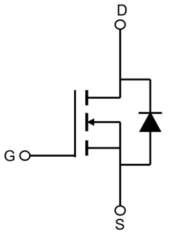
Feature

- 200V,5A
  $R_{DS(ON)}$ <500mΩ @V_{GS}=10V TYP:430 mΩ
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management

Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
5N20K	AP5N20K	TO-252	13 inch	-	2500

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_a =25℃)	I_D	5	A
Continuous Drain Current (T_a =100℃)	I_D	3.3	A
Pulsed Drain Currenr (1)	I_{DM}	20	A
Singel Pulsed Avalanche Energy (2)	E_{AS}	125	mJ
Power Dissipation	P_D	78	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.6	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	200	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =200V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1	1.6	2.5	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =10V, I_D =2.5A	-	430	500	mΩ
Forward tranconductance(3)	g_{FS}	V_{DS} =30V, I_D =2.5A	-	5.2	-	S
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =100kHz	-	255	-	pF
Output Capacitance	C_{oss}		-	30.2	-	
Reverse Transfer Capacitance	C_{rss}		-	2.3	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=100V, I_D=5A,V_{GS}=10V, R_G=2Ω	-	7.33	-	ns
Turn-on rise time	t_r		-	10.7	-	
Turn-off delay time	$t_{d(off)}$		-	18.2	-	
Turn-off fall time	t_f		-	11.9	-	
Total Gate Charge	Qg	VDS=100V, ID=5A, VGS=10V	-	10.8	-	nC
Gate-Source Charge	Qgs		-	1.7	-	
Gate-Drain Charge	Qgd		-	3.1	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=1A	-	-	1.4	V
Diode Forward current(4)	I_S		-	-	5	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=50V,R_G=50Ω,L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Typical Performance Characteristics

