- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced VD MOSFETS

Product Summary

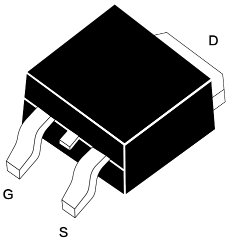
BVDSS	RDSON	ID
500V	1.45mΩ	5A

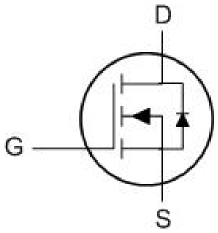
Description

The JH5N50 is the Advanced VD N-ch MOSFETS, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The JH5N50 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO-252 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Value	Units
VDSS	Drain-Source Voltage	500	V
I_D	Drain Current - Continuous (TC= 25°C)	5	A
	- Continuous (TC= 100°C)	2.6*	A
I_{DM}	Drain Current - Pulsed (Note 1)	20*	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	167	mJ
I_{AR}	Avalanche Current (Note 1)	5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	10.6	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5	V/ns
P_D	Power Dissipation (TC = 25°C)	24.5	W
	- Derate above 25°C	0.2	W/°C
T_j, T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds	300	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4.20	°C/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	48.2	°C/W

Electrical Characteristics TC = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C		0.49		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500 V, V_{GS} = 0 V			1	μA
		V_{DS} = 400 V, TC = 125°C			10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS}=V_{GS}, I_D =250 uA	2.0		4.0	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS}=10 V, I_D = 2A, T_J = 25°C		1.45	1.8	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40 V, I_D = 2.5 A (Note 4)		2.90		S
Dynamic Characteristics						
C_{iss}	Input capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz		415		pF
C_{oss}	Output capacitance			58		pF
C_{rss}	Reverse transfer capacitance			1.4		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	V_{DD} = 250 V, ID = 5 A, R_G = 25 Ω (Note 4, 5)		7		ns
t_r	Rising Time			22		ns
$t_{d(off)}$	Turn Off Delay Time			15		ns
t_f	Fall Time			23		ns
Q_g	Total Gate Charge	V_{DS} = 400 V, ID = 5 A, V_{GS} = 10 V (Note 4, 5)		13		nC
Q_{gs}	Gate-Source Charge			4.9		nC
Q_{gd}	Gate-Drain Charge			2.3		nC
Drain-source Diode Characteristics and Maximum Ratings						
I_S	Maximum continuous Drain-source Diode Forward Current				5	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				20	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 5 A			1.2	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 5 A, dI_F / dt = 100 A/μs Note 4)		289		ns
Q_{rr}	Reverse Recovery Charge			1.2		μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 10.6 mH, IAS = 5 A, VDD = 50V, RG = 25 Ω, Starting TJ = 25°C
3. ISD≤5A, di/dt ≤200A/us, VDD ≤ BVDSS, Starting TJ = 25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics

