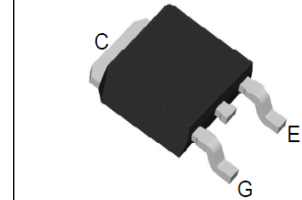


**CGU06N65F2SA**

V_{CE}	$I_c (T_c=100^\circ\text{C})$	$V_{CE(sat)}$
650V	6A	1.68V

TO-252-2L**DESCRIPTION**

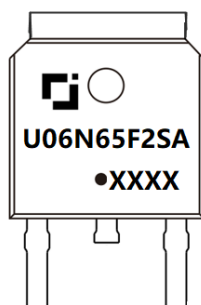
The CGU06N65F2SA is used JSCJ's second generation IGBT technology, with advanced Trench and FS(Field Stop) Structure, it has low Collector-Emitter Saturation Voltage, and fast switching, low switching loss, can easy to use in parallel.

Features

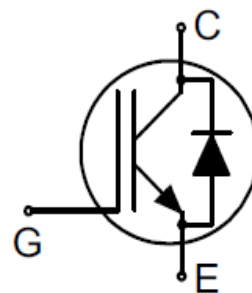
- 650V breakdown Voltage
- Low $V_{ce(sat)}$ and positive temperature coefficient
- High speed switching, Low switching loss
- With fast and soft recovery freewheeling diode
- High short-circuit ruggedness
- Good EMI behavior

Application

- Motor Drivers
- Home appliance applications
- Low power Hard switching Applications

MARKING

U06N65F2SA = Device code
Solid dot = Green molding compound device, if none, the normal device
XXXX = Code

EQUIVALENT CIRCUIT

Order Code	Package	Marking	Parking
CGU06N65F2SA	TO-252	U06N65F2SA	Tape & Reel
CGPF06N65F2SA	TO-220FP	PF06N65F2SA	Tube

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

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Collector Current	12	A
	Collector Current @ $T_C=100^\circ\text{C}$	6	
I_{Cpluse}	Plused Collector Current, tp limited by T_{Jmax}	15	A
$I_{LM}^{(1)}$	Turn-off latching current	15	A
I_F	Continuous Diode Forward Current	12	A
	Continuous Diode Forward Current @ $T_C=100^\circ\text{C}$	6	A
I_{FM}	Diode Pulsed Current, Limited by T_{Jmax}	15	A
$t_{sc}^{(2)}$	Short circuit withstanding time 1) $V_{GE} = 15\text{V}, V_{CC} \leq 400\text{V}, T_J \leq 150^\circ\text{C}$	5	μS
P_D	Power Dissipation @ $T_C=25^\circ\text{C}$	56	W
	Power Dissipation @ $T_C = 100^\circ\text{C}$	22	
T_J	Junction Temperature Range	-55 to 175	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 to 150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering	260	$^\circ\text{C}$

(1) $V_{clamp} = 80\% V_{CES}, V_{GE} = 15\text{V}, R_G = 20\ \Omega, T_J \leq 150^\circ\text{C}$.

(2) Allowed number of short circuits: <1000; time between short circuits: >1s.

