characteristics

Symbol	Description	Max	Unit
R_{thJC}	IGBT Thermal Resistance, Junction - Case	0.46	K/W
R_{thJC}	Diode Thermal Resistance, Junction - Case	1.00	K/W
R_{thJA}	Thermal Resistance, Junction - Ambient	40	K/W

Electrical Characteristics (T_j= 25°C unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
Static						
BV _{CES}	Collector-Emitter Breakdown Voltage	V _{GE} =0V, I _C =250uA	1200			V
		V _{GE} =0V, I _C =0.5mA	1200			V
V _{GE(th)}	Gate Threshold Voltage	V _{GE} =V _{CE} , I _C =0.5mA	5.1	5.8	6.4	V
V _(sat)	Collector-Emitter Saturation Voltage	V _{GE} =15V, I _C =25A	T _j =25°C	1.85		V
			T _j =125°C	2.20		
			T _j =150°C	2.30		
I _{CES}	Zero Gate Voltage Collector Current	V _{CE} = 1200V, V _{GE} = 0V	T _j =25°C		250	μA
			T _j =150°C		5000	
I _{GES}	Gate-Emitter Leakage Current	V _{CE} = 0V, V _{GE} = ±20V			100	nA
Dynamic						
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} = 0V, f=1MHz		1.45		nF
C _{res}	Reverse Transfer Capacitance			0.05		
Q _G	Gate Charge	V _{CC} = 960V, I _C = 25A, V _{GE} = 15V		0.20		uC
I _{SC}	Short Circuit Collector Current	V _{CC} = 900V, t _{sc} ≤ 10us, V _{GE} = 15V, T _j ≤ 150°C		110		A

