

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

Product Summary

RoHS

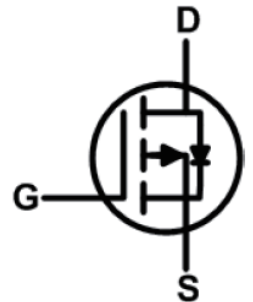
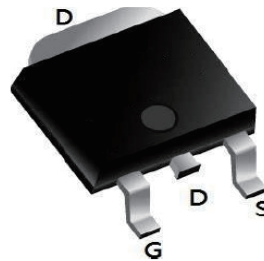
BVDSS	RDSON	ID
-30V	7.5mΩ	-65A

Description

The 70P03 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 70P03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	-30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current	T _C =25°C	-65
		T _C =100°C	-32
I _{DM}	Pulsed Drain Current ₁	-200	A
EAS	Single Pulse Avalanche Energy ₂	80	mJ
P _D	Total Power Dissipation	T _C =25°C	43.1
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance from Junction-to-Ambients	70	°C/W
R _{θJC}	Thermal Resistance from Junction-to-Case	2.9	°C/W

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Static Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	V
I_{GSS}	Gate-body Leakage current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$T_J = 25^\circ\text{C}$	-	-	-1	μA
		$T_J = 100^\circ\text{C}$	-	-	-100	
$V_{GS(th)}$	Gate-Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.5	-2.5	V
$R_{DS(on)}$	Drain-Source on-Resistance ⁴	$V_{GS} = -10V, I_D = -15A$	-	7.5	14	$m\Omega$
		$V_{GS} = -4.5V, I_D = -10A$	-	10.5	22	$m\Omega$
g_{fs}	Forward Transconductance ⁴	$V_{DS} = -10V, I_D = -15A$	-	44	-	S
Dynamic Characteristics⁵						
C_{iss}	Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$	-	2503	-	μF
C_{oss}	Output Capacitance		-	315	-	
C_{rss}	Reverse Transfer Capacitance		-	279	-	
R_g	Gate Resistance	$f = 1MHz$	-	10.5	-	Ω
Switching Characteristics⁵						
Q_g	Total Gate Charge	$V_{GS} = -10V, V_{DS} = -15V, I_D = -15A$	-	30	-	nC
Q_{gs}	Gate-Source Charge		-	5	-	
Q_{gd}	Gate-Drain Charge		-	7.5	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = -10V, V_{DD} = -15V, R_G = 2.5\Omega, I_D = -15A$	-	14.1	-	ns
t_r	Rise Time		-	20	-	
$t_{d(off)}$	Turn-off Delay Time		-	94	-	
t_f	Fall Time		-	65	-	
Drain-Source Body Diode Characteristics						
V_{SD}	Diode Forward Voltage ⁴	$I_S = -1A, V_{GS} = 0V$	-	-	-1.2	V
I_S	Continuous Source Current	$T_C = 25^\circ\text{C}$	-	-	-65	A

Notes:

- 1.Repetitive rating, pulse width limited by junction temperature $T_J(MAX) = 150^\circ\text{C}$.
- 2.The EAS data shows Max. rating . The test condition is $V_{DD} = -25V, L = 0.1mH, I_{AS} = -40A$.
- 3.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
- 4.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.This value is guaranteed by design hence it is not included in the production test.