Thermal Characteristics

Symbol	Parameter	Value	Units
$R\theta_{JC}$	Maximum IGBT Junction-to-Case	2.2	$^\circ\text{C}/\text{W}$
$R\theta_{JC}$	Maximum Diode Junction-to-Case	5.6	$^\circ\text{C}/\text{W}$
$R\theta_{JA}$	Maximum Junction-to-Ambient	55	$^\circ\text{C}/\text{W}$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Ration			Unit s	
			Min.	Typ.	Max.		
STATIC PARAMETERS							
V _{(BR)CES}	Collector-Emitter Breakdown Voltage	V _{GE} =0V, I _{CE} =1mA	650	--	--	V	
I _{CES}	Zero Gate Voltage Collector Current	V _{GE} =0V, V _{CE} =650V	--	--	1.0	μA	
I _{GES}	Gate-Emitter leakage current	V _{GE} =±20V	--	--	±250	nA	
		V _{GE} =±30V	--	--	±500	nA	
V _{GE(th)}	Gate-Emitter Threshold Voltage	I _C =250μA, V _{CE} =V _{GE}	5.5	--	7.5	V	
V _F	Diode Forward Voltage	I _F =6A, T _C =25°C	--	1.69	--	V	
		I _F =6A, T _C =125°C	--	1.49	--	V	
		I _F =6A, T _C =150°C	--	1.47	--	V	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =6A, V _{GE} =15V, T _J =25°C	--	1.68	--	V	
		I _C =5A, V _{GE} =15V, T _J =25°C	--	1.57	2.1	V	
		I _C =5A, V _{GE} =15V, T _J =125°C	--	1.7	--	V	
		I _C =5A, V _{GE} =15V, T _J =150°C	--	1.74	--	V	
DYNAMIC PARAMETERS							
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V f=1MHz	--	541	--	pF	
C _{oes}	Output Capacitance		--	21.5	--		
C _{res}	Reverse Transfer Capacitance		--	7.68	--		
Q _g	Total Gate Charge	V _{GE} =15V, V _{CC} =400V, I _C =5A	--	28.8	--	nC	
Q _{ge}	Gate to Emitter Charge		--	6	--		
Q _{gc}	Gate to Collector Charge		--	17.8	--		
R _g	Gate resistance	V _{GE} =0V, V _{CC} =0V, f=1MHz	--	5.4	--	Ω	
I _{C(SC)}	Short circuit collector current	V _{GE} =15V, V _{CC} =400V, t _{SC} ≤5μs, T _J ≤150°C	--	28	--	A	
SWITCHING PARAMETERS							
t _{d(on)}	Turn-On Delay Time	V _{CE} =400V, I _C =5A, R _g =10Ω, V _{GE} =15V, Inductive Load T _J =25°C	--	23.1	--	ns	
t _r	Current Rise Time		--	17.5	--		
t _{d(off)}	Turn-Off Delay Time		--	96.8	--		
t _f	Current Fall Time		--	84	--		
E _{on} ⁽³⁾	Turn-On Switching Energy		I _F =5A, V _{CC} =400V, di/dt=200A/μs, T _J =25°C	--	0.09	--	mJ
E _{off}	Turn-Off Switching Energy			--	0.068	--	
E _{is}	Total Switching Energy	--		0.158	--		
t _{rr}	Diode Reverse Recovery Time	I _F =5A, V _{CC} =400V, di/dt=200A/μs, T _J =25°C	--	110	--	ns	
I _{rrm}	Diode Reverse Recovery Current		--	3.5	--	A	
Q _{rr}	Diode Reverse Recovery Charge		--	105	--	nC	

(3) Including the reverse recovery of the diode.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

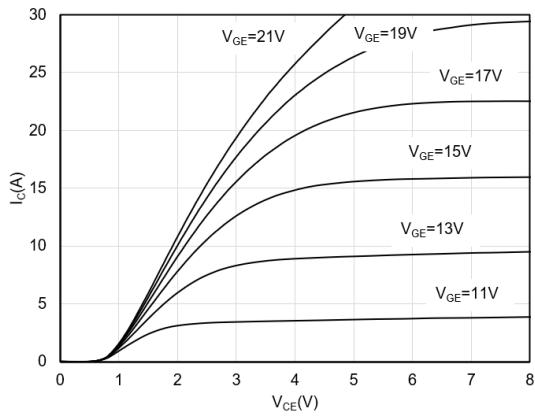


Figure 1: Output Characteristic
($T_j=25^{\circ}\text{C}$)

