



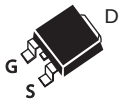
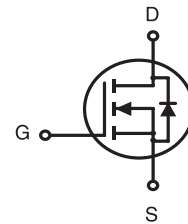
N-Channel Logic Level Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (Ω) Typ
500V	2.6A	2.0 @ V _{GS} =10V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- Surface Mount Package.

SDU SERIES
TO-252(D-PAK)SDD SERIES
TO-251S(I-PAK)SDD SERIES
TO-251L(I-PAK)

ORDERING INFORMATION

Ordering Code	Package	Marking Code	Delivery Mode	RoHS Status
SDU03N50HZ	TO-252	SDU03N50	Reel	Halogen Free
SDD03N50HS	TO-251S	SDD03N50	Tube	Halogen Free
SDD03N50HL	TO-251L	SDD03N50	Tube	Halogen Free

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Symbol	Parameter		Limit	Units
V _{DS}	Drain-Source Voltage		500	V
V _{GS}	Gate-Source Voltage		±30	V
I _D	Drain Current-Continuous ^{a e}	T _C =25°C	2.6	A
		T _C =100°C	1.64	A
I _{DM}	-Pulsed ^b		10.4	A
E _{AS}	Single Pulse Avalanche Energy ^d		260	mJ
P _D	Maximum Power Dissipation	T _C =25°C	45	W
		T _C =100°C	18	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	2.78	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	50	°C/W

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ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	500			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =400V , V _{GS} =0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±30V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2		4	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V , I _D =1.3A		2.0	2.7	ohm
DYNAMIC CHARACTERISTICS ^c						
C _{iss}	Input Capacitance	V _{DS} =25V,V _{GS} =0V f=1.0MHz		350	460	pF
C _{OSS}	Output Capacitance			55	70	pF
C _{RSS}	Reverse Transfer Capacitance			6	8	pF
SWITCHING CHARACTERISTICS ^c						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =250V I _D =1.0A R _{GEN} =25 ohm		12	30	ns
t _r	Rise Time			45	100	ns
t _{D(OFF)}	Turn-Off Delay Time			20	50	ns
t _f	Fall Time			30	70	ns
Q _g	Total Gate Charge	V _{DS} =400V,I _D =1.0A,V _{GS} =10V		10	13	nC
Q _{gs}	Gate-Source Charge	V _{DS} =400V,I _D =1.0A,		2.5		nC
Q _{gd}	Gate-Drain Charge	V _{GS} =10V		4.7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =2.6A			1.4	V
Notes						
a.Surface Mounted on FR4 Board,t ≤ 10sec.						
b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.						
c.Guaranteed by design, not subject to production testing.						
d.Starting T _J =25°C,L=40mH,V _{DD} = 50V.						
e.Drain current limited by maximum junction temperature.						

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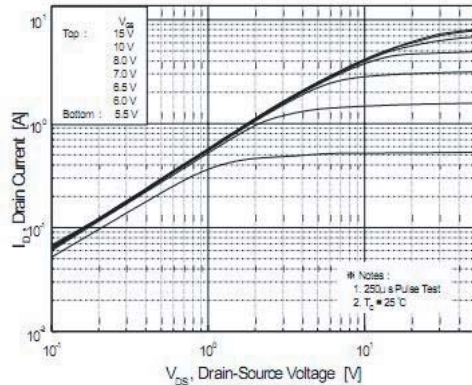