Typical Performance Characteristics

Figure 1: Output Characteristics

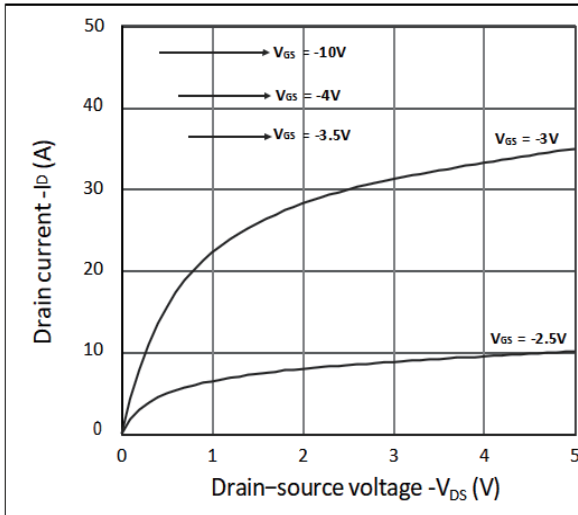


Figure 2: Transfer Characteristics

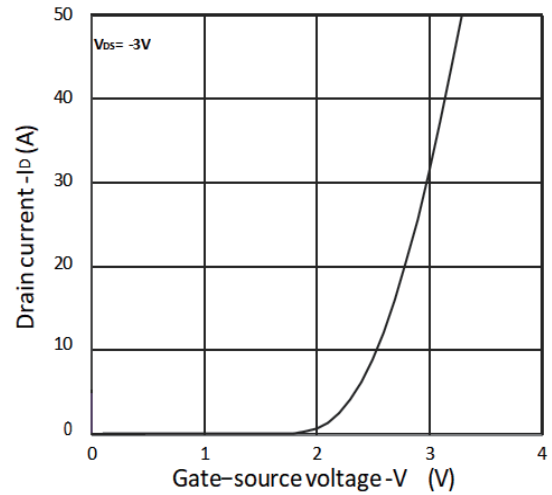


Figure 3: Forward Characteristics of Reverse

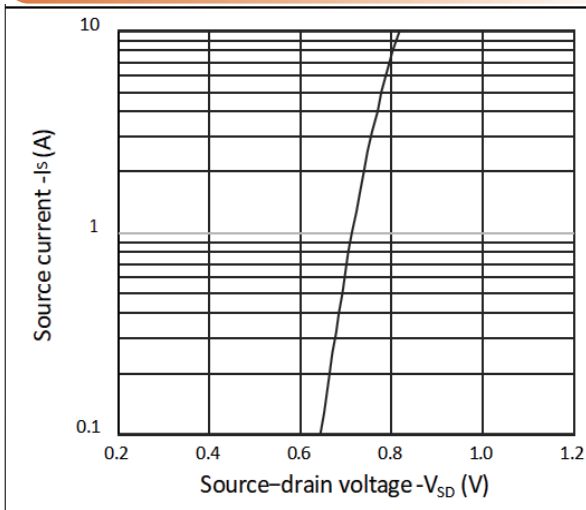


Figure 4: RDS(ON) vs. VGS

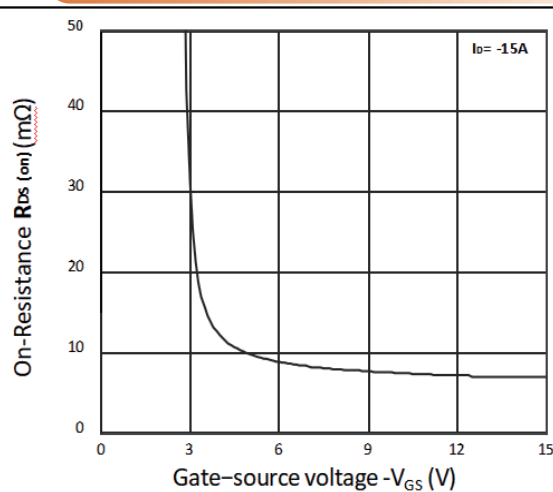


Figure 5: RDS(ON) vs. ID

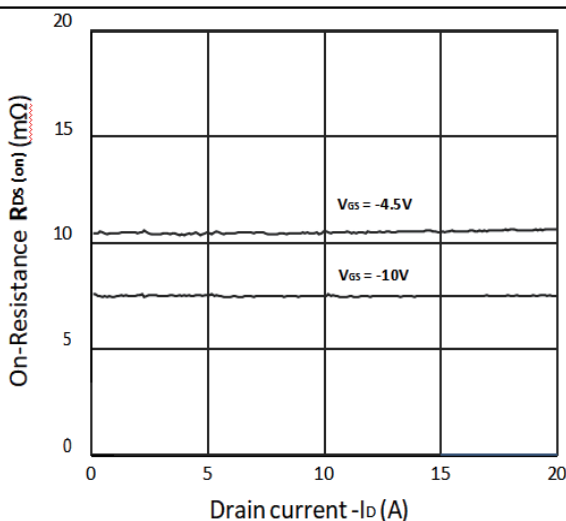
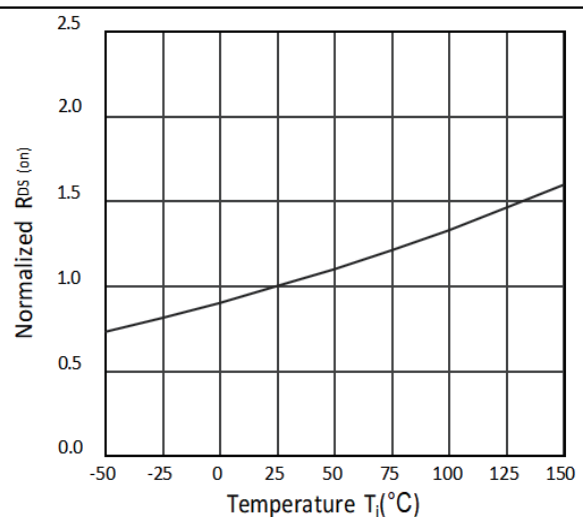