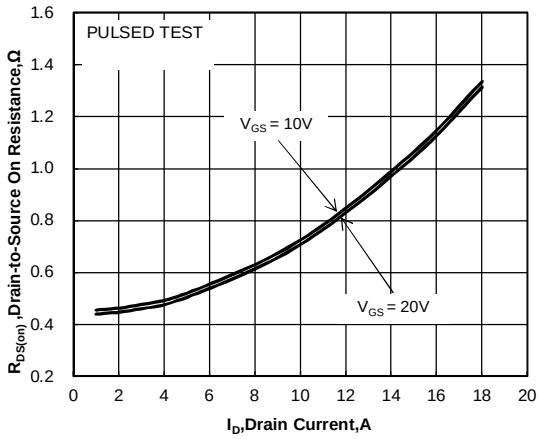


Figure 1. Drain-to-Source On Resistance vs. Drain Current and Gate Voltage

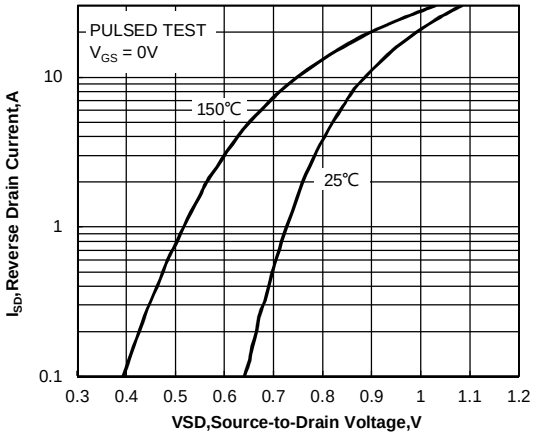


Figure 2. Body Diode Forward Voltage vs. Source Current and Temperature

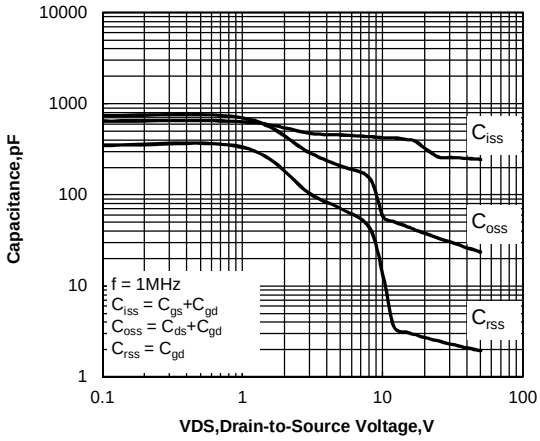


Figure 3. Capacitance Characteristics

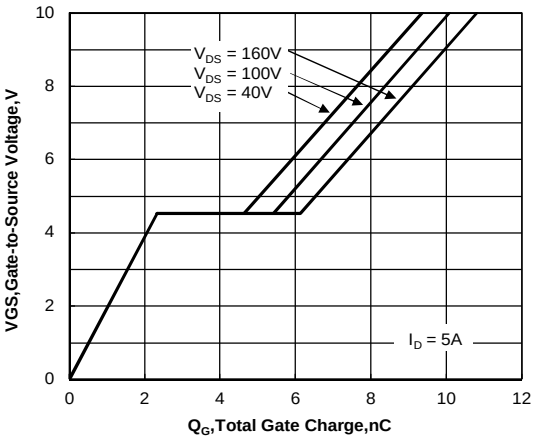


Figure4 .Gate Charge Characteristics

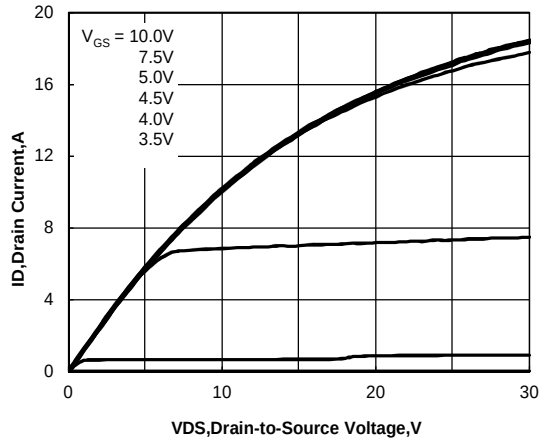


