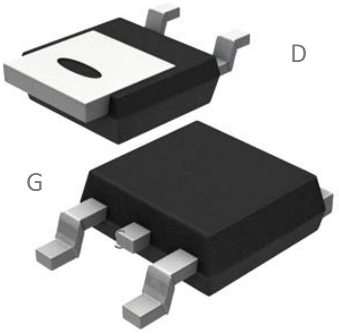
Description：

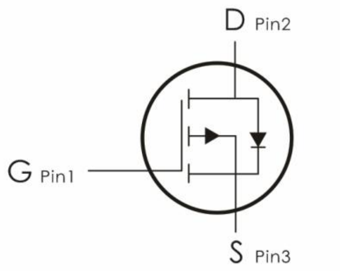
This P-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



Features：

1) V_{DS}=-60V,I_D=-13A,$R_{DS(ON)}$<85mΩ @V_{GS}=-10V（Typ：66mΩ）
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.
6) MSL3



Absolute Maximum Ratings： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current [1]	-13	A
	Continuous Drain Current-T_C=100℃ [1]	-9	
I_{DM}	Pulsed Drain Current [2]	-52	
P_D	Power Dissipation	34.7	W
E_{AS}	Single pulse avalanche energy [3]	6	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	3.6	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	62	

Electrical Characteristics： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250 μA	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-60V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250 μA	-1	-1.75	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance^4	V_{GS}=-10V,I_D=-10A	---	66	85	mΩ
		V_{GS}=-4.5V,I_D=-5A	---	90	110	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	---	1080	---	pF
C_{oss}	Output Capacitance		---	92	--	
C_{rss}	Reverse Transfer Capacitance		---	65	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=-15V, I_D=-1A, R_{ENG}=3.3Ω,V_{GS}=-10V	---	28.8	---	ns
t_r	Rise Time		---	20	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	60.8	---	ns
t_f	Fall Time		---	7.2	---	ns
Q_g	Total Gate Charge	V_{GS}=-4.5V_{DS}=-48V, I_D=-10A	---	11.8	---	nC
Q_{gs}	Gate-Source Charge		---	3.08	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	2.95	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=-1A	---	---	-1.2	V
I_S	Continuous Drain Curren	V_D=V_G=0V	---	---	-13	A
I_{SM}	Pulsed Drain Current		---	---	-52	A

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : TJ=25℃,VDD=-30V,V_G=-10V,L=0.5mH
4. Pulse Test: Pulse Width≤300µs, Duty Cycle≤0.5%

Typical Characteristics： (T_C=25℃ unless otherwise noted)