Switching Characteristic, Inductive Load

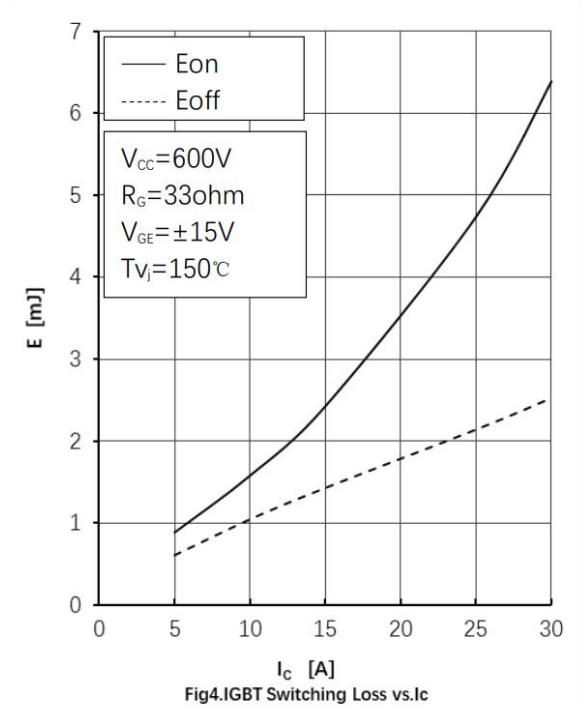
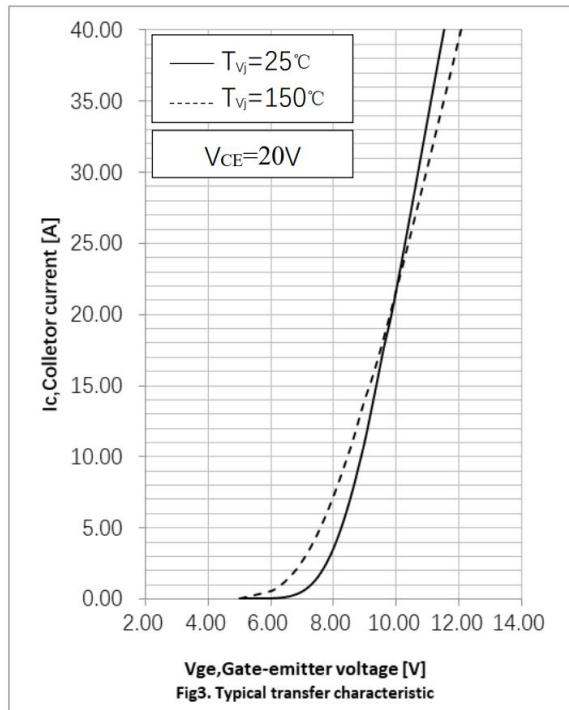
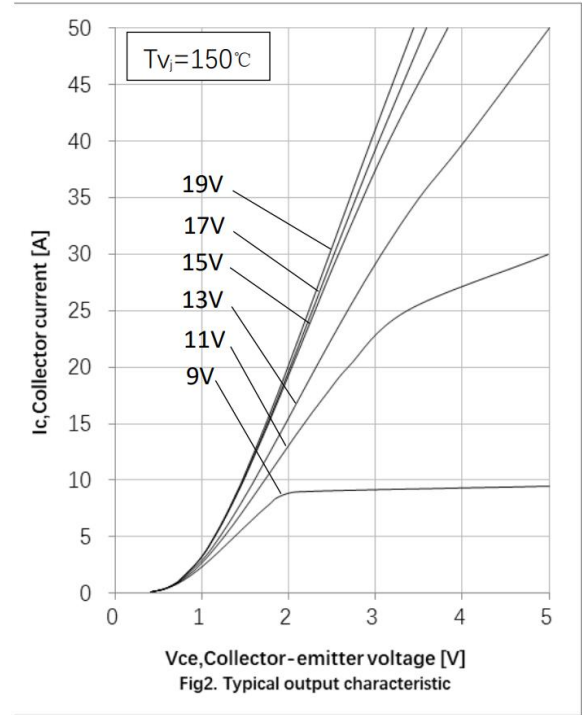
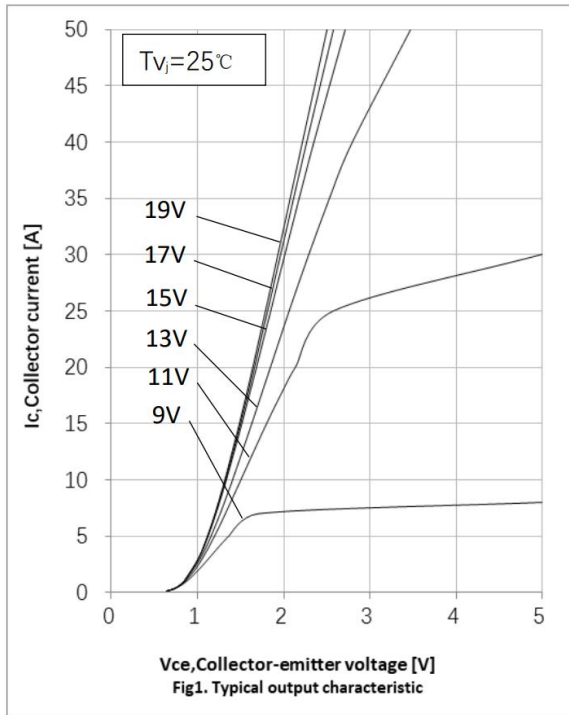
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Unit
Dynamic T _j =25°C						
t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =25.0A, V _{GE} =-15.0/15.0V, R _g =18Ω		158		ns
t _r	Rise Time			32		ns
t _{d(off)}	Turn-off Delay Time			331		ns
t _f	Fall Time			83		ns
E _{on}	Turn-on Energy			1.8		mJ
E _{off}	Turn-off Energy			1.4		mJ
Dynamic T _j =125°C						
t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =25.0A,		172		ns

t _r	Rise Time	V _{GE} =-15.0/15.0V, R _g =18Ω		45		ns
t _{d(off)}	Turn-off Delay Time			154		ns
t _f	Fall Time			212		ns
E _{on}	Turn-on Energy			2.4		mJ
E _{off}	Turn-off Energy			2.2		mJ
Dynamic T _j =150°C						
t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =25.0A, V _{GE} =-15.0/15.0V, R _g =18Ω		190		ns
t _r	Rise Time			48		ns
t _{d(off)}	Turn-off Delay Time			165		ns
t _f	Fall Time			230		ns
E _{on}	Turn-on Energy			2.8		mJ
E _{off}	Turn-off Energy			2.4		mJ