Figure 5. Output Characteristics

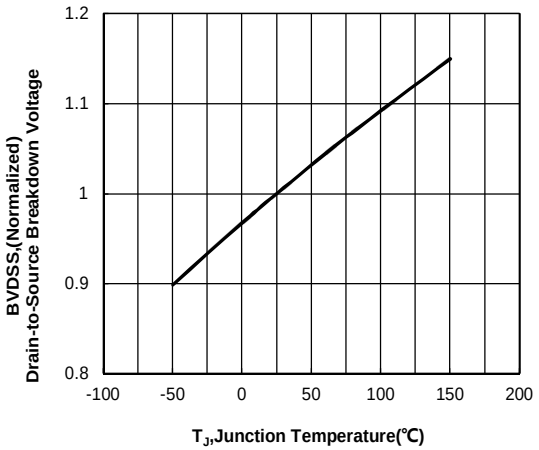


Figure 6. Normalized Breakdown Voltage vs. Junction Temperature

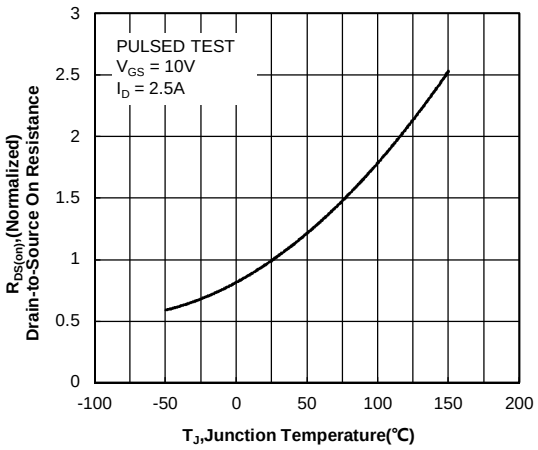


Figure 7. Normalized On Resistance vs. Junction Temperature

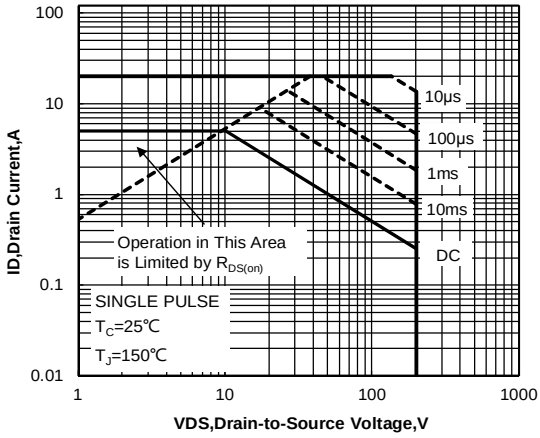


Figure 8. Maximum Safe Operating Area for AP5N20A

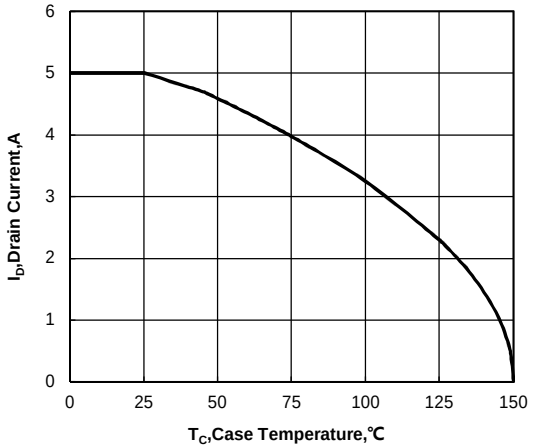


Figure 9. Maximum Continuous Drain Current vs. Case Temperature

