

N-Ch 40V Fast Switching MOSFETs

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary

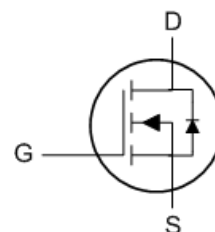
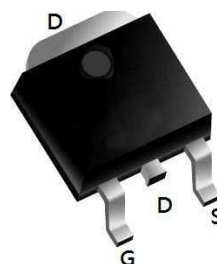


BVDSS	RDSON	ID
40V	3.8 mΩ	100A

Description

The XR100N04 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The XR100N04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252-3L Pin Configuration



Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter	Value	Units
V _{DS}	Drain-to-Source Voltage	40	V
V _{GS}	Gate-to-Source Voltage	±20	V
I _D	Continuous Drain Current	T _C = 25°C	A
		T _C = 100°C	
I _{DM}	Pulsed Drain Current ⁽¹⁾	320	A
E _{AS}	Single Pulsed Avalanche Energy ⁽²⁾	156	mJ
P _D	Power Dissipation	T _C = 25°C	W
R _{θJA}	Thermal Resistance, Junction to Ambient ⁽³⁾	31	°C/W
R _{θJC}	Thermal Resistance, Junction to Case	0.88	
T _J , T _{STG}	Junction & Storage Temperature Range	-55 to 150	°C

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	40	-	-	V
I _{DS}	Zero Gate Voltage Drain Current	V _{DS} = 40V, V _{GS} = 0V	-	-	1.0	μA
I _{GS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(t)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.3	1.9	2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 30A	-	3.8	4.9	mΩ
		V _{GS} = 4.5V, I _D = 20A	-	5.7	7.4	mΩ
Dynamic Characteristics						
C _{IS}	Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz	-	3778	-	pF
C _{OS}	Output Capacitance		-	267	-	pF
C _{RS}	Reverse Transfer Capacitance		-	224	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 20V, I _D = 30A	-	73	-	nC
Q _g	Gate Source Charge		-	15	-	nC
Q _g	Gate Drain("Miller") Charge		-	16	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 20V I _D = 30A, R _{GEN} = 3Ω	-	12	-	ns
t _r	Turn-On Rise Time		-	29	-	ns
t _{d(off)}	Turn-Off DelayTime		-	60	-	ns
t _f	Turn-Off Fall Time		-	16	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	100	A
I _S	Maximum Pulsed Drain to Source Diode Forward Current		-	-	320	A
V _{VS}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 30A	-	-	1.2	V
t _{trr}	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	-	16	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	10	-	nC

- Note:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. EAS condition: Starting T_J=25°C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=25A
 3. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
 4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