Figure 1. On-Region Characteristics

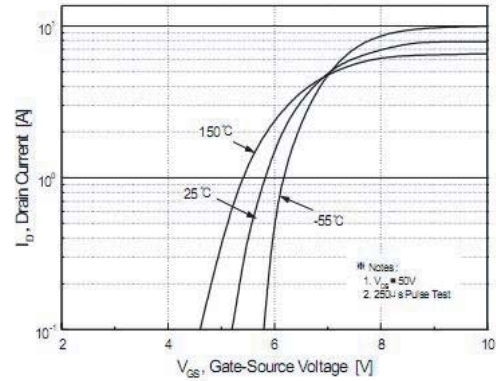


Figure 2. Transfer Characteristics

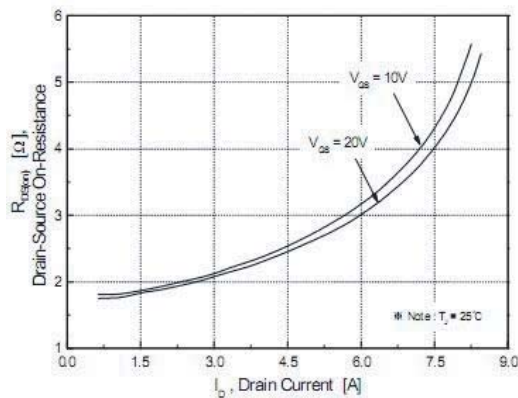


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

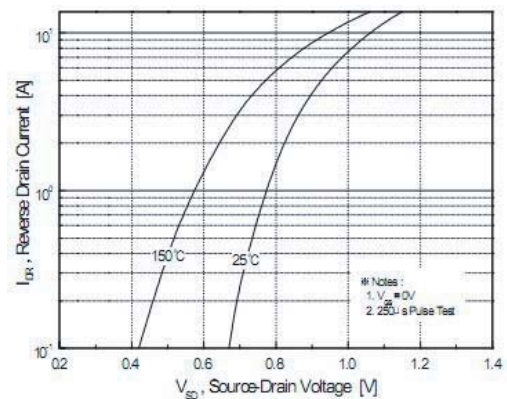


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

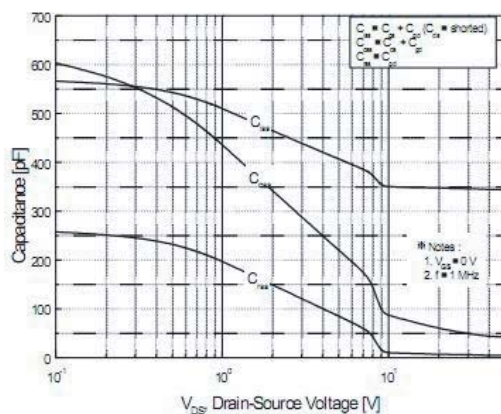


Figure 5. Capacitance Characteristics

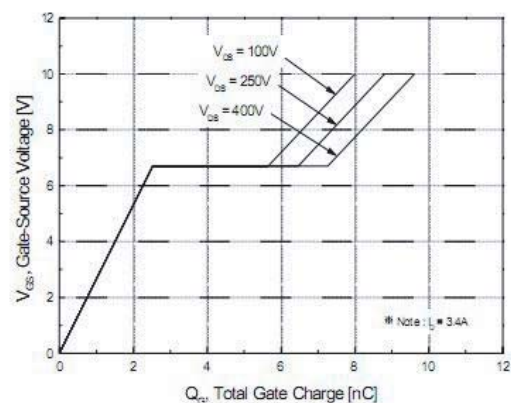


Figure 6. Gate Charge Characteristics

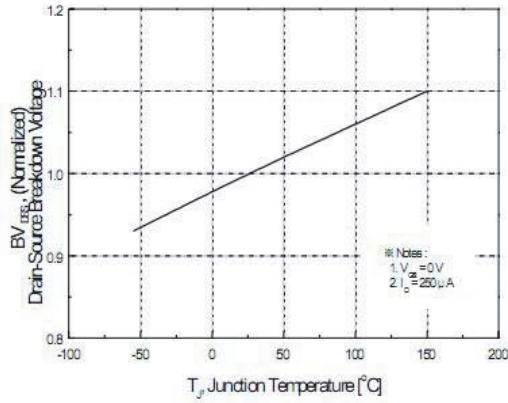