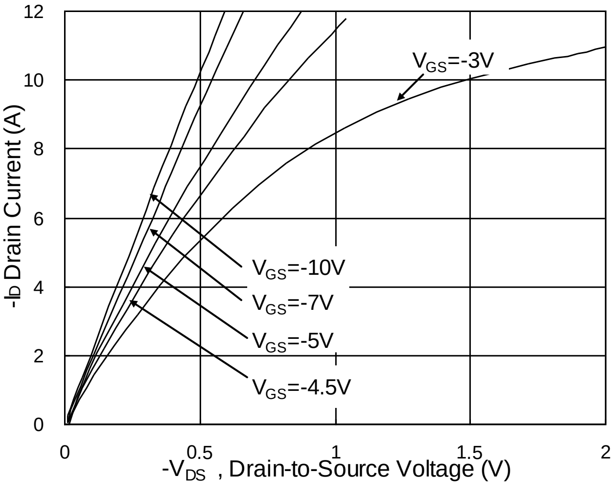


Fig.1 Typical Output Characteristics

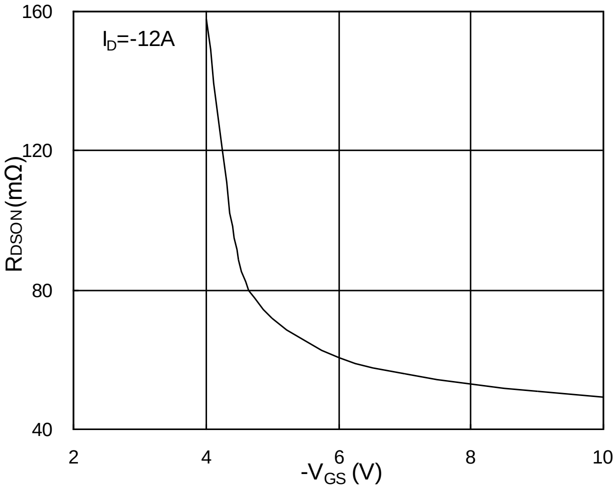
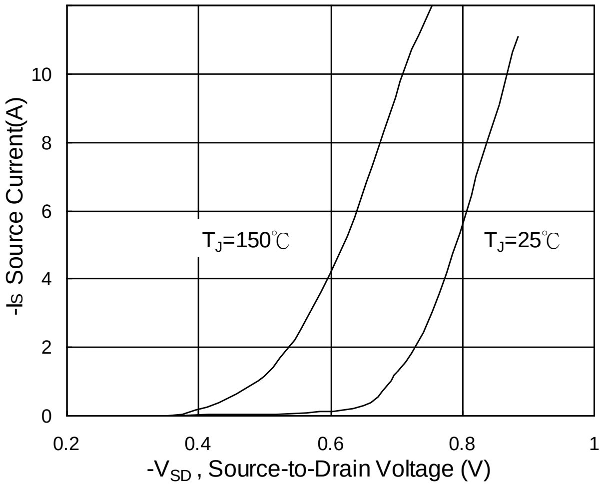