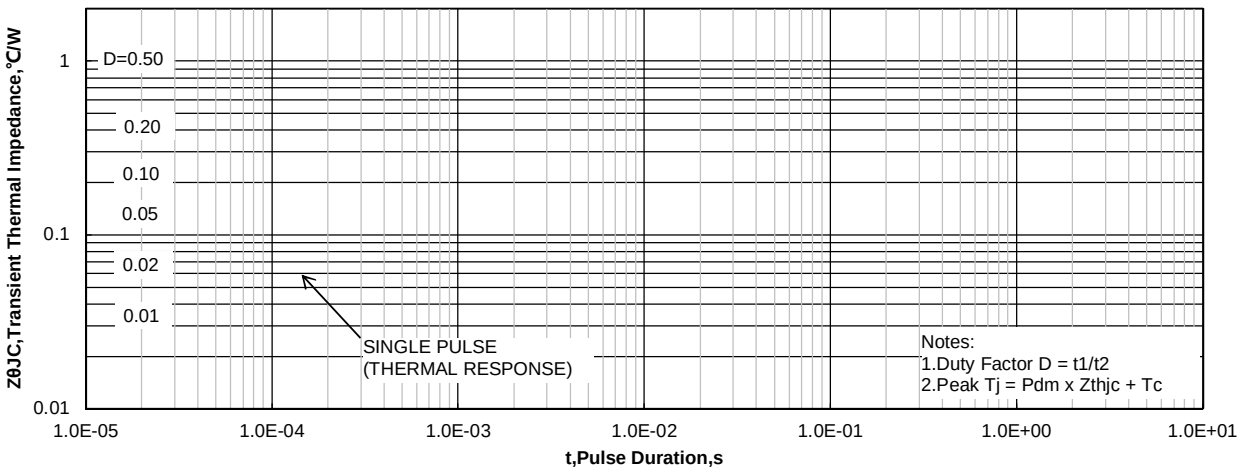


Figure 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case for AP5N20A

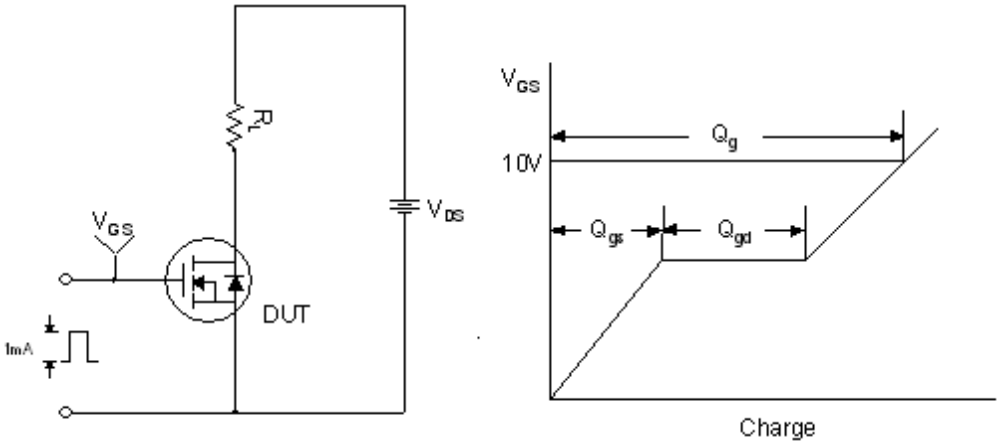


Figure 11. Gate Charge Test Circuit & Waveform

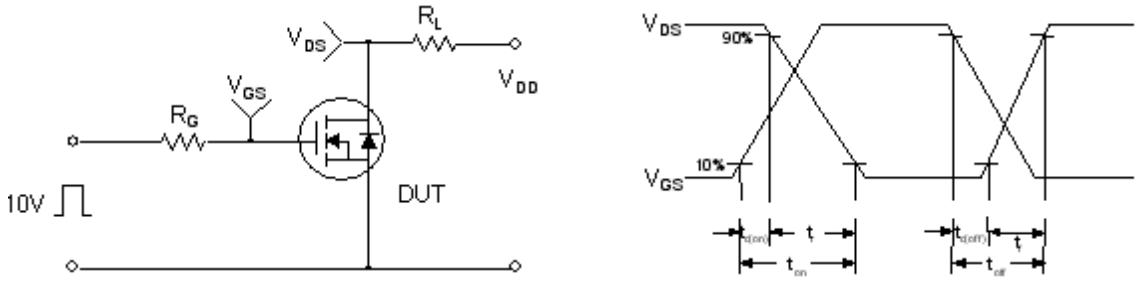


Figure 12. Resistive Switching Test Circuit & Waveforms

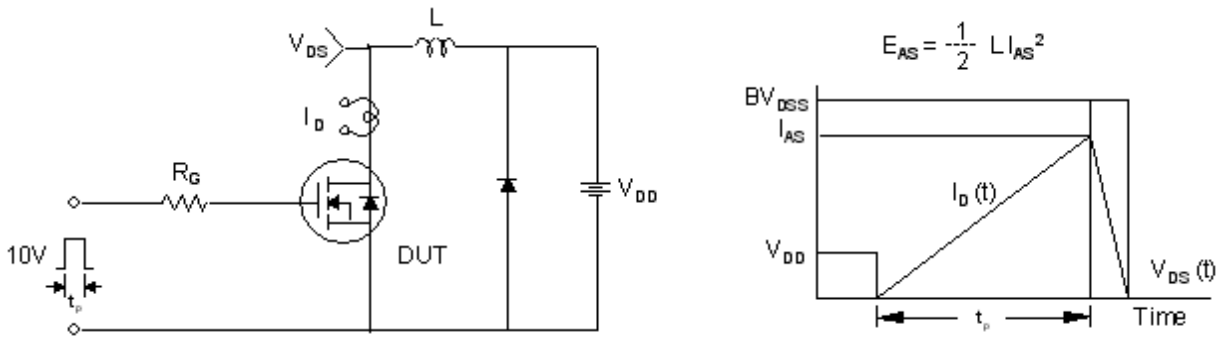
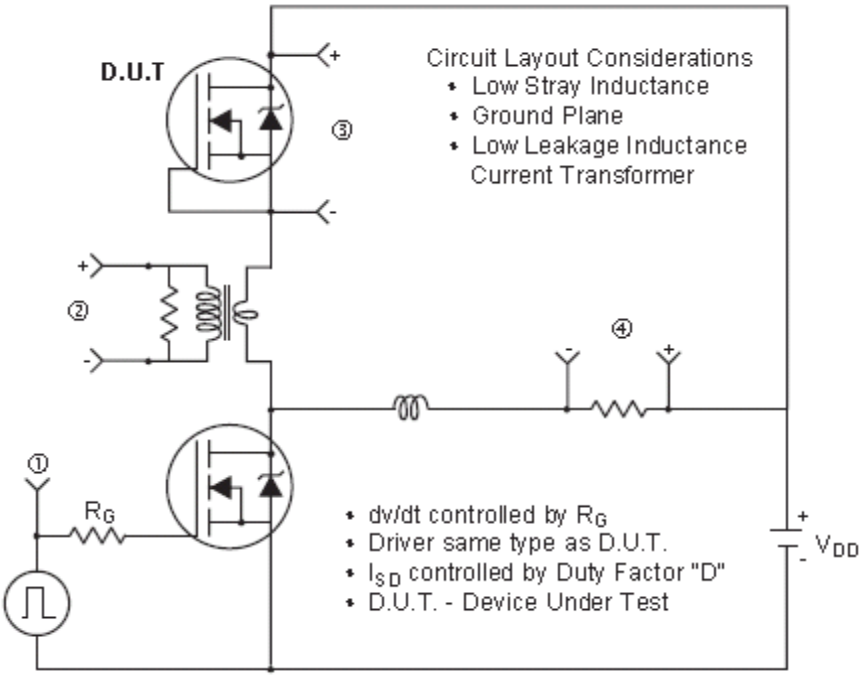