Typical Performance

Figure1:OutputCharacteristics

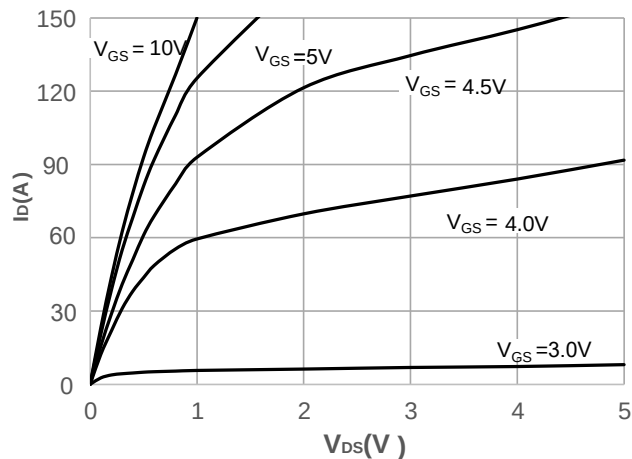


Figure 2: Typical Transfer Characteristics

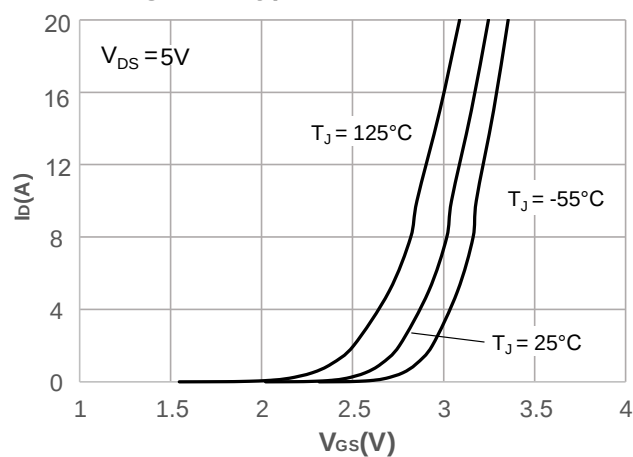


Figure 3: On-resistance vs. Drain Current

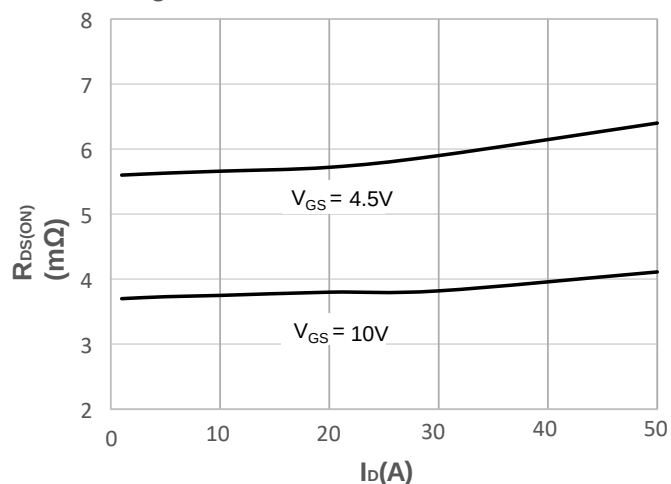


Figure 4: Body Diode Characteristics

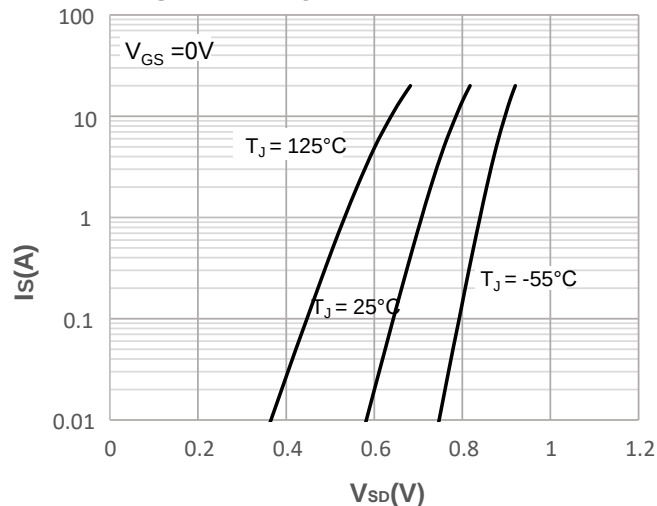


Figure 5: Gate Charge Characteristics

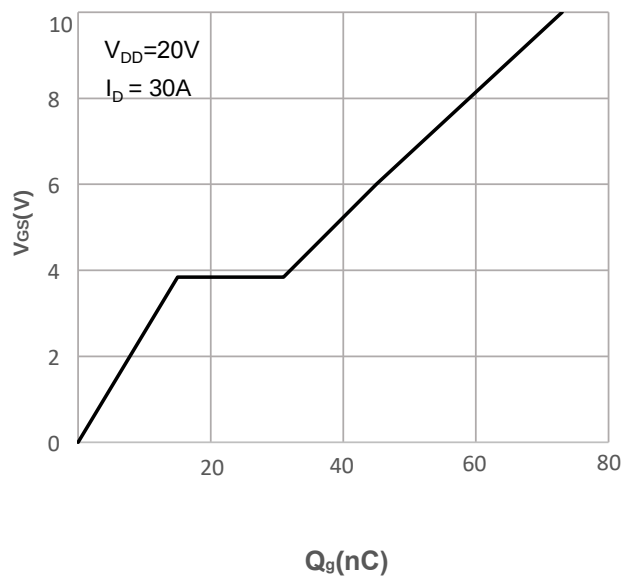
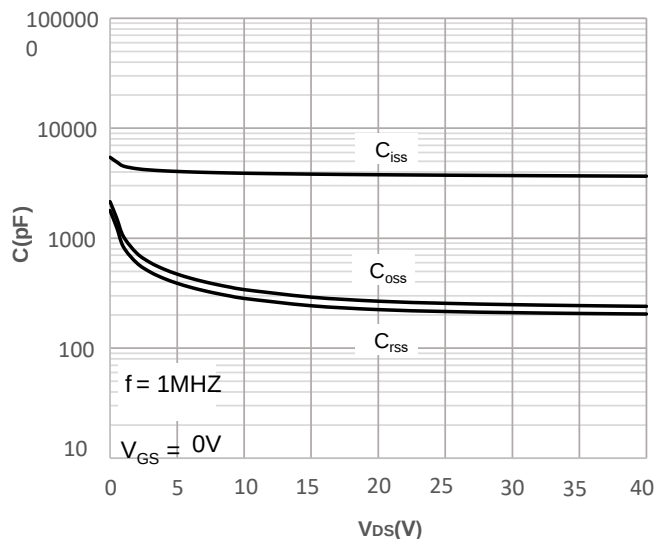