Fig.2 On-Resistance v.s Gate-Source



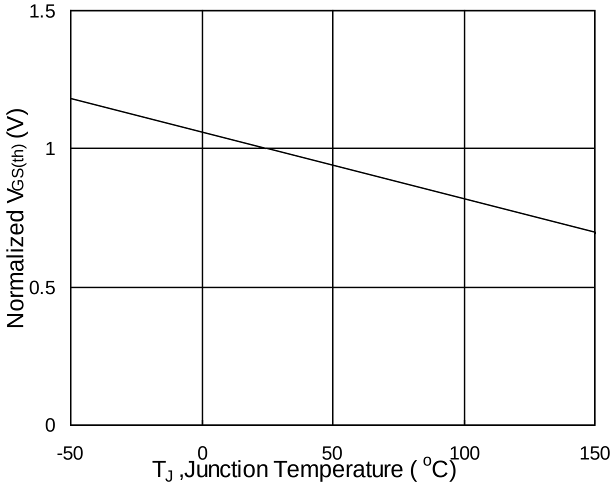


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

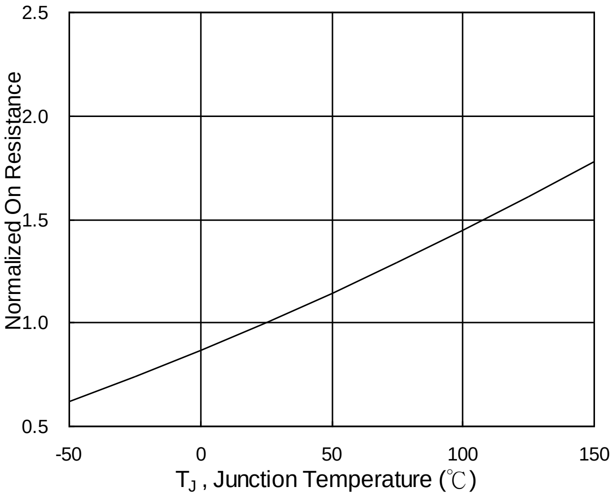


Fig.6 Normalized R_{DSON} v.s T_J

