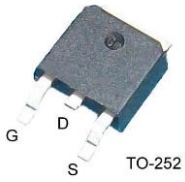
Features

- -60V, -13A
- $R_{DS(ON)}$ = 90mΩ (Max.) @ V_{GS} = -10V, I_D = -10A
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

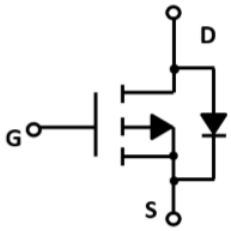
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

Package



SFD6113AT



Absolute Maximum Ratings T_C=25℃ unless otherwise specified

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		-60	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current note1	T_C = 25℃	-13	A
		T_C = 100℃	-8.3	A
I_{DM}	Pulsed Drain Current note2		-26	A
E_{AS}	Single Pulsed Avalanche Energy note3		29.8	mJ
P_D	Power Dissipation note4	T_C = 25℃	31.1	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		4	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

*Drain current limited by maximum junction temperature

Electrical Characteristics T_C=25℃ unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250μA	-60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -48V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-	-2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance note2	V_{GS} = -10V, I_D = -10A	-	-	90	mΩ
		V_{GS} = -4.5V, I_D = -5A	-	-	132	
g_{FS}	Forward Transconductance	V_{DS} = -10V, I_D = -5A	-	8.7	-	S
R_g	Gate Resistance	V_{DS} = V_{GS}=0V, f = 1.0MHz	-	15	-	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz	-	1080	-	pF
C_{oss}	Output Capacitance		-	73	-	pF
C_{rss}	Reverse Transfer Capacitance		-	50	-	pF
Q_g	Total Gate Charge (-4.5V)	V_{DS} = -12V, I_D = -6A, V_{GS} = -4.5V	-	11.8	-	nC
Q_{gs}	Gate-Source Charge		-	1.9	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	6.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15V, I_D = -1A, R_G= 3.3Ω, V_{GS} = -10V	-	8.8	-	ns
t_r	Turn-On Rise Time		-	19.6	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	47.2	-	ns
t_f	Turn-Off Fall Time		-	9.6	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current note1,5		-	-	-13	A
I_{SM}	Pulsed Source Current note2,5		-	-	-26	A
V_{SD}	Drain to Source Diode Forward Voltage note2	V_{GS} = 0V, I_S =-1A	-	-	-1	V

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-24.4A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation

Typical Performance Characteristics

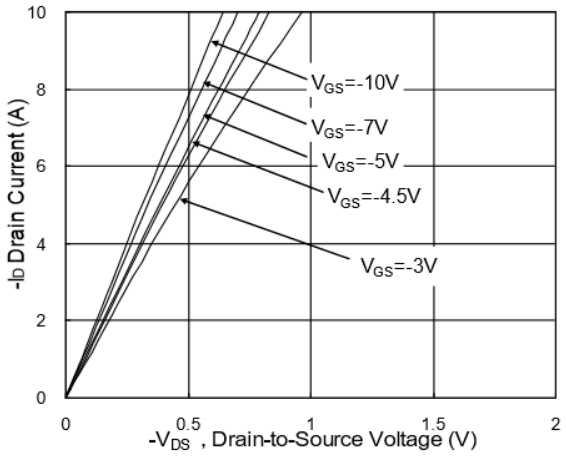


Figure 1. Output Characteristics

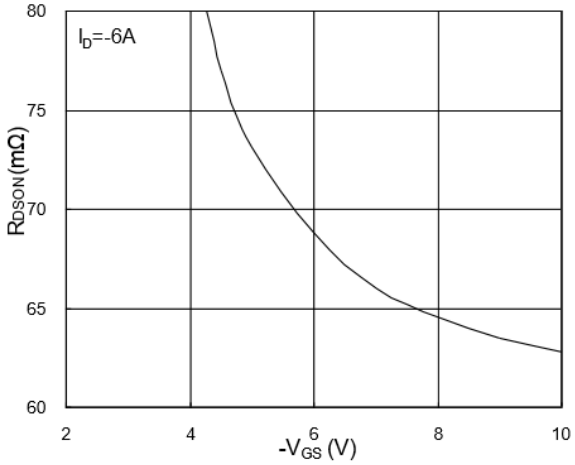


Figure 2. On-Resistance v.s Gate-Source

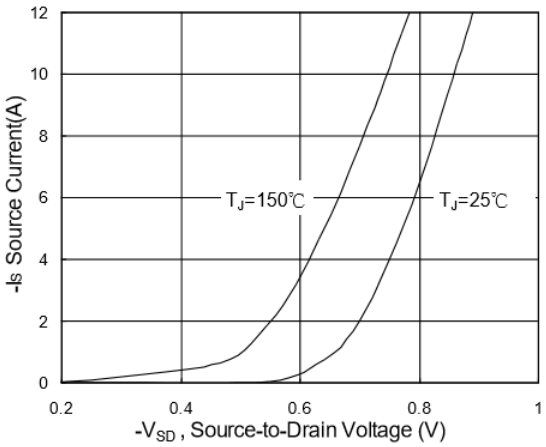


Figure 3. Forward Characteristics of Reverse

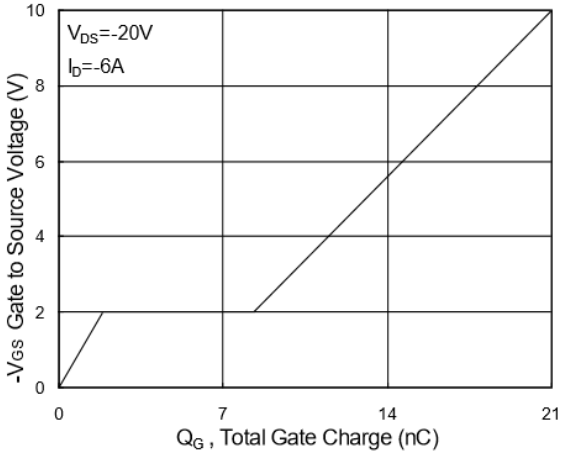


Figure 4. Gate-Charge Characteristics

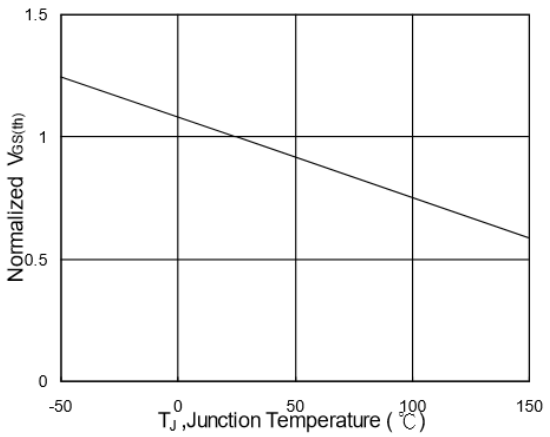


Figure 5. Normalized $V_{GS(th)}$ v.s T_J