Figure 6: Capacitance Characteristics



Typical Performance

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

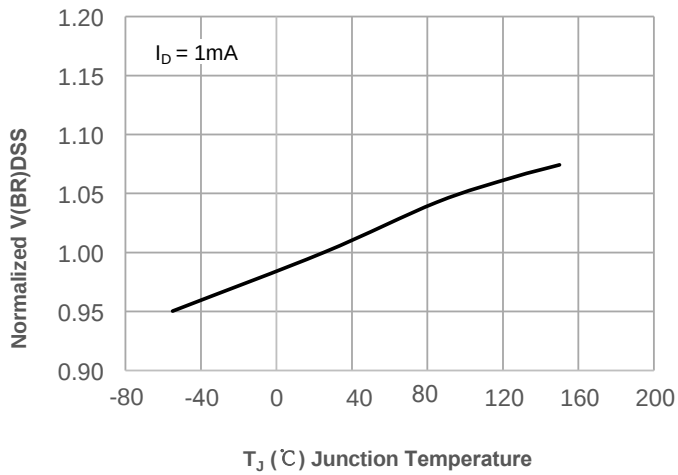


Figure 8: Normalized on Resistance vs. Junction Temperature

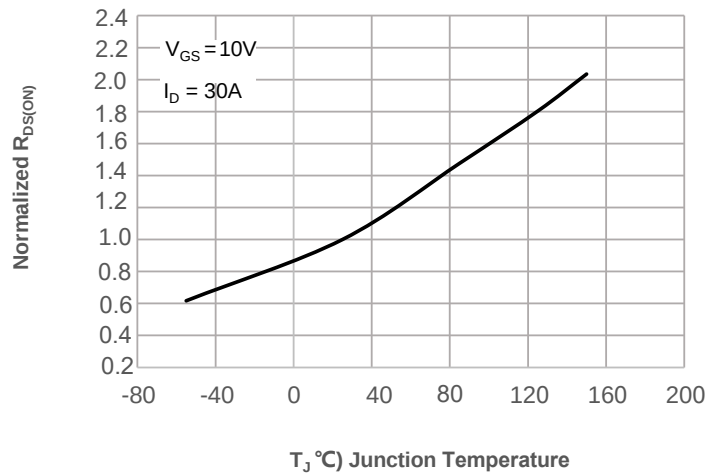


Figure 9: Maximum Safe Operating Area