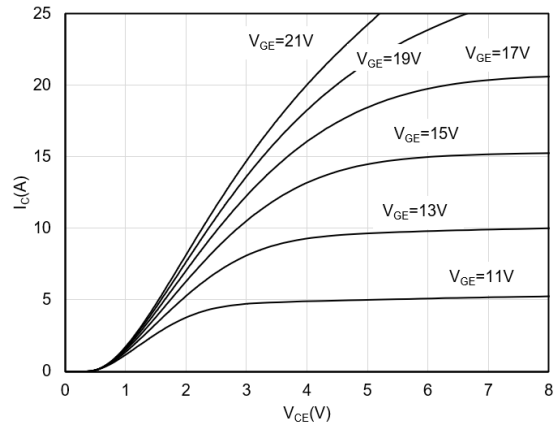


Figure 2: Output Characteristic
($T_j=150^{\circ}\text{C}$)

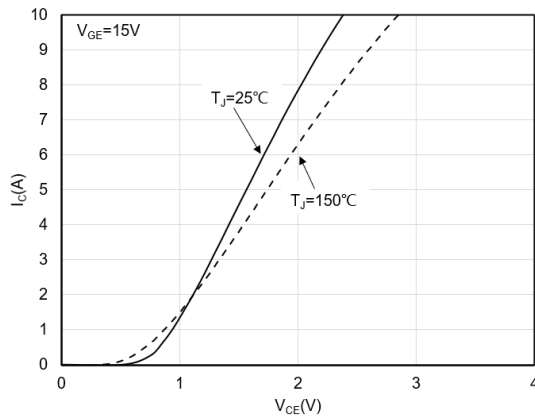


Figure 3: Collector-Emitter Saturation Voltage

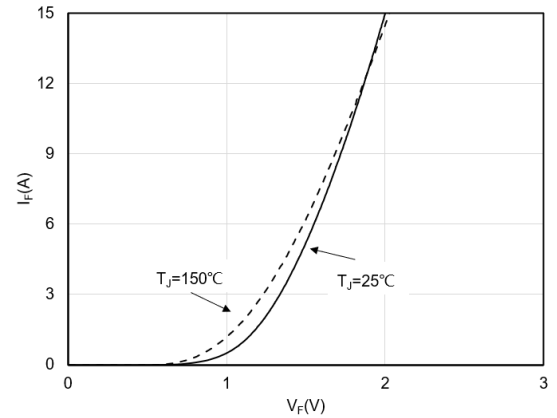


Figure 4: Diode Characteristic

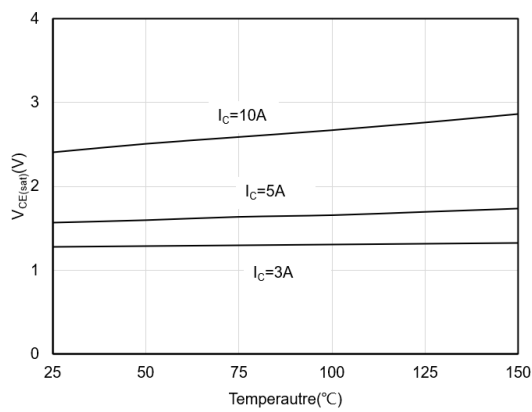


Figure 5: Collector-Emitter Saturation Voltage vs.
Junction Temperature

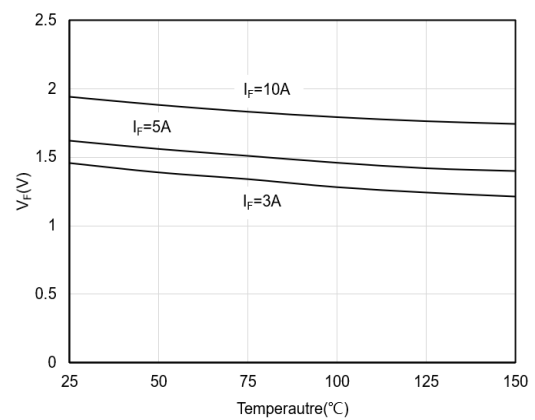


Figure 6: Diode Forward voltage vs. Junction
Temperature

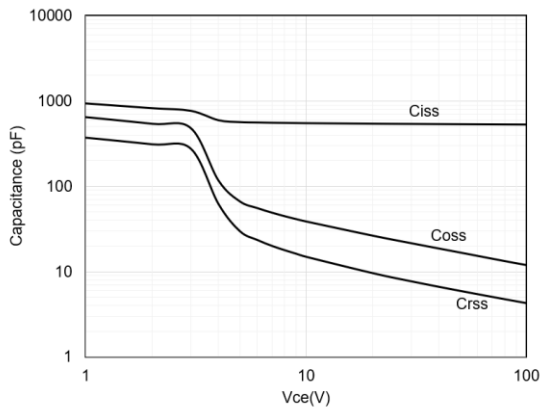


Figure 7: Capacitance Characteristic

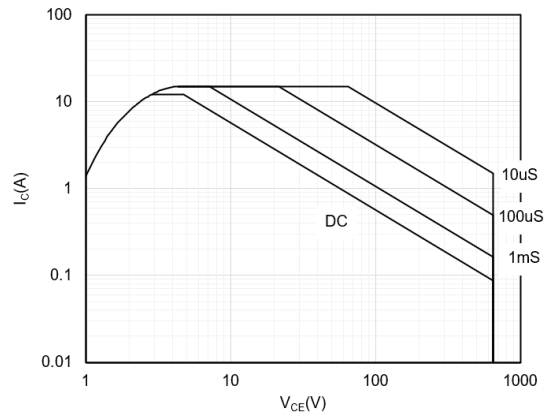


Figure 8: Forward Bias Safe Operating Area
($T_C=25^\circ\text{C}$, $V_{GE}=15\text{V}$)