Table 7 Reverse diode characteristics

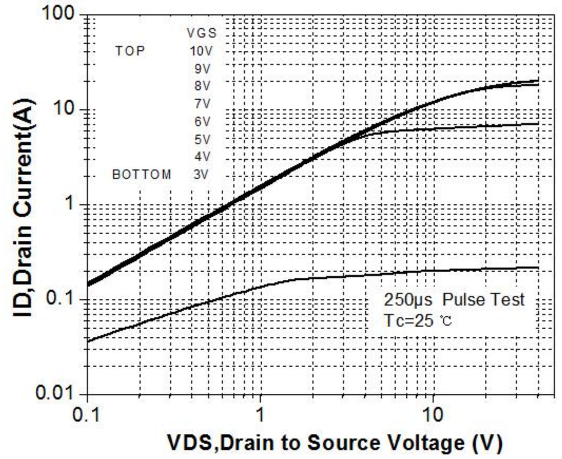


Figure 1. On-Region Characteristics

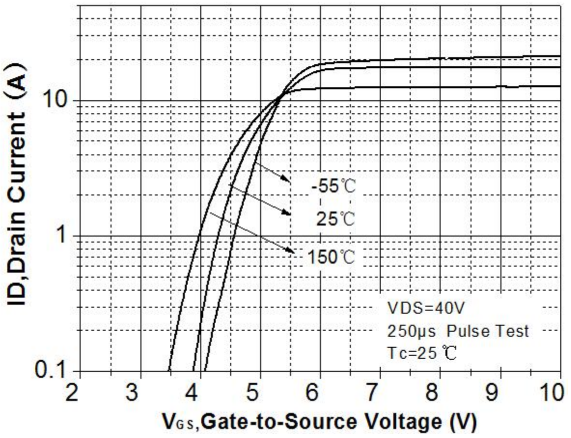


Figure 2. Transfer Characteristics

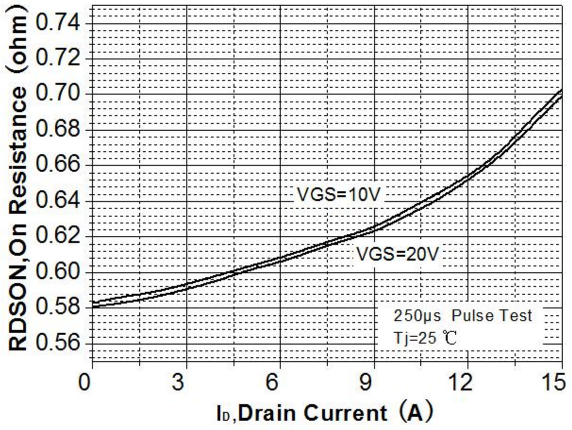


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

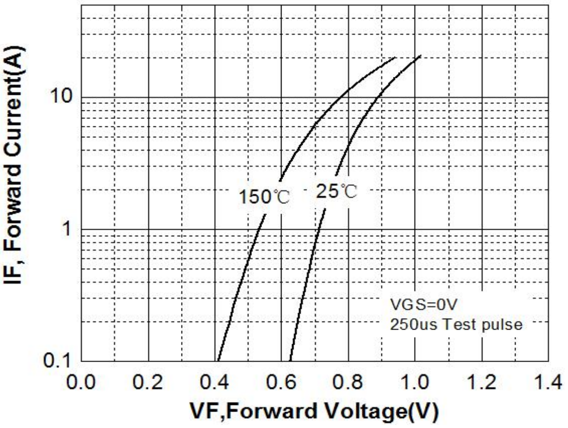