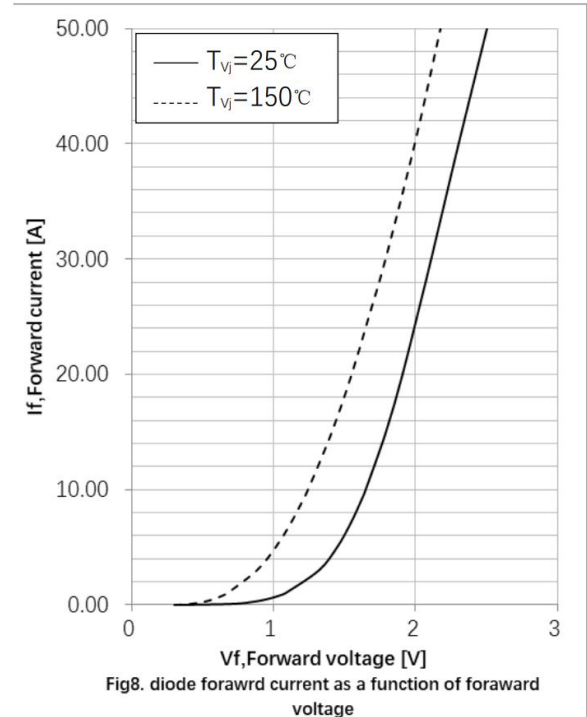
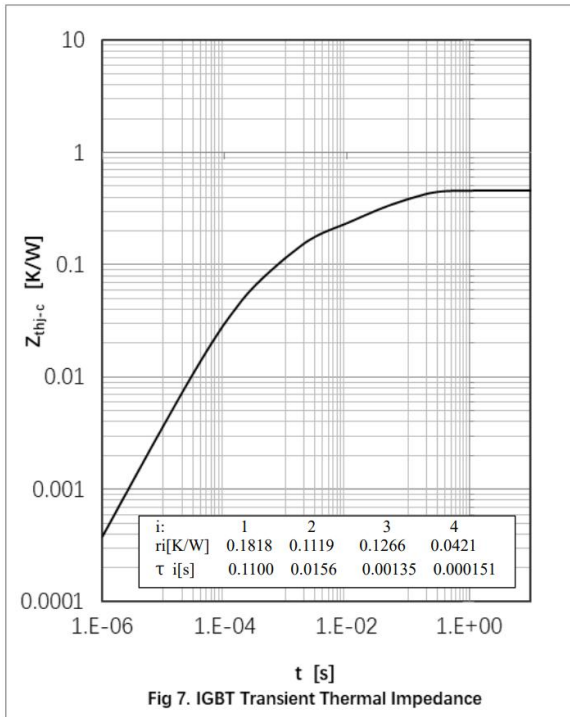
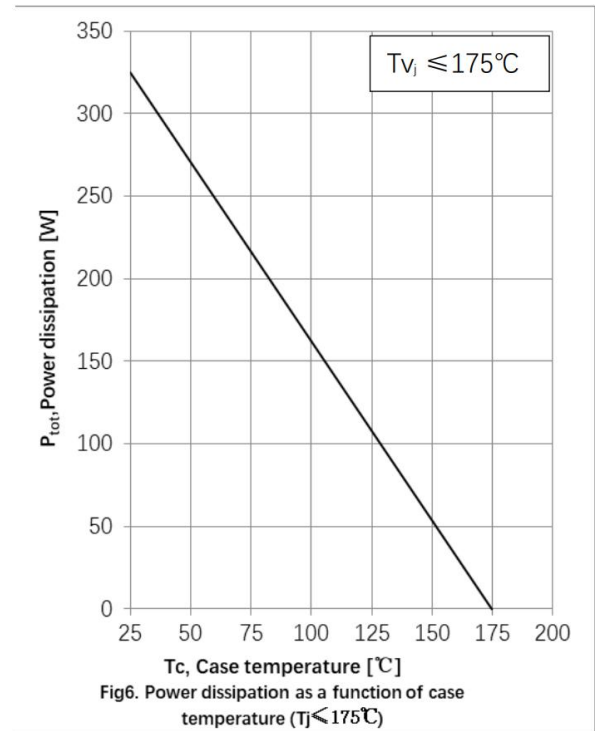
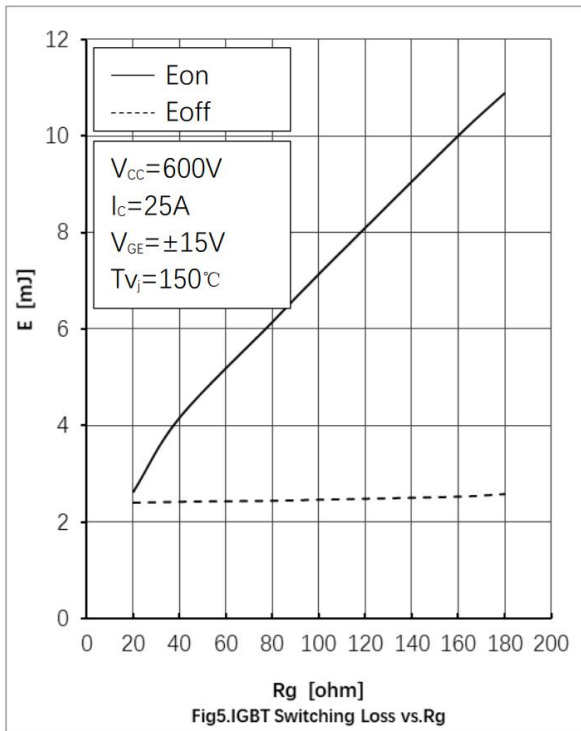
Electrical Characteristics of the DIODE ($T_j=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Unit
V_{FM}	Diode Forward Voltage	$I_F=25A, T_j=25^\circ C$		2.00		V
		$I_F=25A, T_j=125^\circ C$		1.80		
		$I_F=25A, T_j=150^\circ C$		1.70		
I_{rr}	Reverse Recovery Current	$I_F=25A,$ $V_R=600V,$ $di/dt=-1700A/\mu s,$ $T_j=25^\circ C$		48.5		A
Q_{rr}	Reverse Recovery Charge			2.52		uC
E_{rec}	Reverse Recovery Energy			0.94		mj
I_{rr}	Reverse Recovery Current	$I_F=25A,$ $V_R=600V,$ $di/dt=-1700A/\mu s,$ $T_j=125^\circ C$		50.0		A
Q_{rr}	Reverse Recovery Charge			5.08		uC
E_{rec}	Reverse Recovery Energy			1.75		mj
I_{rr}	Reverse Recovery Current	$I_F=25A,$ $V_R=600V,$ $di/dt=-1700A/\mu s,$ $T_j=150^\circ C$		51.2		A
Q_{rr}	Reverse Recovery Charge			5.25		uC
E_{rec}	Reverse Recovery Energy			1.96		mj