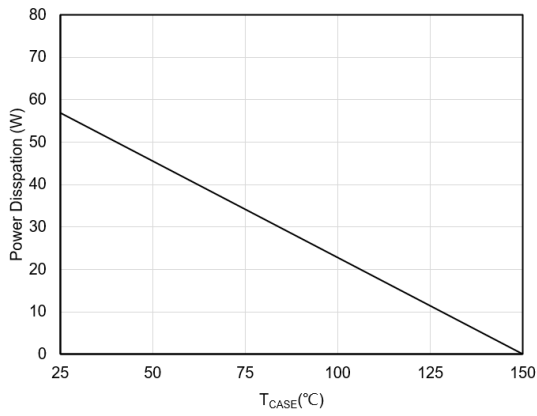


Figure 9: Power Dissipation as a Function of Case

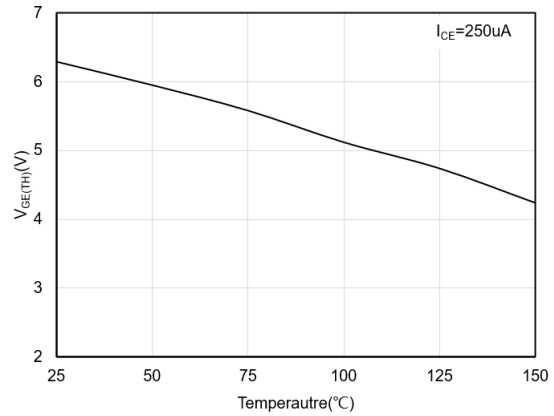


Figure 10: $V_{GE(TH)}$ vs. T_J

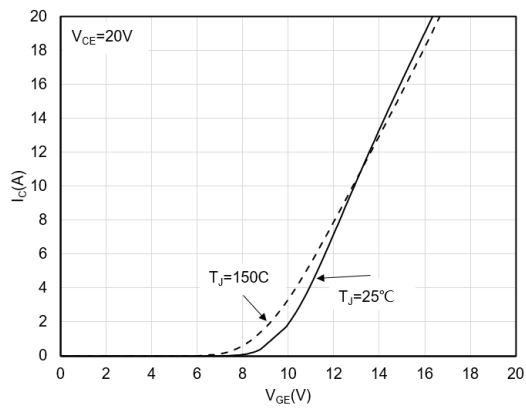