Figure 13. Unclamped Inductive Switching Test Circuit & Waveforms



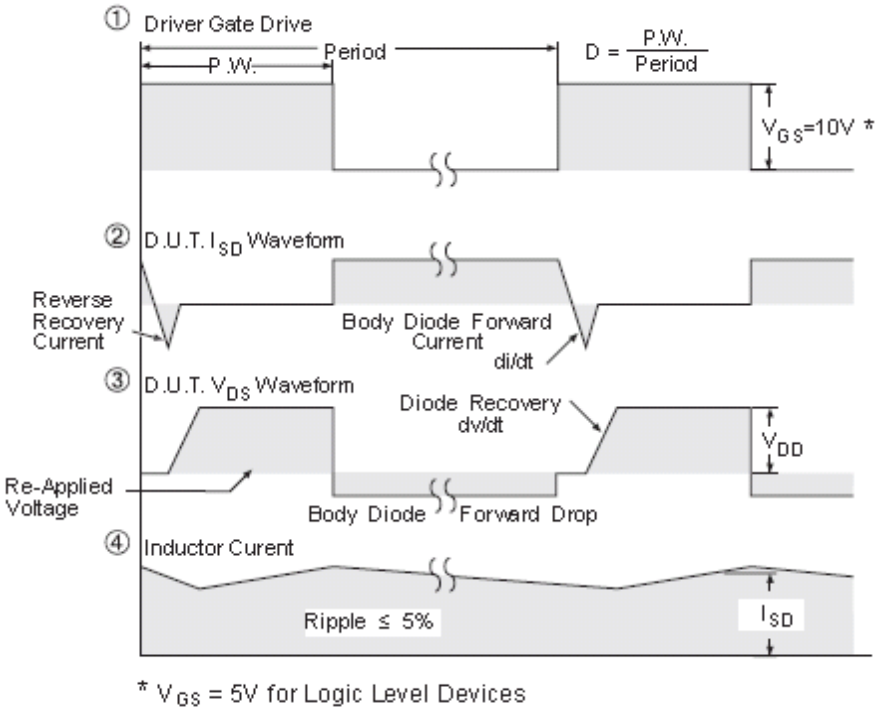
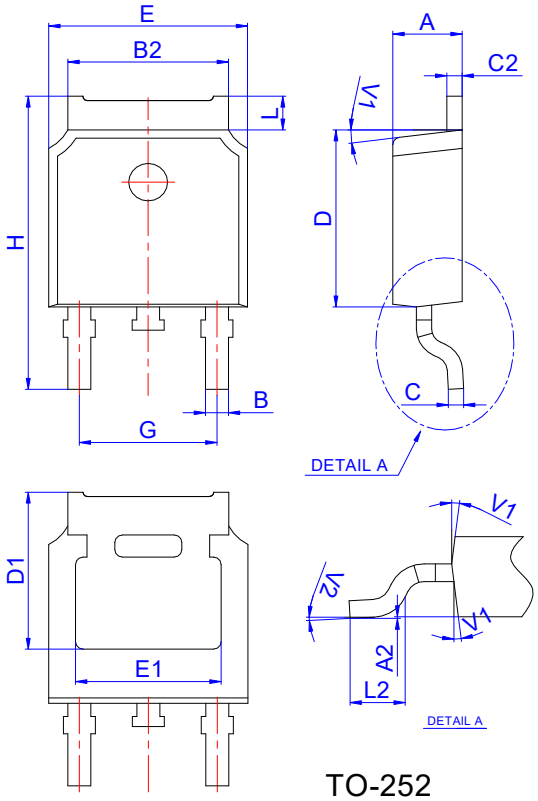


Figure 14. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

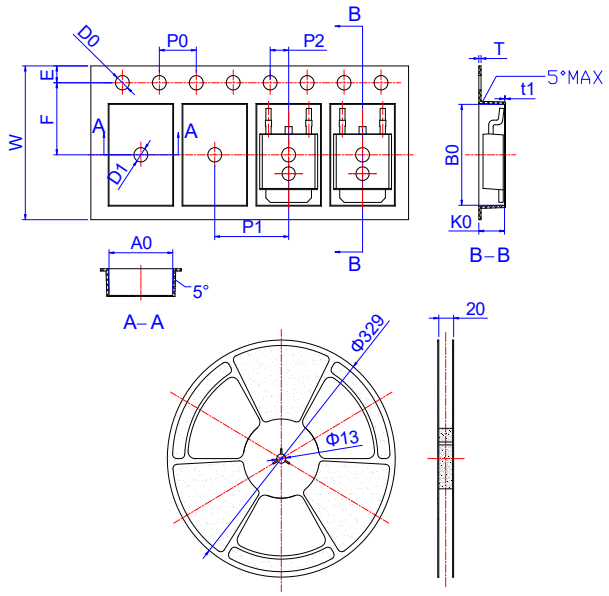
TO-252 Package Information



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