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

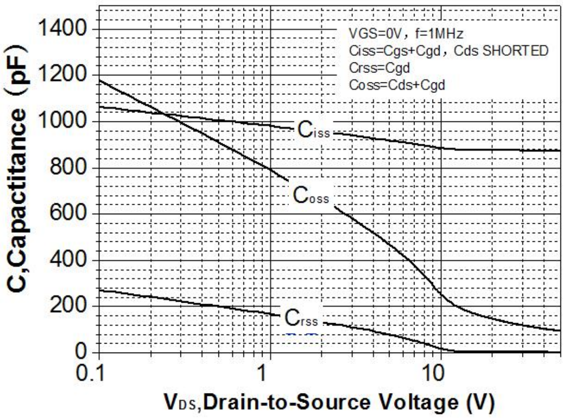


Figure 5. Capacitance Characteristics

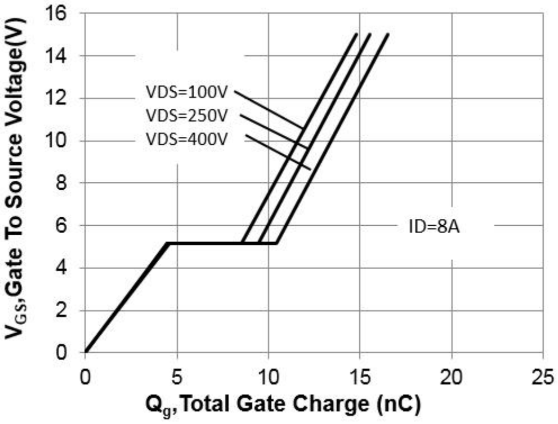


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

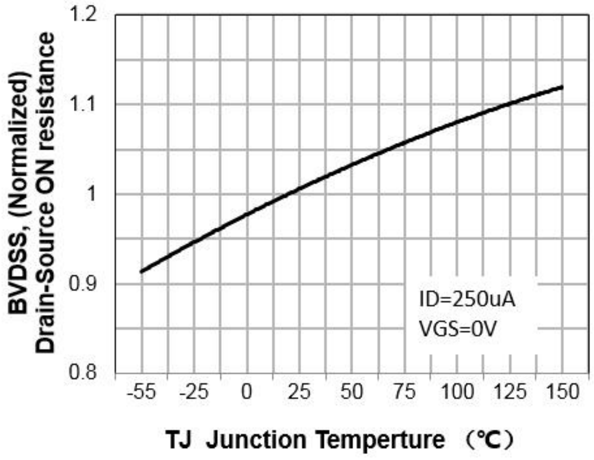


Figure 7. Breakdown Voltage Variation vs Temperature

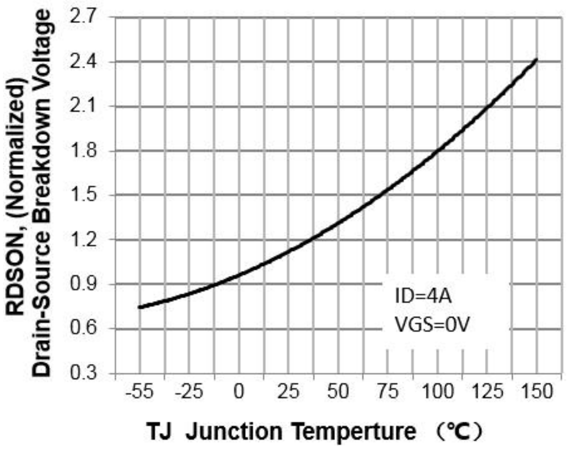