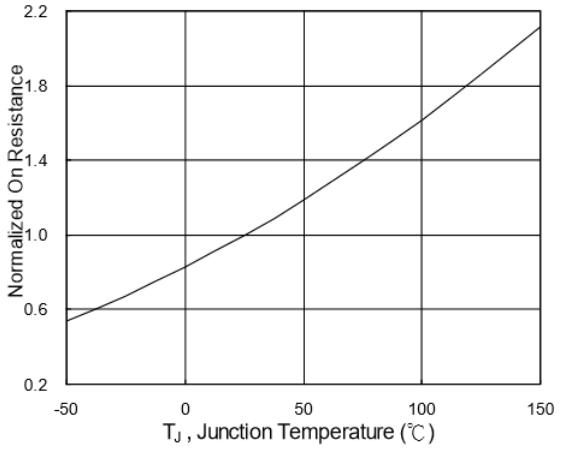


Figure 6. Normalized R_{DSON} v.s T_J

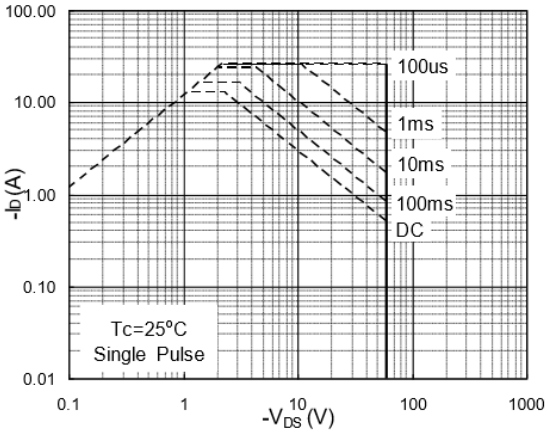


Figure 7. Maximum Safe Operating Area

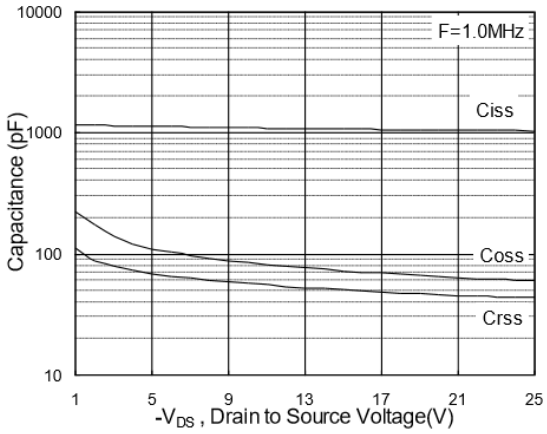


Figure 8. Typical Capacitance Characteristics

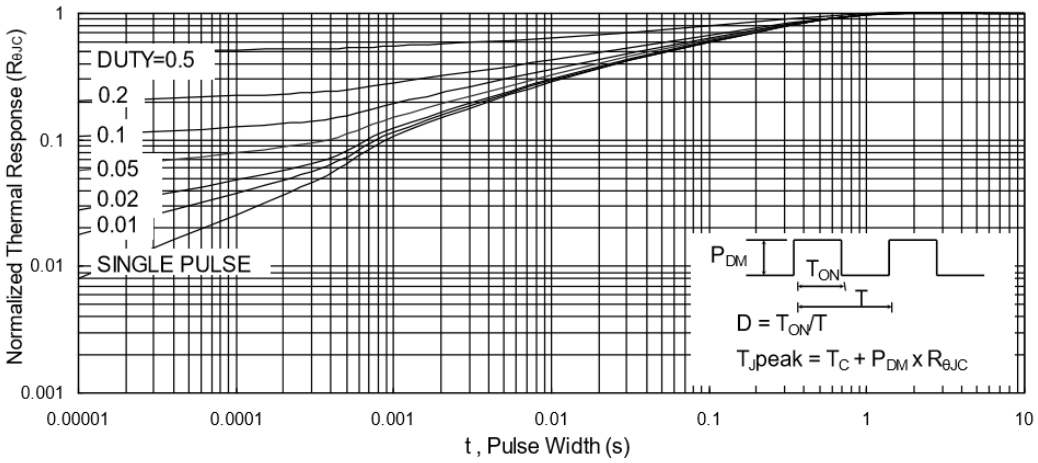


Figure 9 Effective Transient Thermal Impedance

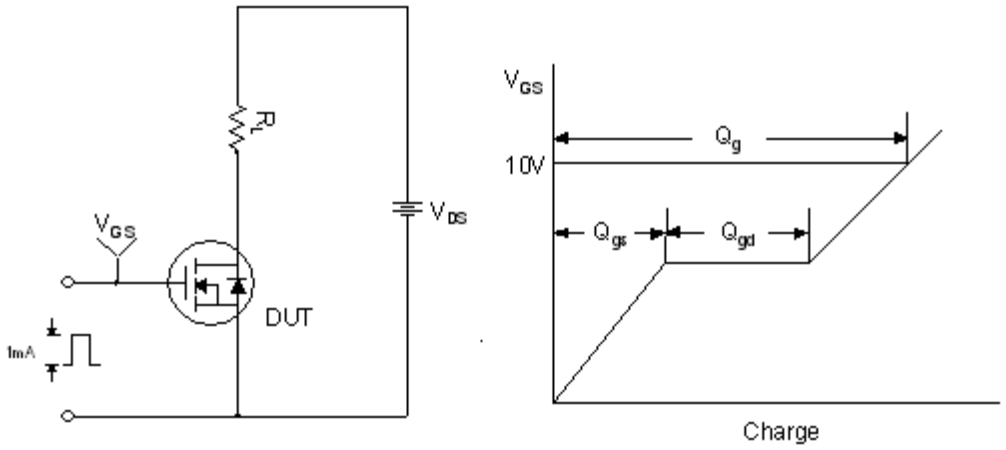


Figure 10. Gate Charge Test Circuit & Waveform