Figure 6: Normalized RDS(on) vs. Temperature



Typical Performance Characteristics

Figure 7: Capacitance Characteristics

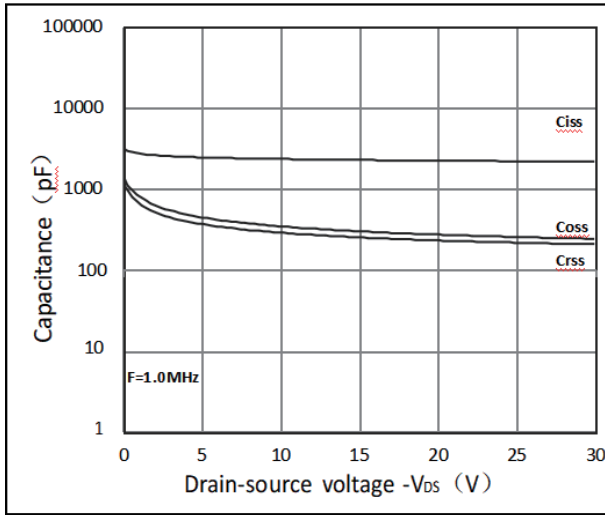


Figure 8: Gate Charge Characteristics

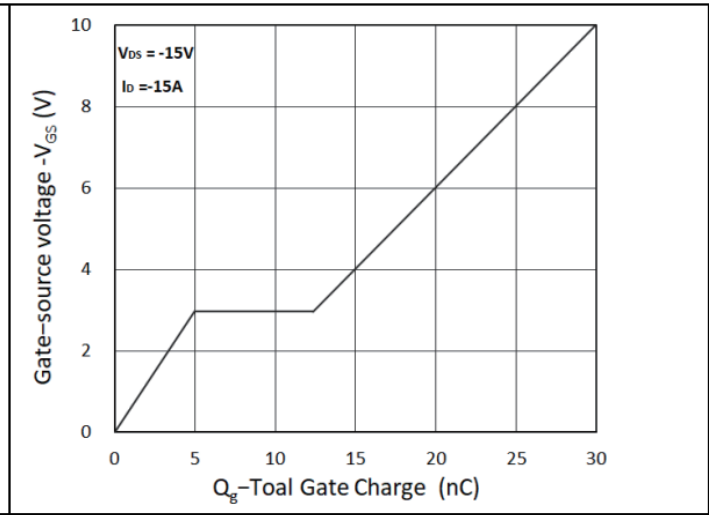