Figure 11: Transfer Characteristic

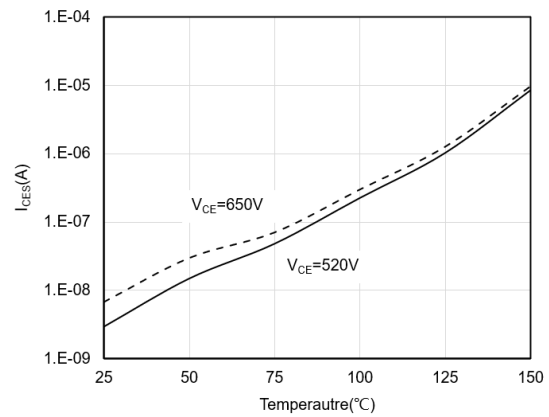


Figure 12: Reverse Leakage Current vs. T_J

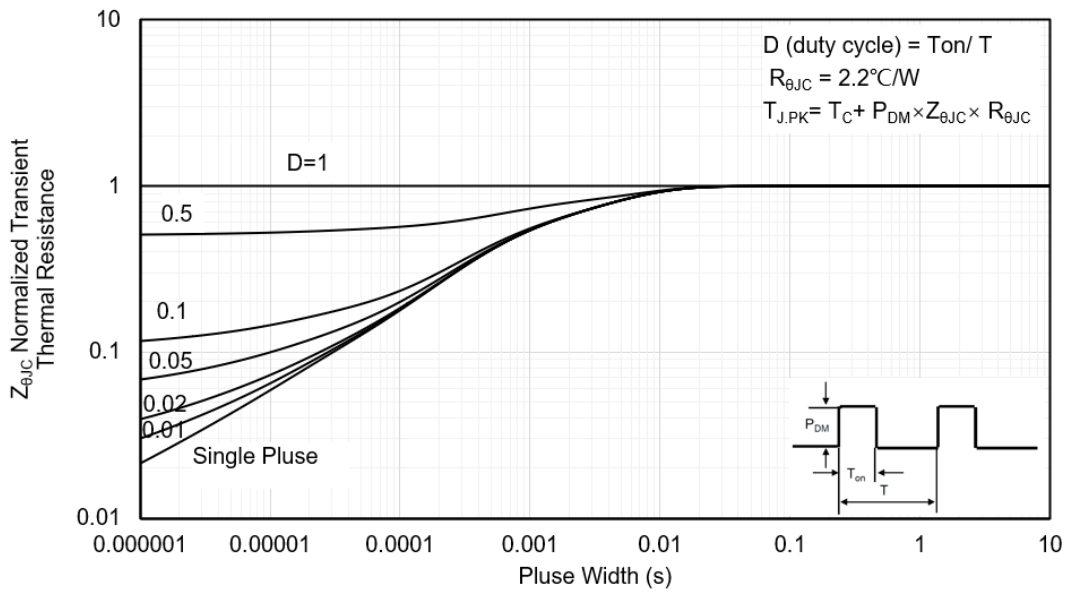
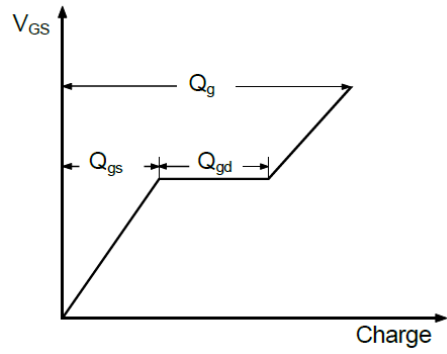
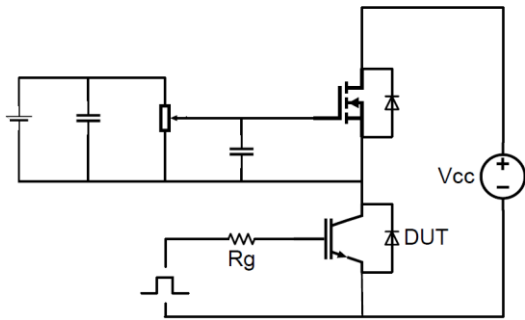