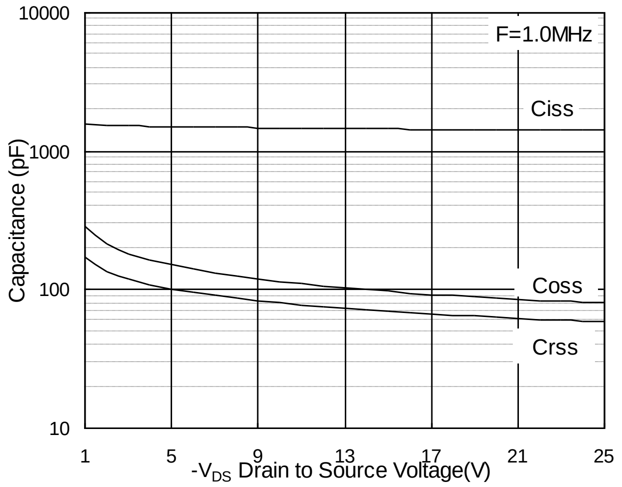


Fig.7 Capacitance

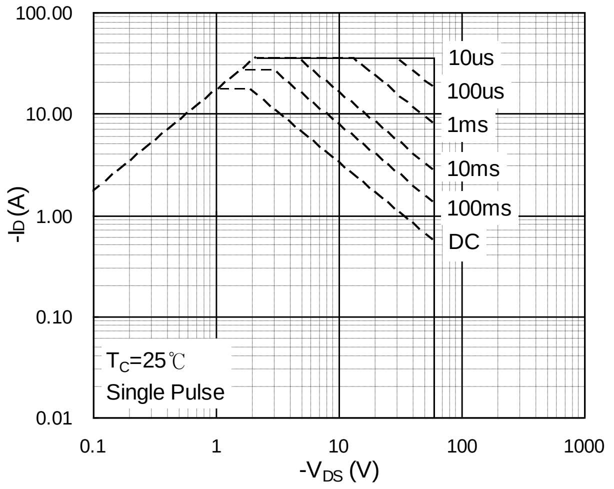
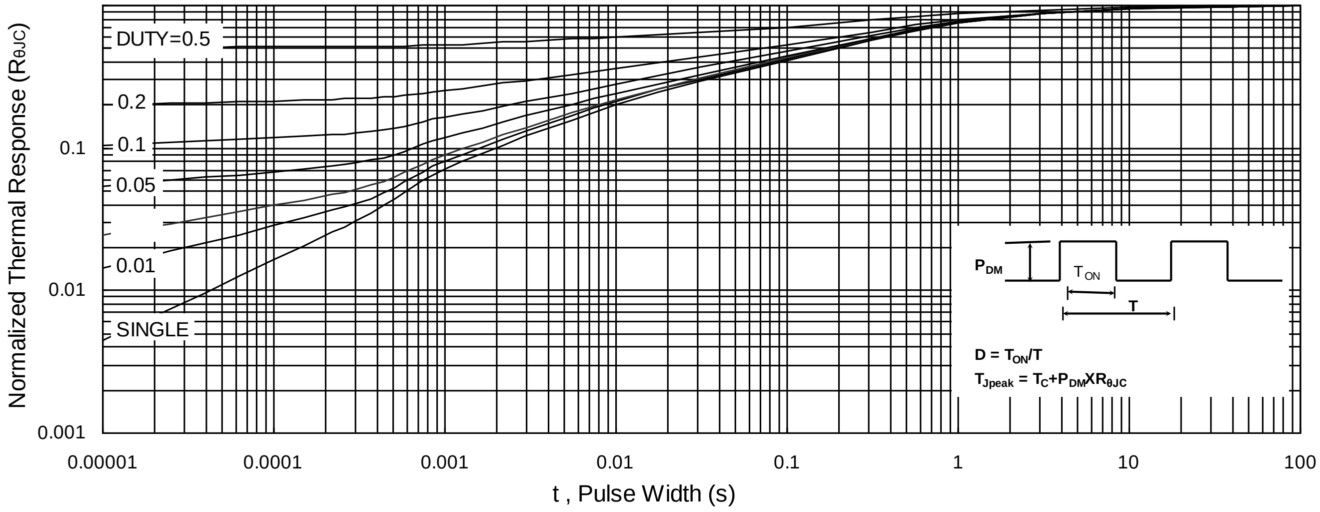
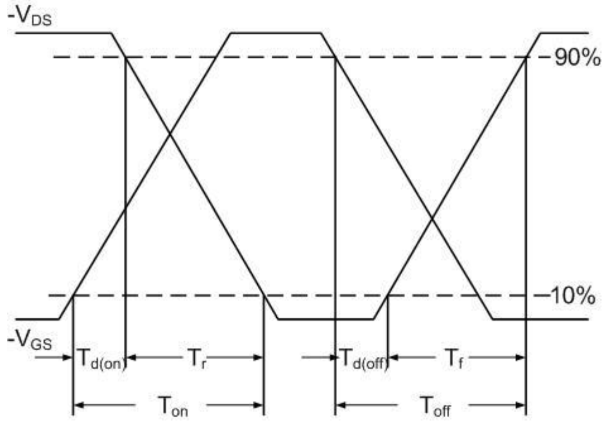
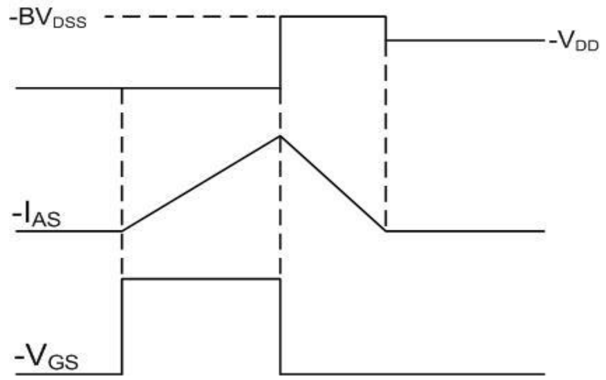