Figure 8. On-Resistance Variation vs Temperature

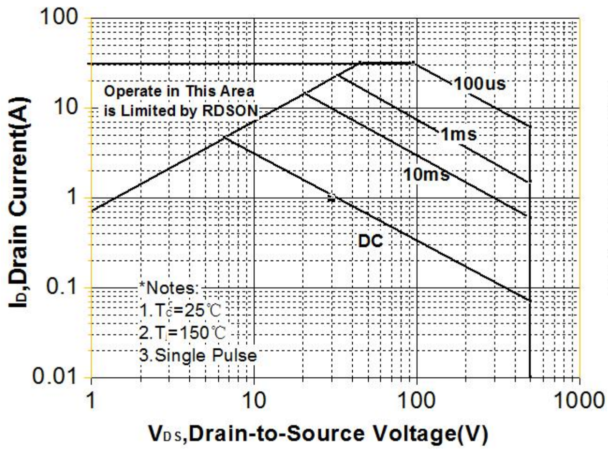


Figure 9. Maximum Safe Operating Area

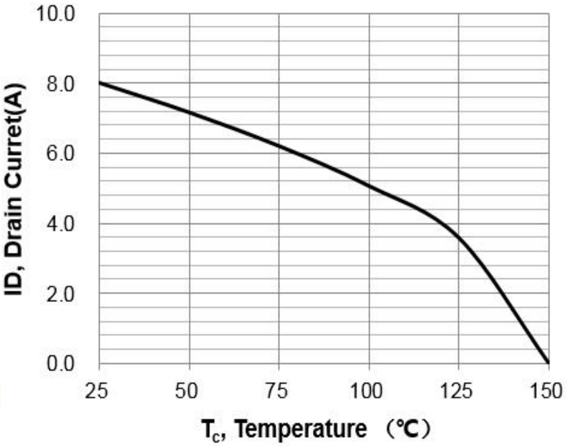


Figure 10. Maximum Drain Current vs Case Temperature

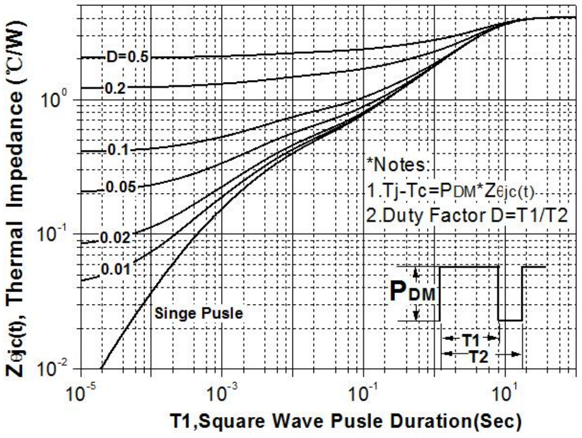
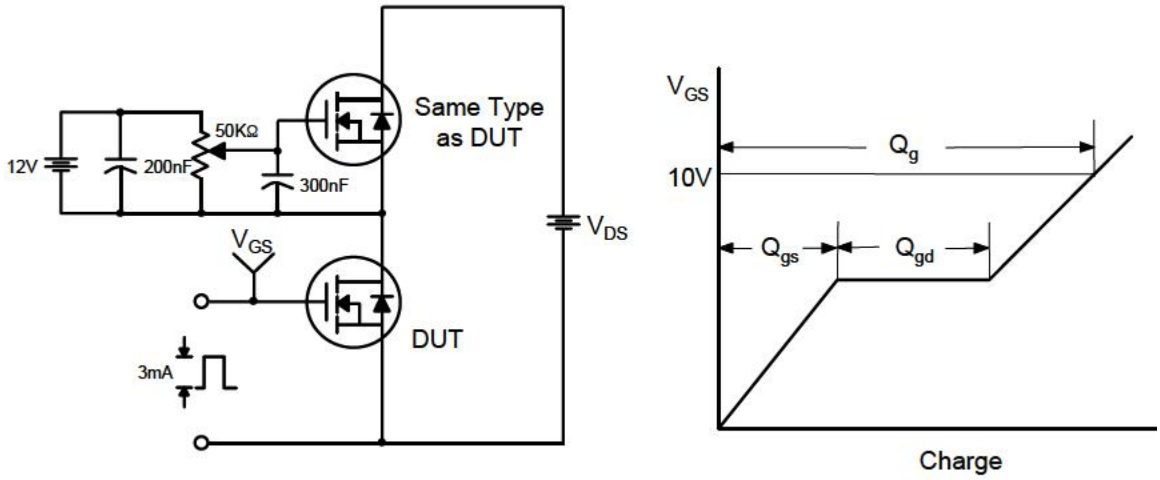
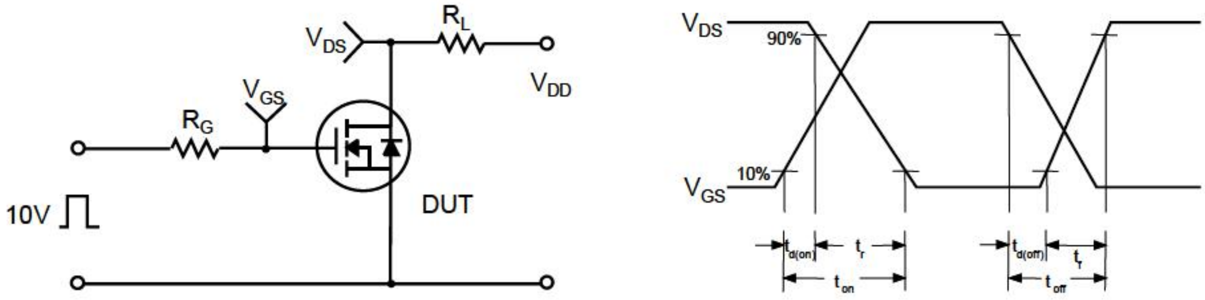