Figure 9: Power Dissipation

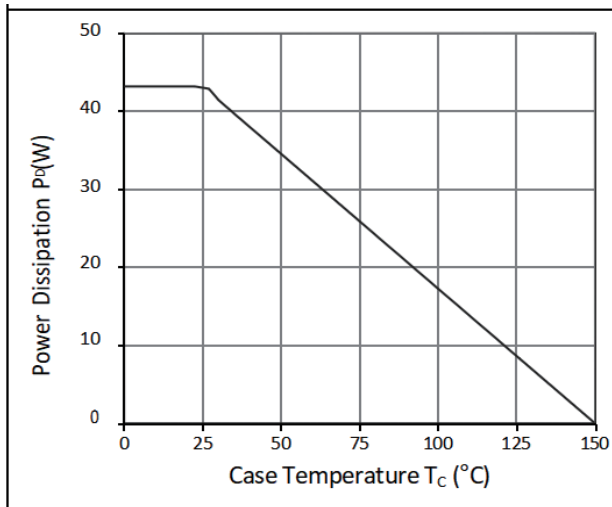


Figure 10: Safe Operating Area

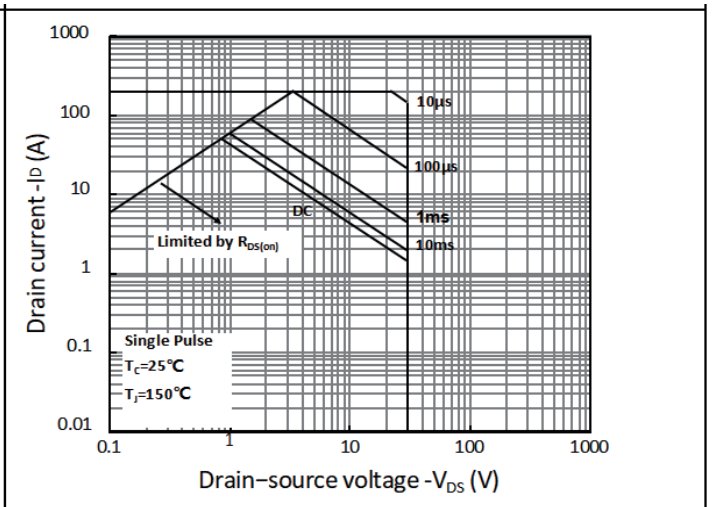
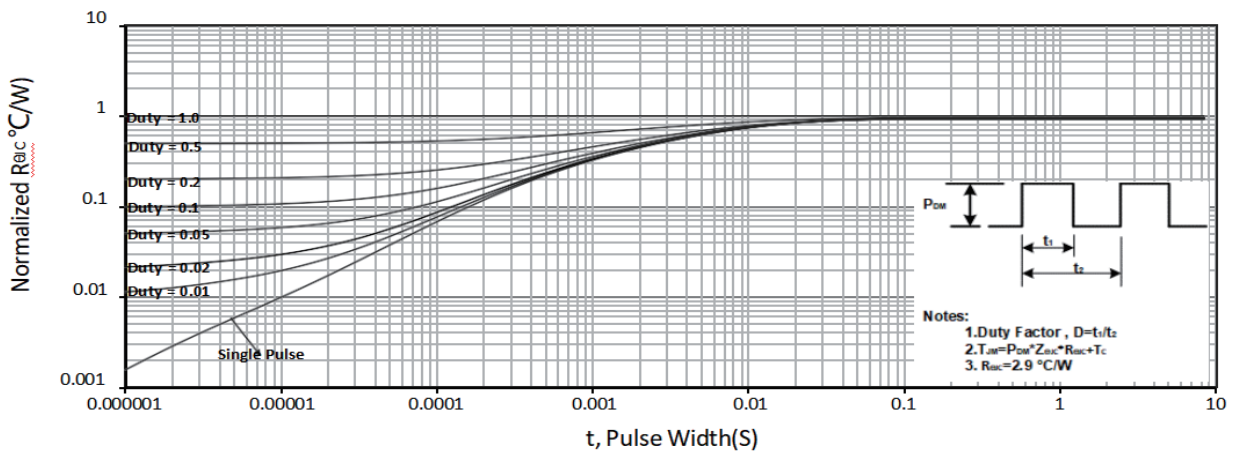
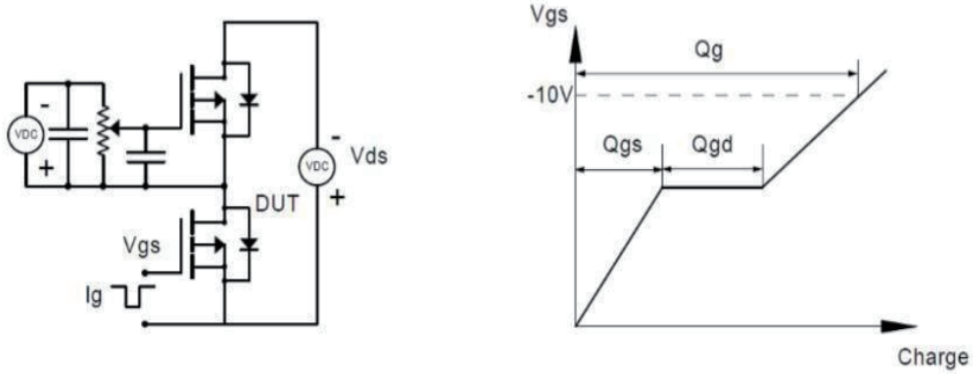