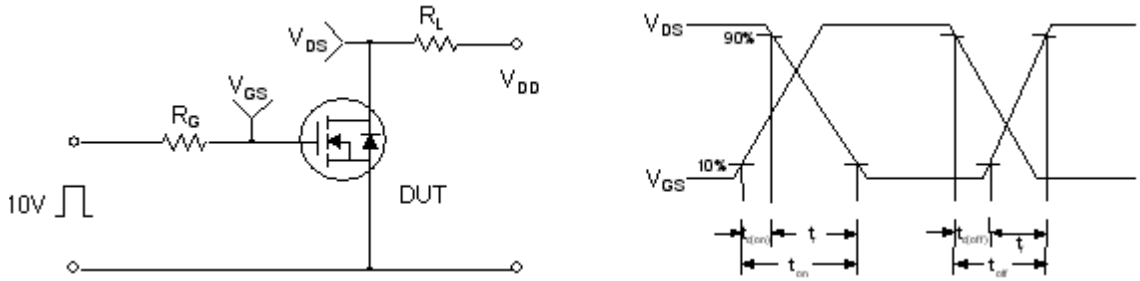


Figure 11. Resistive Switching Test Circuit & Waveforms

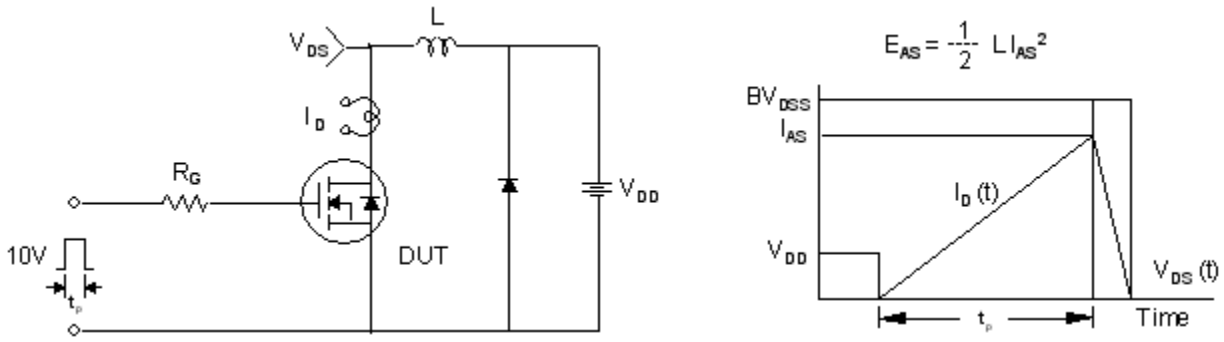


Figure 12. Unclamped Inductive Switching Test Circuit & Waveforms

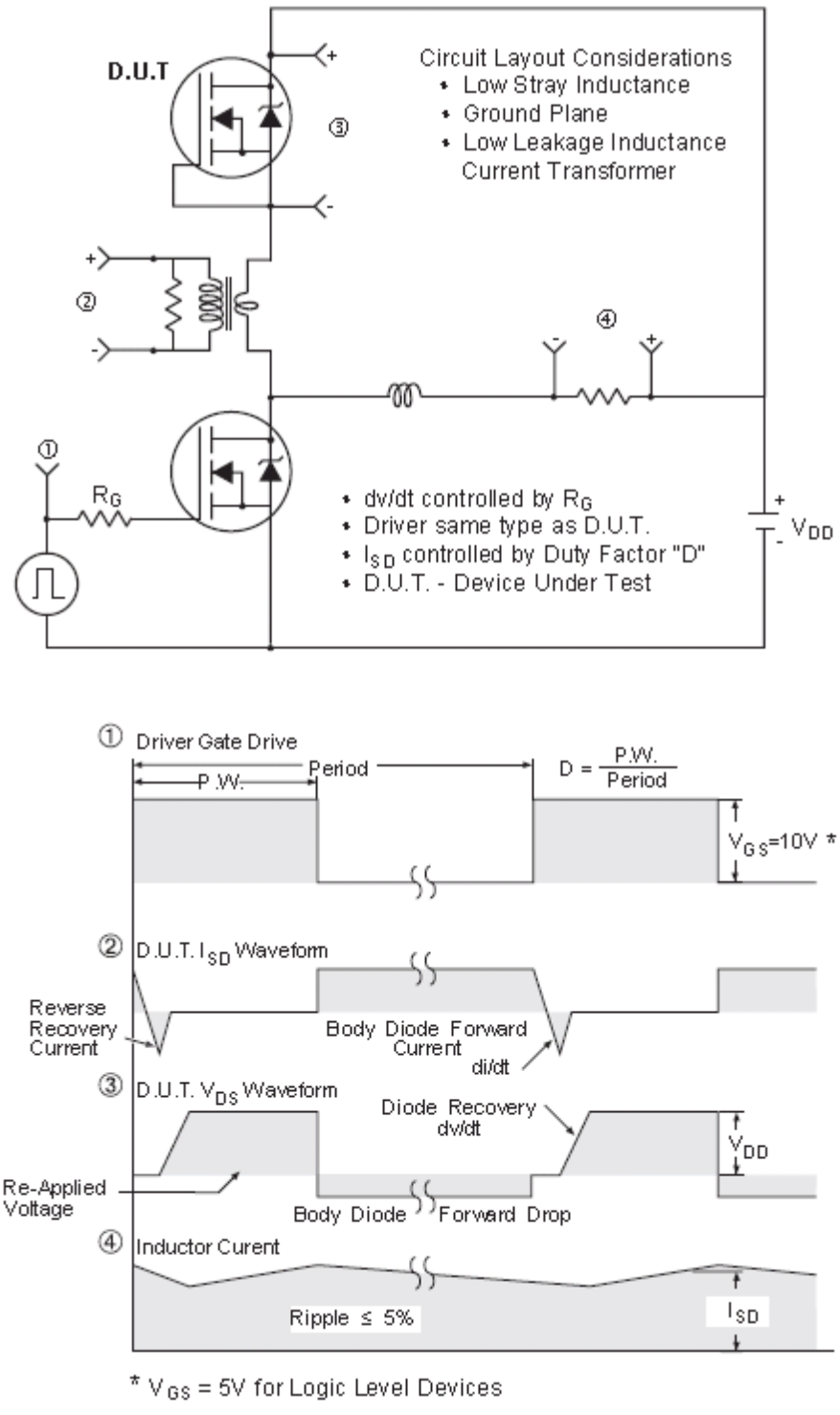
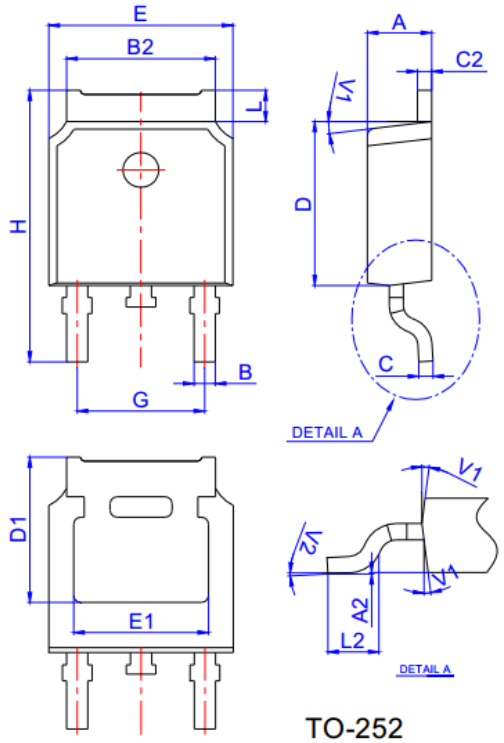


Figure 13. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

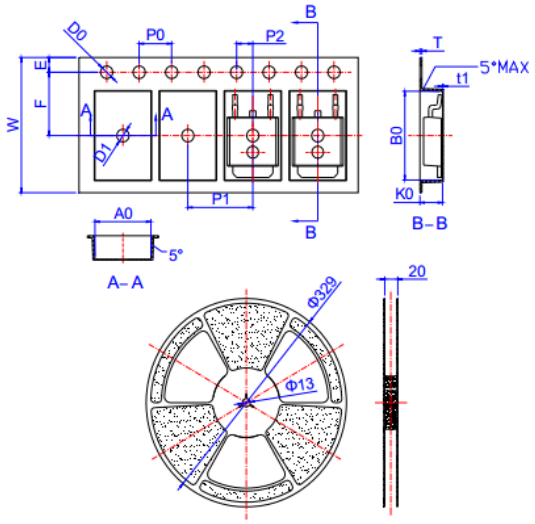
Package Mechanical Data



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

OUTLINE	REEL (PCS)	PER CARTON (PCS)	TAPE & REEL
TAPING	2,500	25,000	13inch

NOTE:

1.We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.

2.Please do not exceed the absolute maximum ratings of the device when circuit designing.

3.Winsemi Microelectronics Co., Ltd reserved the right to make changes in this specification sheet and is subject to change without prior notice.

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