Figure 7. Breakdown Voltage Variation vs. Temperature

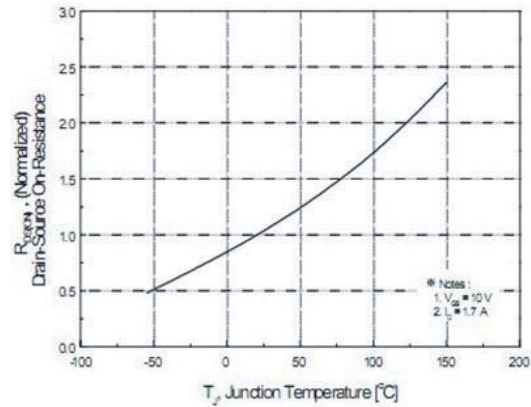


Figure 8. On-Resistance Variation vs Temperature

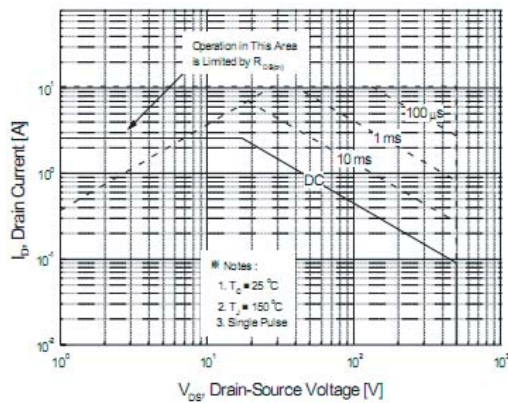


Figure 9-3. Maximum Safe Operating Area for TO251, TO252

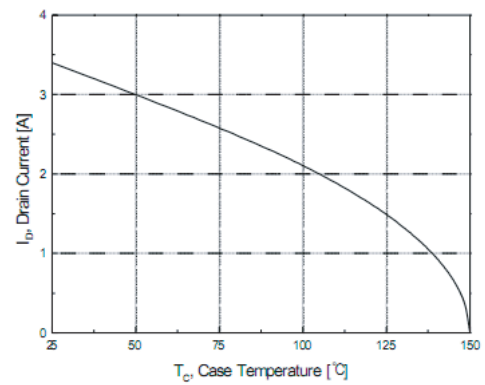


Figure 10. Maximum Drain Current vs Case Temperature

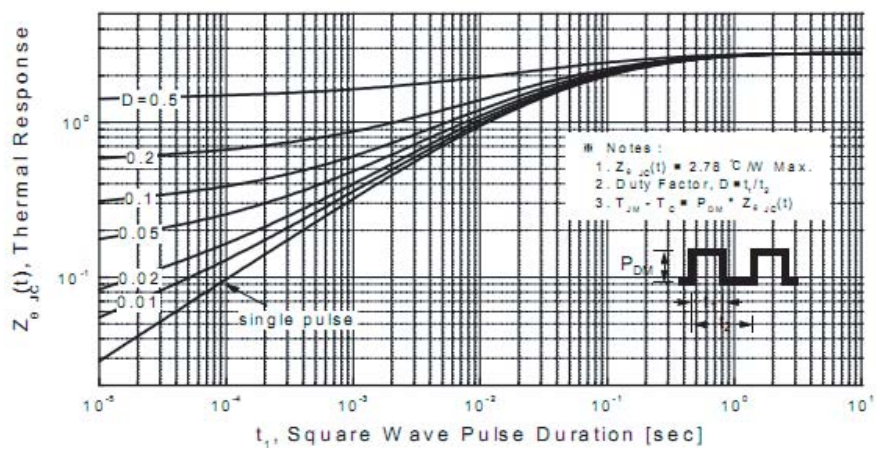
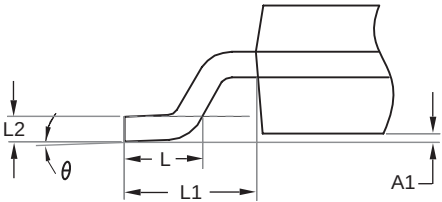
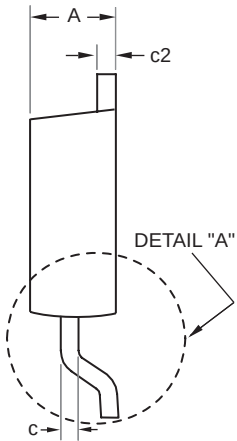
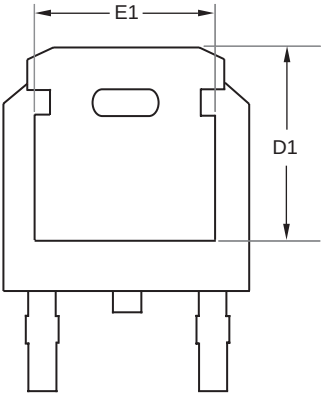
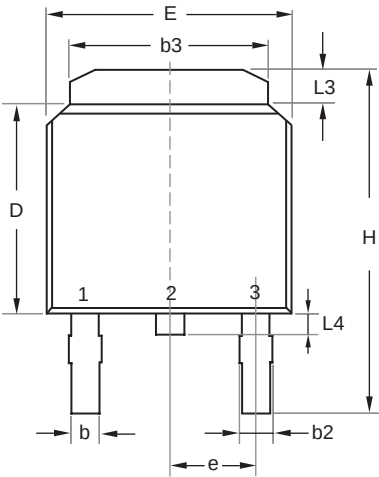