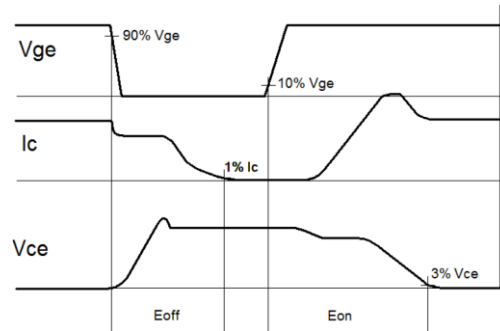
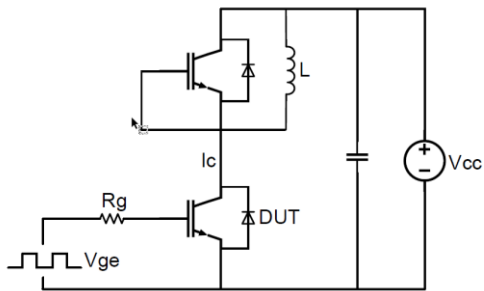
Figure 13: Normalized Transient Thermal Impedance for IGBT

TEST CIRCUIT AND WAVEFORMS

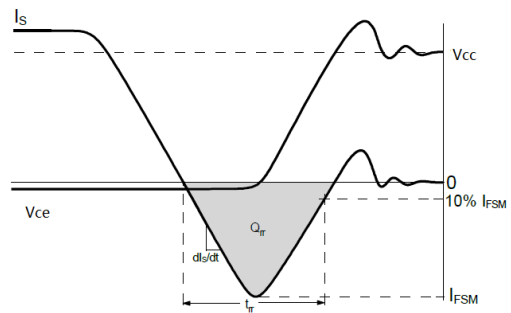
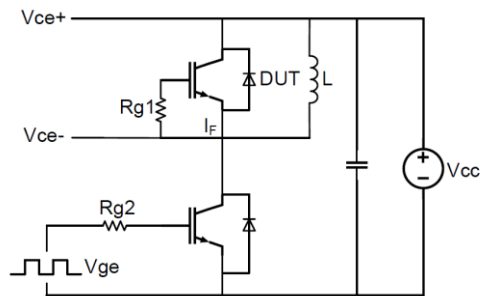
Gate Charge