Fig.8 Safe Operating Area

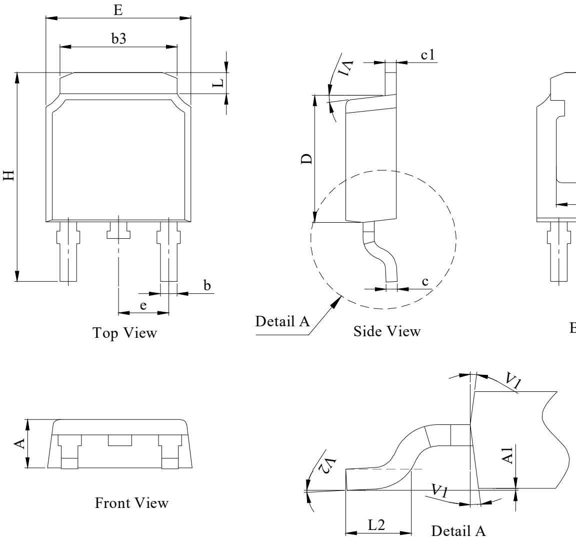




$$EAS=\frac{1}{2}L\times(-I_{AS}{}^{2})\times\frac{-BV_{DSS}}{-BV_{DSS}-(-V_{DD})}$$



Package Outline Type-A

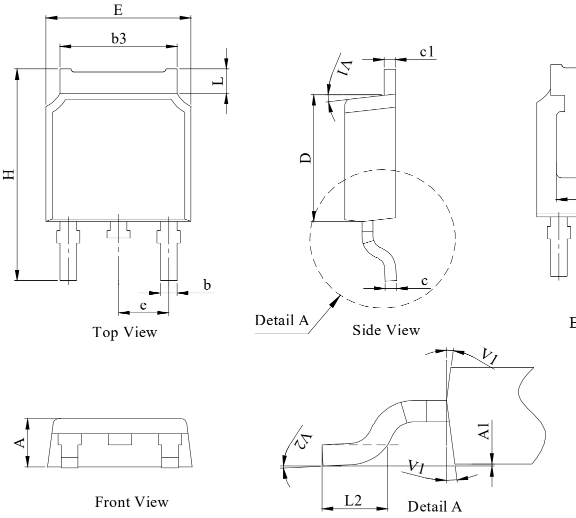


Top View Side View Bottom View

Front View Detail A

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

Package Outline Type-B

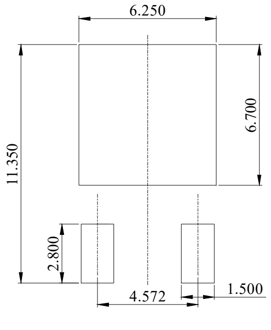


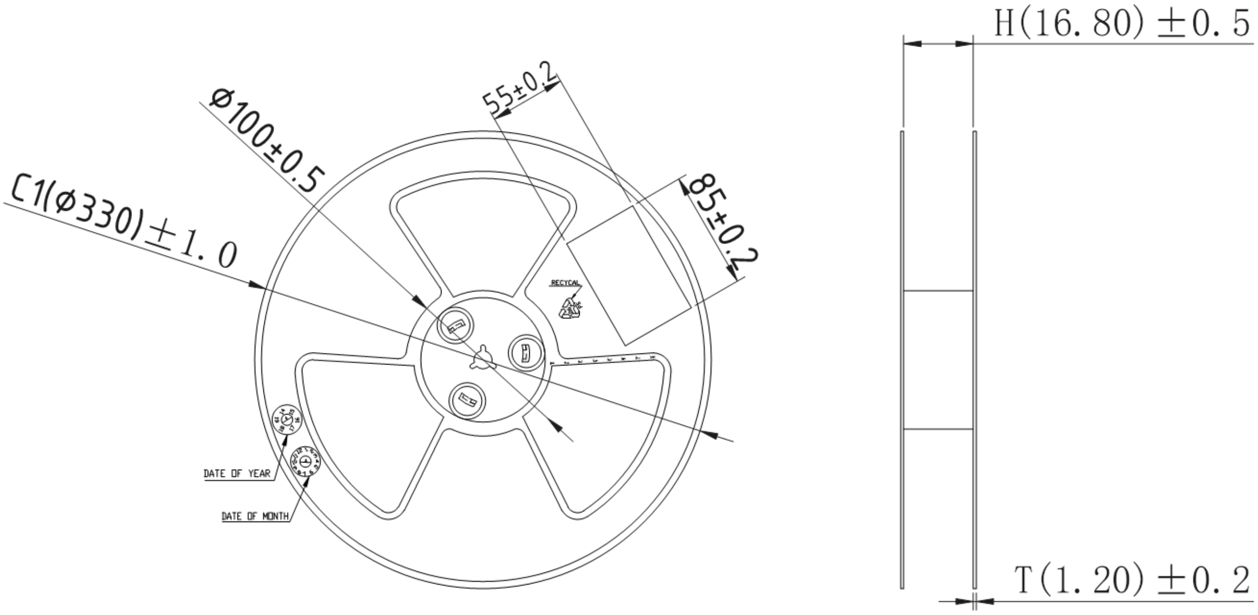
Top View Side View Bottom View