Figure 11-3. Transient Thermal Response Curve for TO251/ TO252

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TO-252



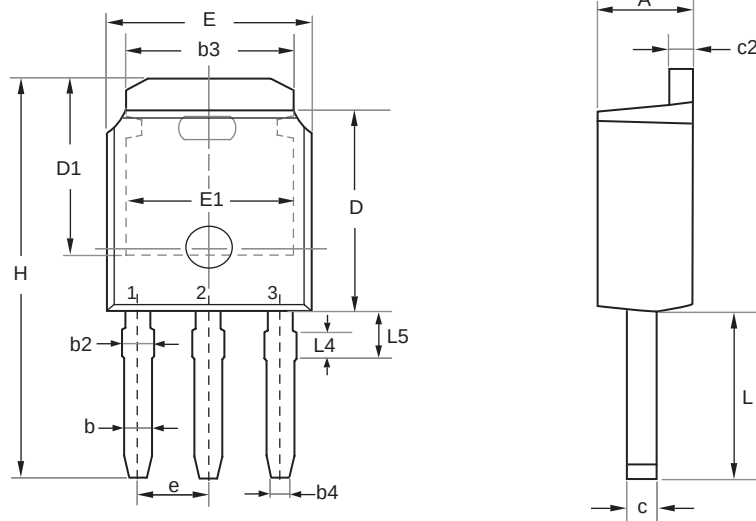
DETAIL "A"

SYMBOLS	MILLIMETERS	
	MIN	MAX
A	2.200	2.380
A1	0.000	0.127
b	0.635	0.889
b2	0.762	1.143
b3	5.200	5.460
c	0.450	0.600
c2	0.450	0.580
D	6.000	6.223
D1	5.210	5.380
e	2.286 BSC	
E	6.400	6.731
E1	4.318	4.900
H	9.400	10.400
L	1.400	1.770
L1	2.743 REF	
L2	0.508 BSC	
L3	0.890	1.270
L4	0.640	1.010
θ	0°	10°

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PACKAGE OUTLINE DIMENSIONS

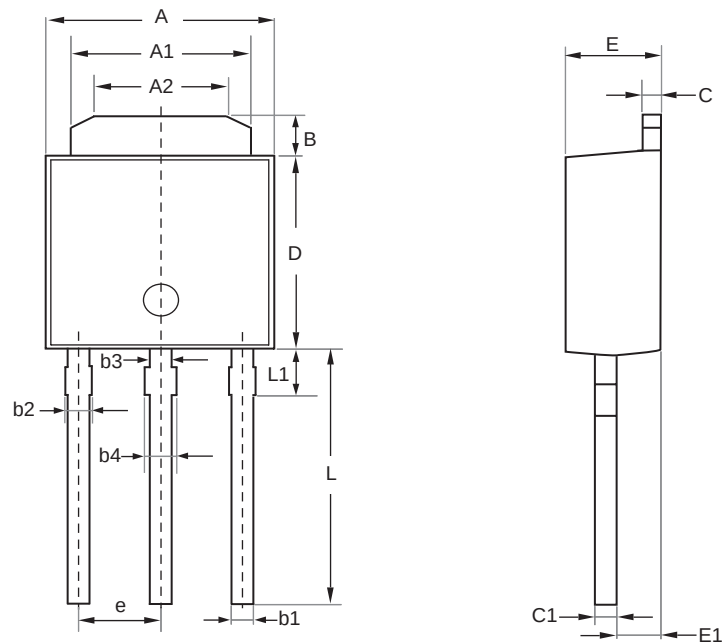
TO-251S



SYMBOL	MILLIMETERS	
	MIN	MAX
E	6.350	6.731
L	3.700	4.400
L4	0.698 REF	
L5	0.972	1.226
D	5.970	6.223
H	9.670	11.450
b	0.630	0.850
b2	0.760	1.140
b3	4.950	5.460
b4	0.450	0.550
e	2.286 BSC	
A	2.180	2.390
c	0.400	0.610
c2	0.400	0.610
D1	5.100	---
E1	4.318	---