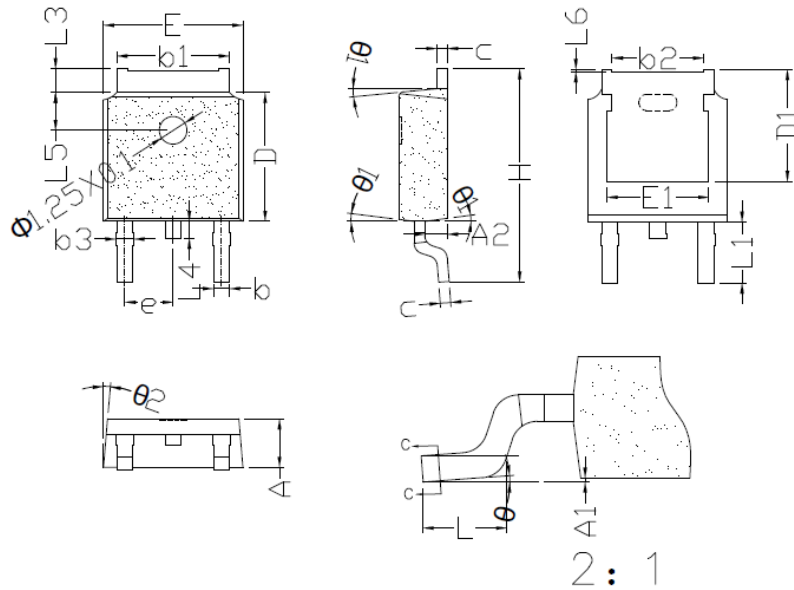
Inductive Switching Test Circuit



Diode Reverse Recovery

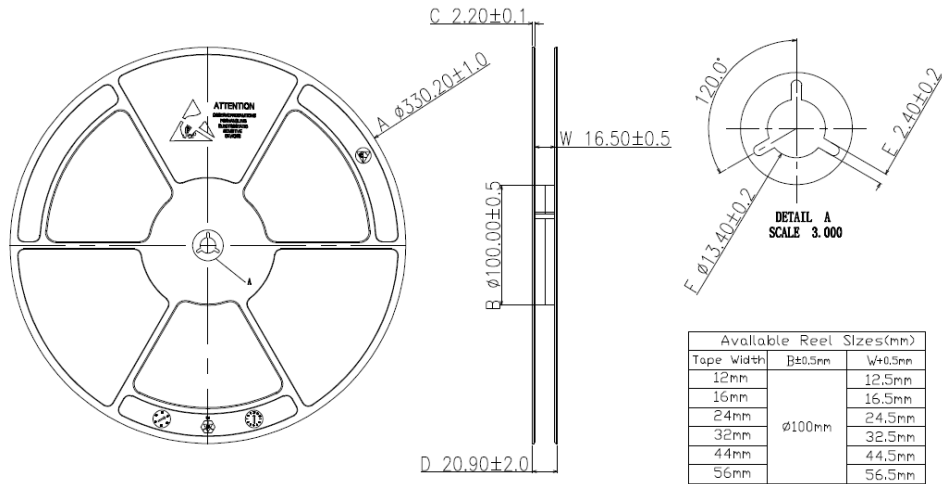


TO-252-2L PACKAGE OUTLINE DIMENSIONS



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	5.23	5.33	5.46
b2	4.27	4.32	4.37
*b3	0.78	0.85	0.90
*c	0.47	0.52	0.55
*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	0.00	0.04	0.12
* θ	0°	—	5°
θ_1	5°	7°	9°
θ_2	5°	7°	9°

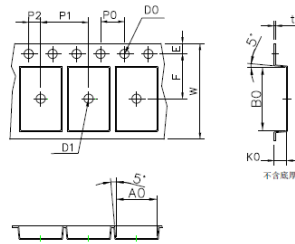
TO-252-2L TAPE AND REEL



Available Reel Sizes(mm)		
Tape Width	B±0.5mm	W±0.5mm
12mm	Ø100mm	12.5mm
16mm		16.5mm
24mm		24.5mm
32mm		32.5mm
44mm		44.5mm
56mm		56.5mm

注: 1. 材质: HIPS
2. 单位: mm

Symbol	A0	B0	K0	D0	D1	P0	P1	10*P0	
Spec	6.85±0.10	10.45±0.1	2.80±0.10	1.55±0.10	1.55±0.10	4.00±0.10	8.00±0.10	40.00±0.10	
Symbol	W	E	F	P2	t	t1			
Spec	16.00±0.10	1.75±0.10	7.50±0.10	2.00±0.10	0.28±0.02	0.05以上			



NOTE:

1. 材料: SPCS
2. 10个链孔的累积公差不能超过0.2MM;
3. 250MM带子的扇形不得超过1MM;
4. 按照E/A-481-D的要求。