Figure 11. Transient Thermal Response Curve

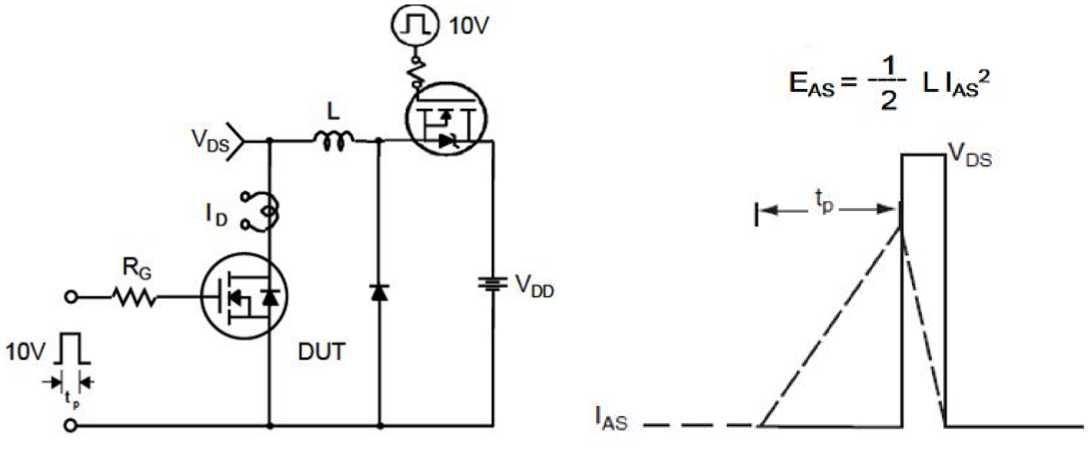
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