PACKAGE OUTLINE DIMENSIONS

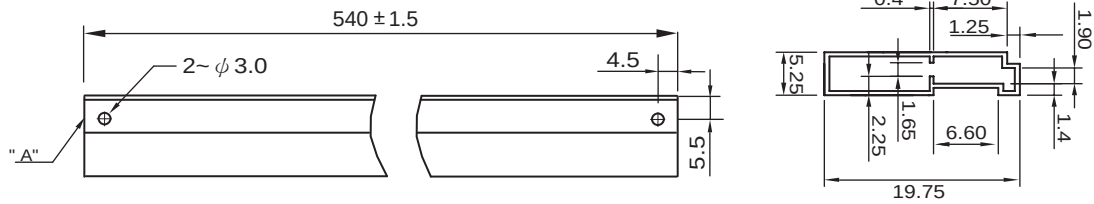
TO-251L



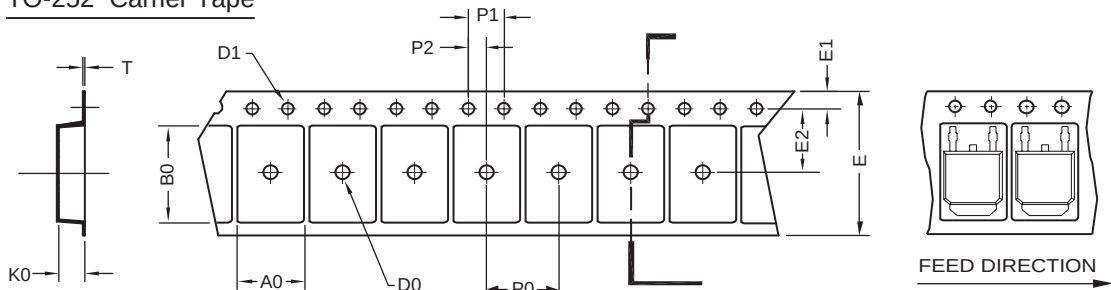
SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	6.40	6.50	6.60
A1	5.30	5.40	5.50
A2	4.30	4.40	4.50
B	1.35	1.50	1.65
L1	1.55 REF		
L	7.40	7.70	8.00
D	5.40	5.55	5.70
C	0.55	0.60	0.65
C1	0.49	0.54	0.59
E1	1.72	1.77	1.82
E	2.20	2.30	2.40
b1	0.60	—	0.75
b2	0.70	—	0.85
b3	0.80		
b4	0.90		
e	2.30		

TO-251 Tube/TO-252 Tape and Reel Data

TO-251 Tube



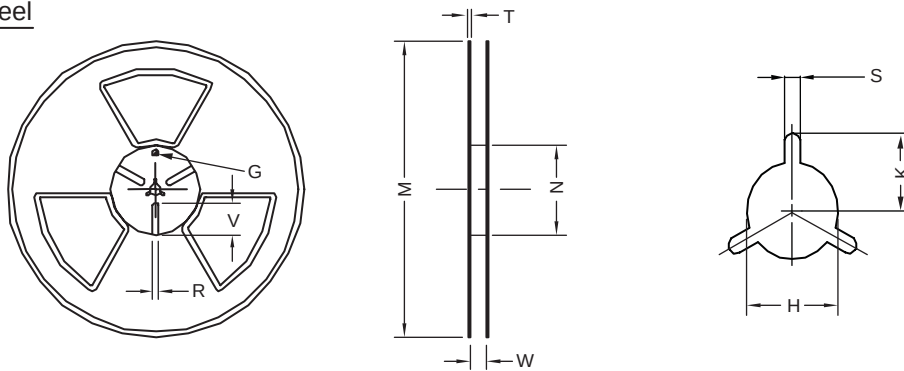
TO-252 Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 mm)	6.96 ±0.1	10.49 ±0.1	2.79 ±0.1	φ 2	φ 1.5 +0.1 - 0	16.0 ±0.3	1.75 ±0.1	7.5 ±0.15	8.0 ±0.1	4.0 ±0.1	2.0 ±0.15	0.3 ±0.05