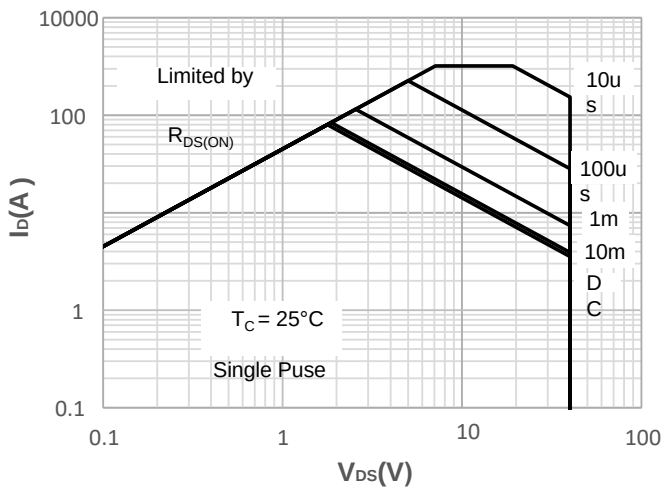


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

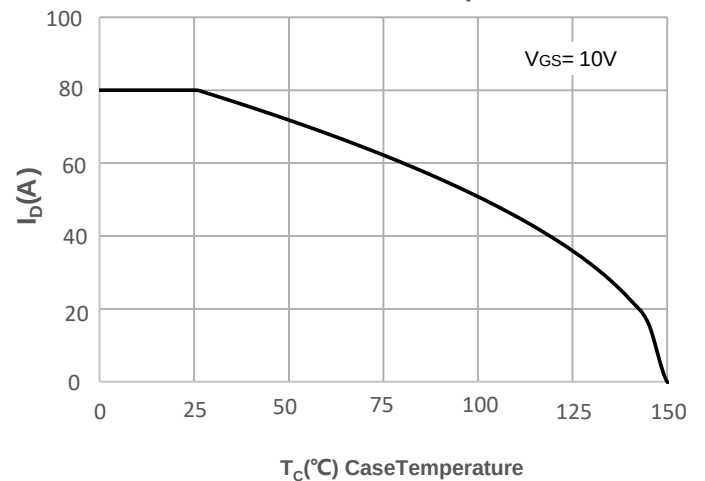


Figure 11: Normalized Maximum Transient Thermal Impedance

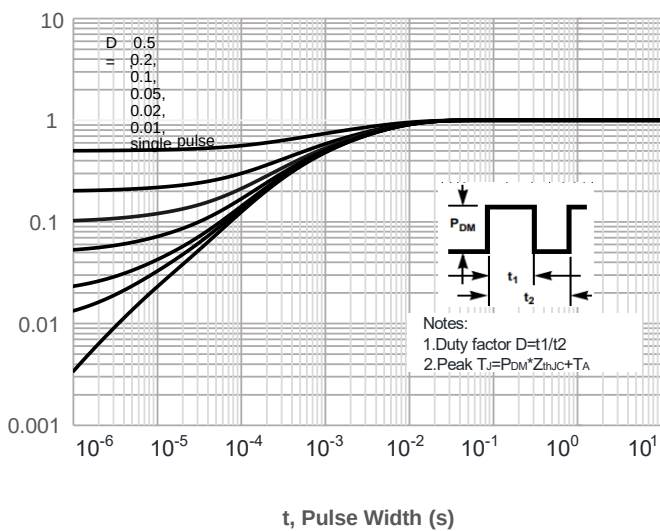
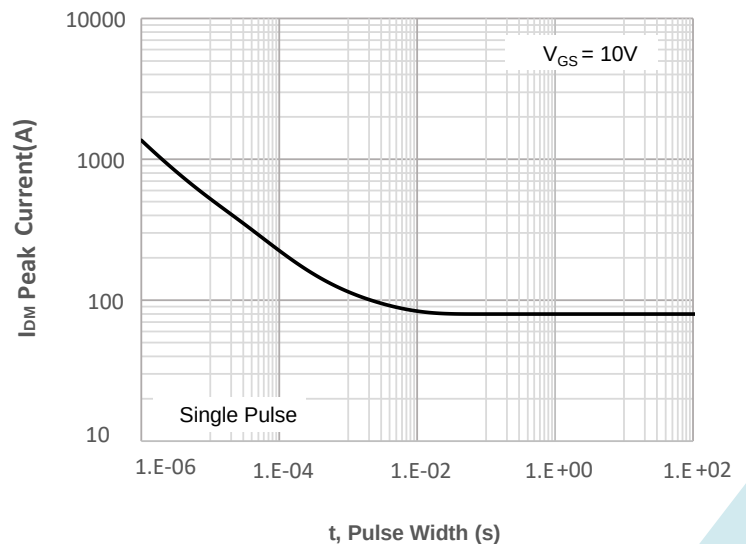