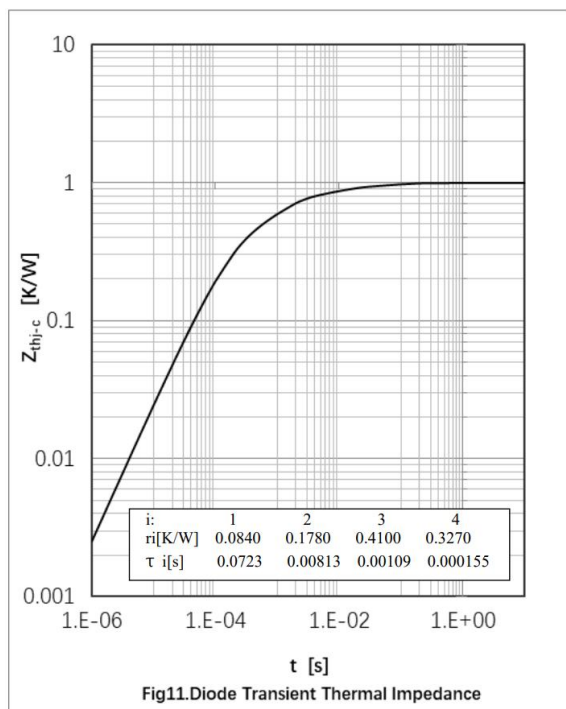
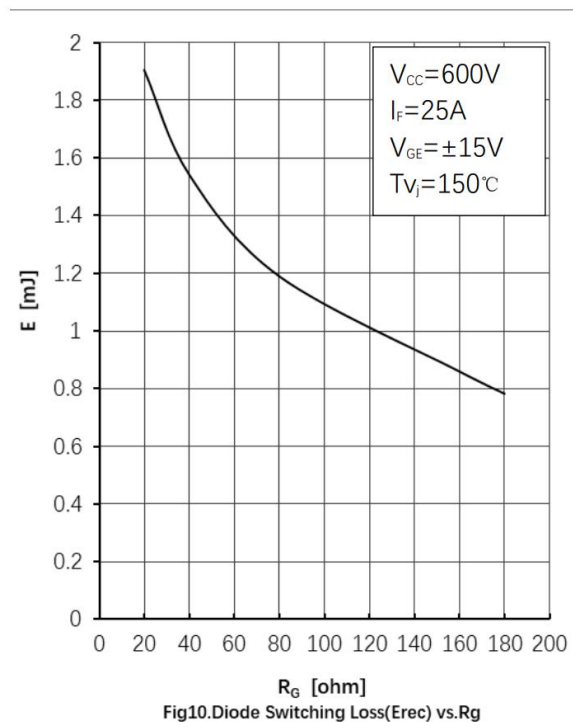
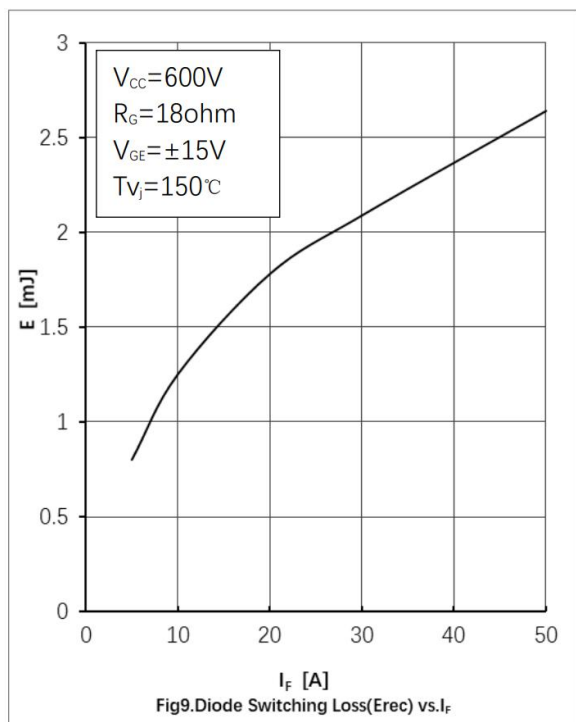
Typical Performance