TO-252 Reel



UNIT:mm

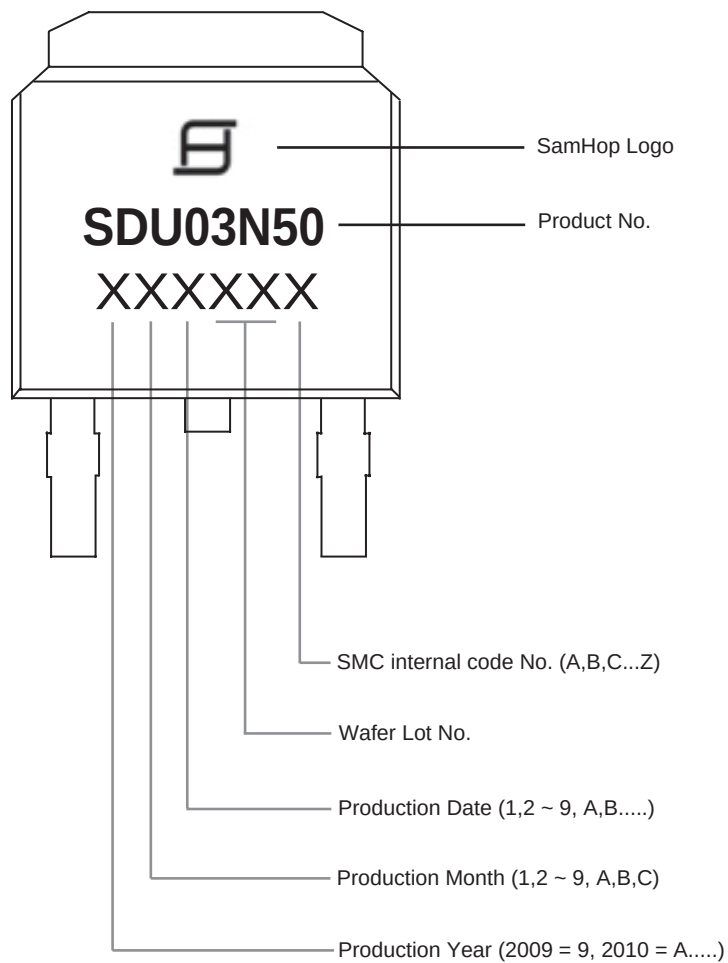
TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 mm	φ 330	φ 330 ± 0.5	φ 97 ± 1.0	17.0 + 1.5 - 0	2.2	φ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---

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TOP MARKING DEFINITION

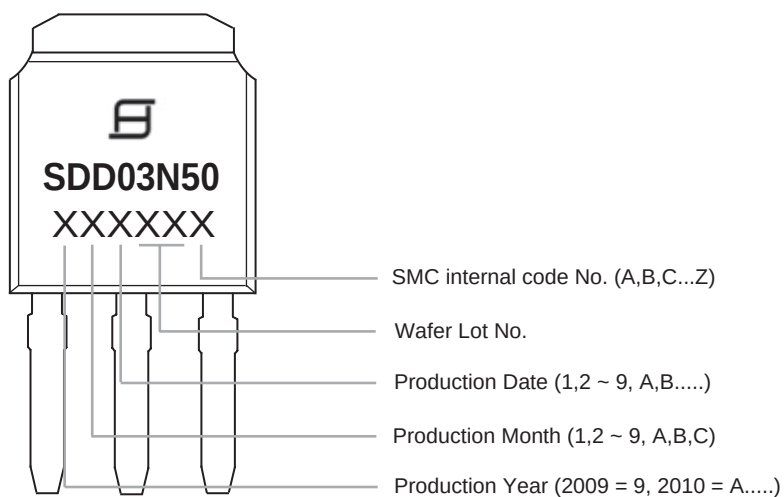
TO-252



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TOP MARKING DEFINITION

TO-251S



TO-251L