Figure 12: Peak Current Capacity



Test Circuit

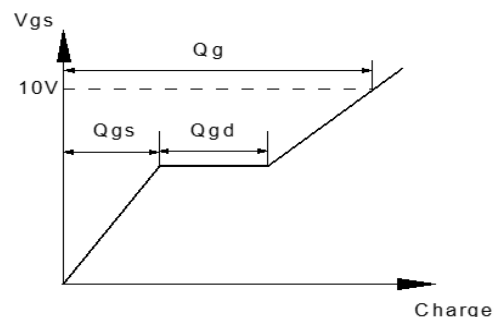
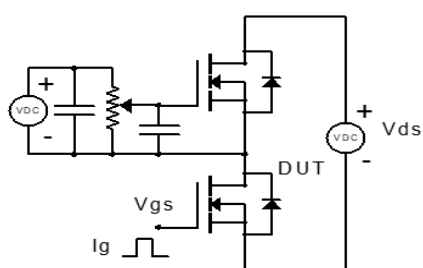


Figure 1: Gate Charge Test Circuit & Waveform

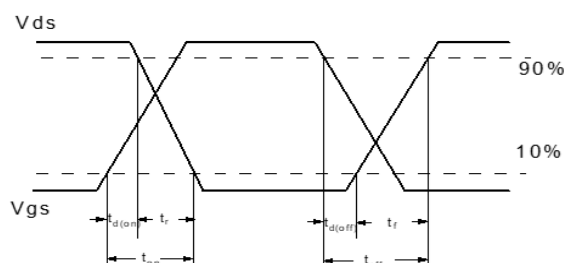
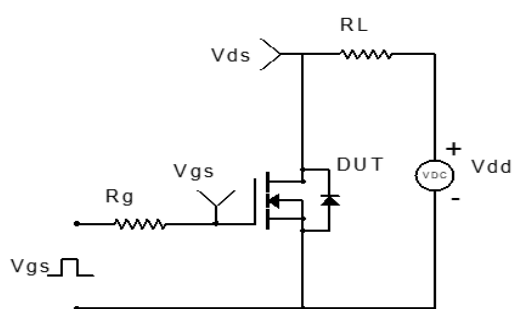


Figure 2: Resistive Switching Test Circuit & Waveform

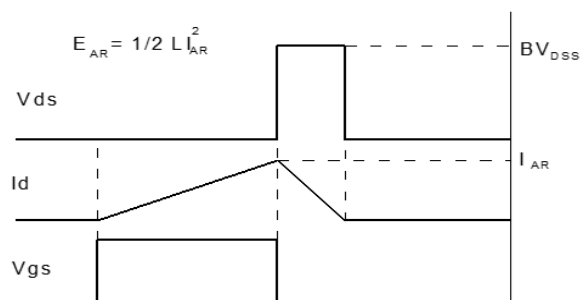
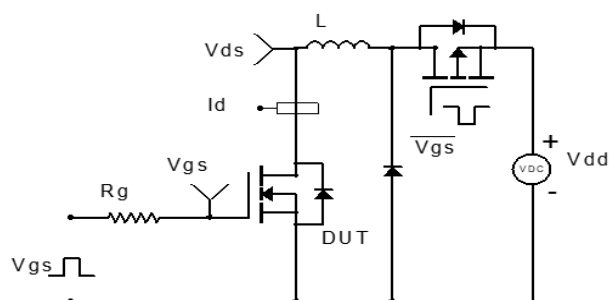