Typical Performance

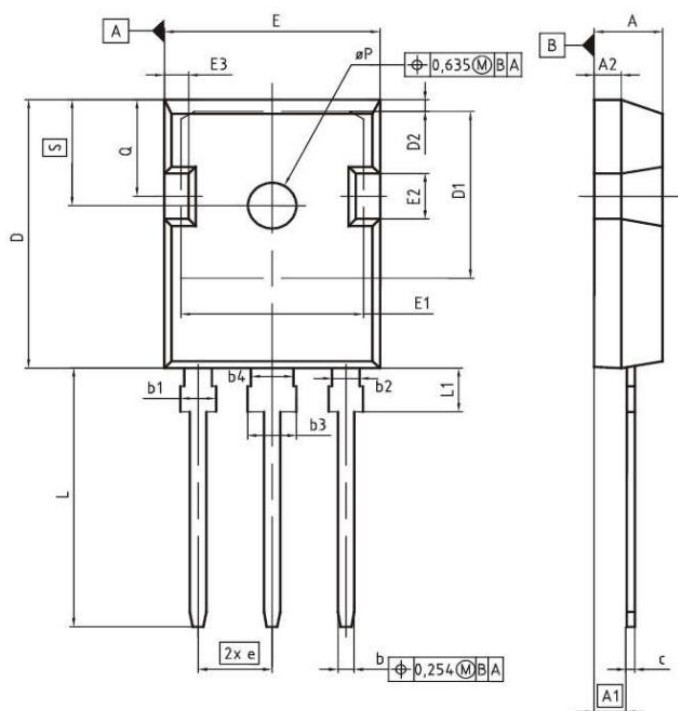


Typical Performance



Package Dimensions

TO-247-3



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.90	2.41	0.075	0.095
b2	1.90	2.16	0.075	0.085
b3	2.87	3.38	0.113	0.133
b4	2.87	3.13	0.113	0.123
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
e	5.44(BSC)		0.214(BSC)	
N	3		3	
L	19.80	20.32	0.780	0.800
L1	4.10	4.47	0.161	0.176
ΦP	3.50	3.70	0.138	0.146
Q	5.49	6.00	0.216	0.236
S	6.04	6.30	0.238	0.248

UNIT:mm