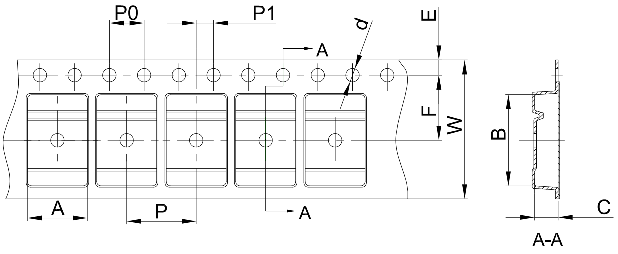


Unclamped Inductive Switching Test Circuit & Waveforms



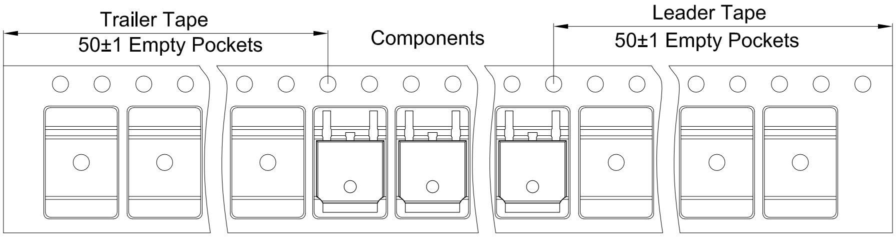
TO-252-2L Tape and Reel

TO-252 Embossed Carrier Tape

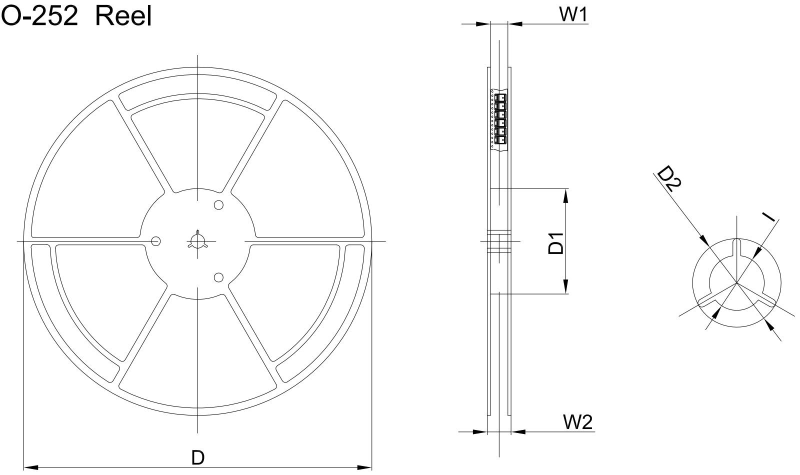


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252 Tape Leader and Trailer

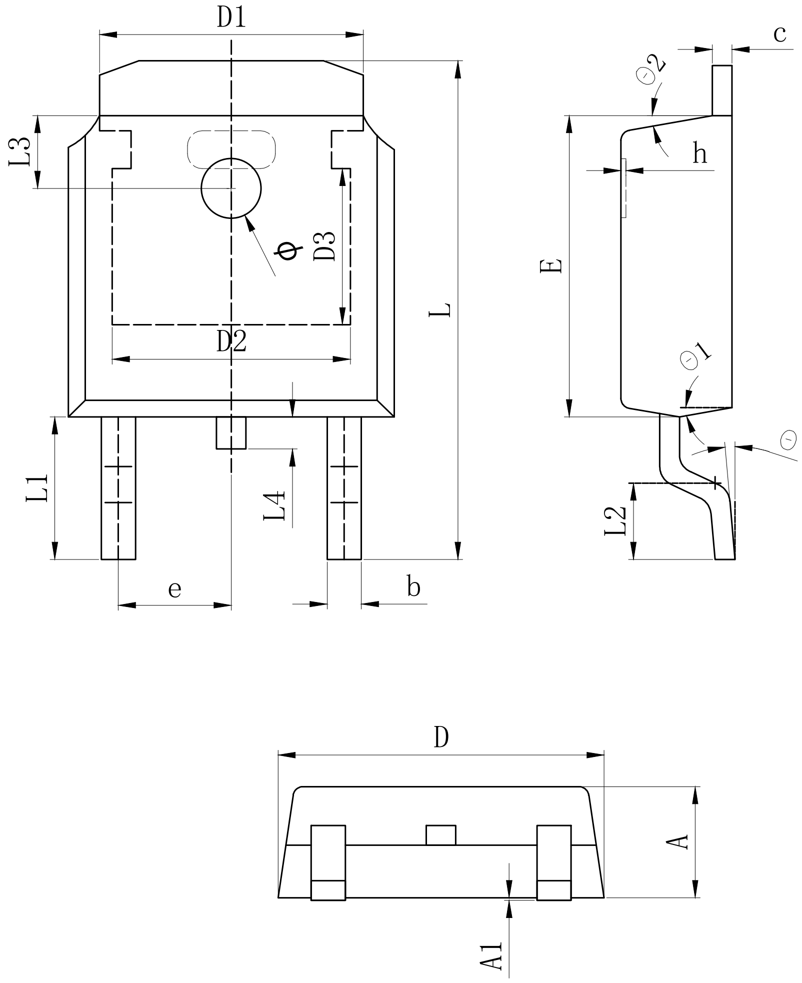


TO-252 Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13"Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		

DISCLAIMER

JHG PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with JHG products. You are solely responsible for

(1)selecting the appropriate JHG products for your application;

(2)designing, validating and testing your application;

(3)ensuring your application meets applicable standards, and any other safety, security, or other requirements.

These resources are subject to change without notice. JHG grants you permission to use these resources only for development of an application that uses the JHG products described in the resource. Other reproduction and display of these resources are prohibited. No license is granted to any other JHG intellectual property right or to any third party intellectual property right. JHG disclaims responsibility for, and you will fully indemnify JHG and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.