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

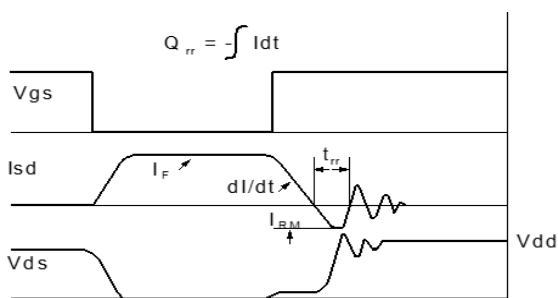
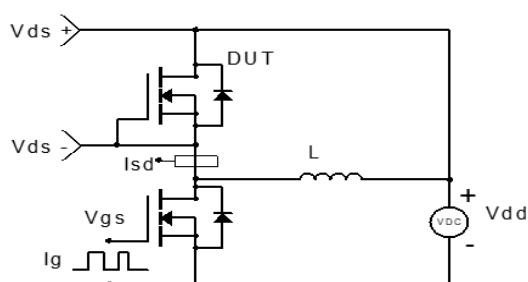
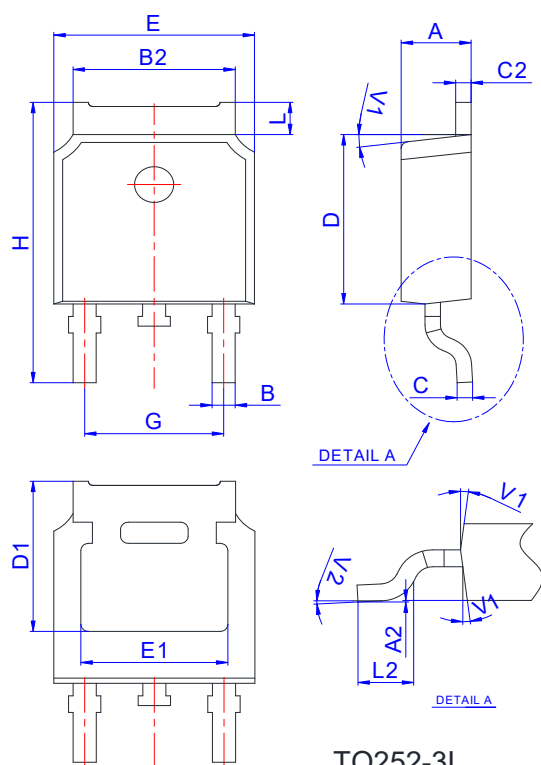


Figure 4: Diode Recovery Test Circuit & Waveform

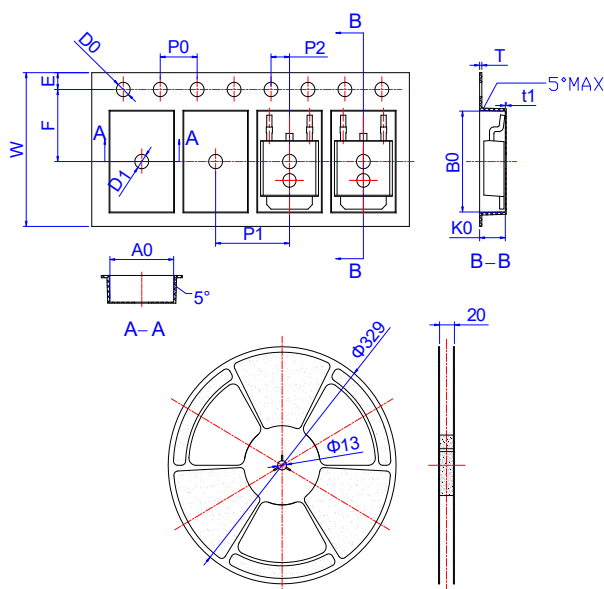
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Package Mechanical Data-TO252-3L



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-TO252-3L



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