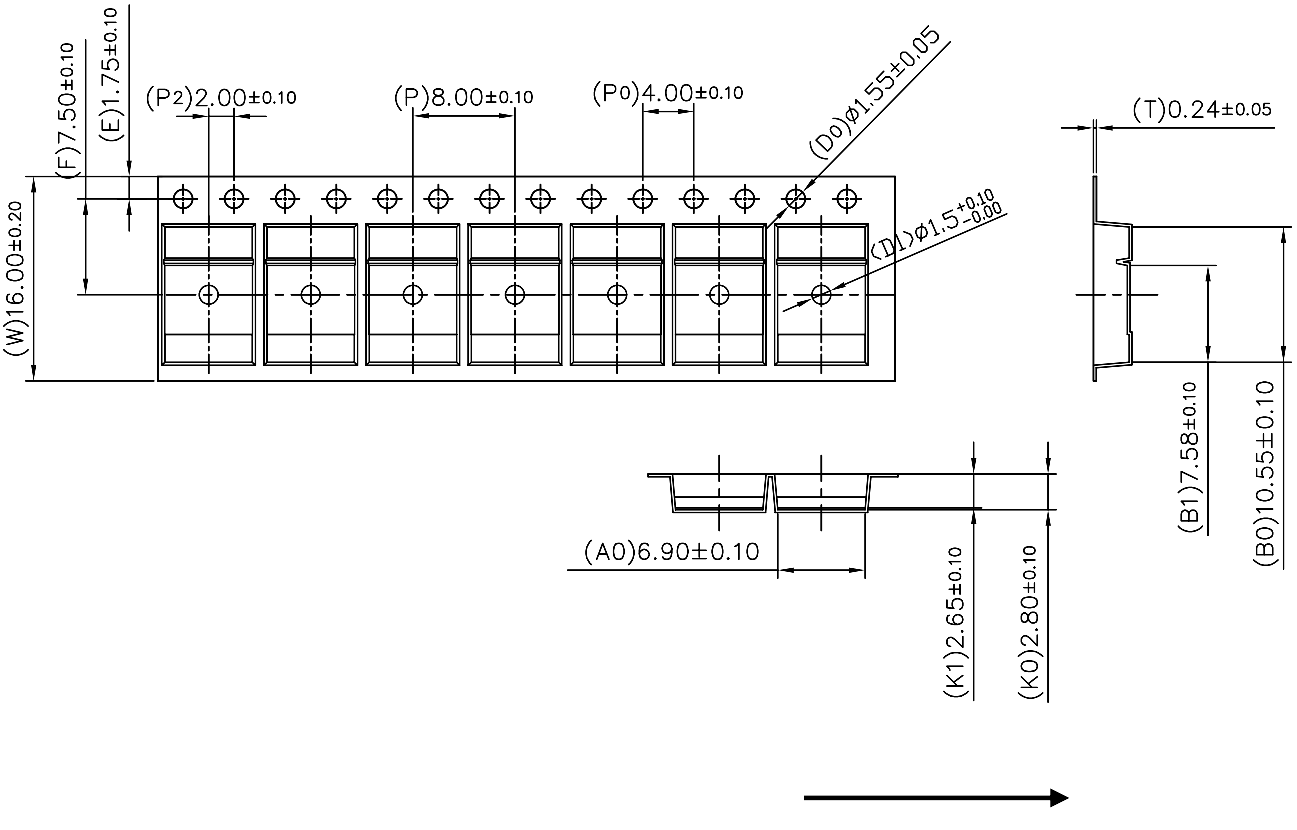
Front View Detail A

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

Recommended Soldering Footprint




C1(Ø330)±1.0
Ø100±0.5
55±0.2
85±0.2
RECYCAL
DATE OF YEAR
DATE OF MONTH
H(16.80)±0.5
T(1.20)±0.2


(F)7.50±0.10
(E)1.75±0.10
(P2)2.00±0.10
(P)8.00±0.10
(P0)4.00±0.10
(D0)Ø1.55±0.05
(D1)Ø1.5+0.10 −0.00
(W)16.00±0.20
(T)0.24±0.05
(B1)7.58±0.10
(B0)10.55±0.10
(A0)6.90±0.10
(K1)2.65±0.10
(K0)2.80±0.10