Figure 11: Normalized Maximum Transient

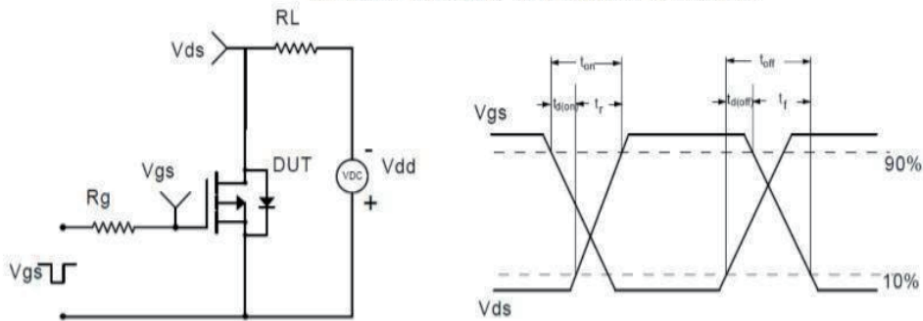


Test Circuit

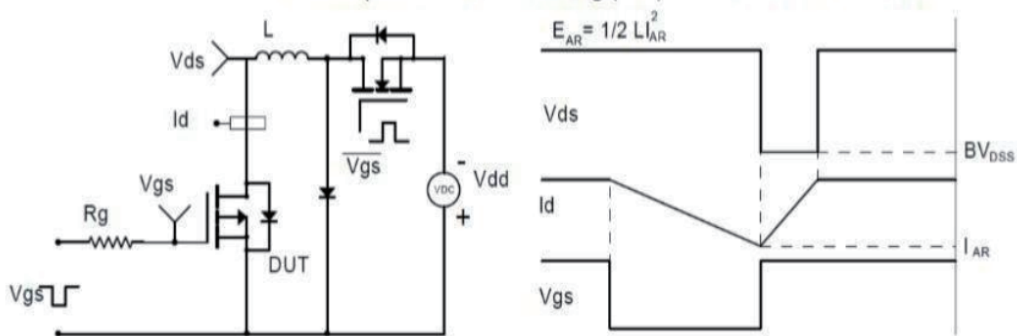
Gate Charge Test Circuit & Waveform



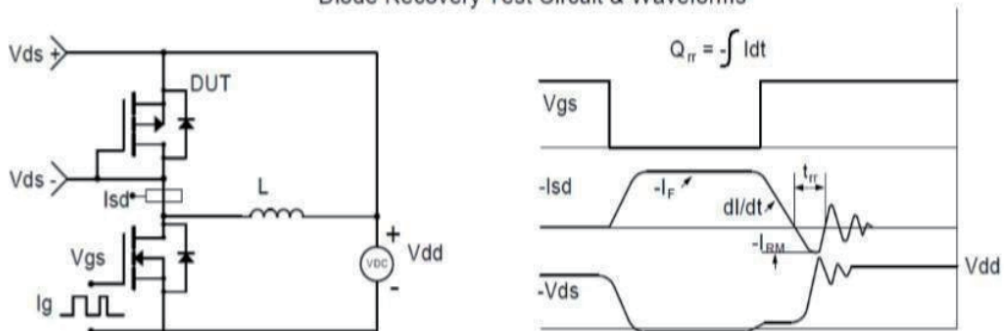
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

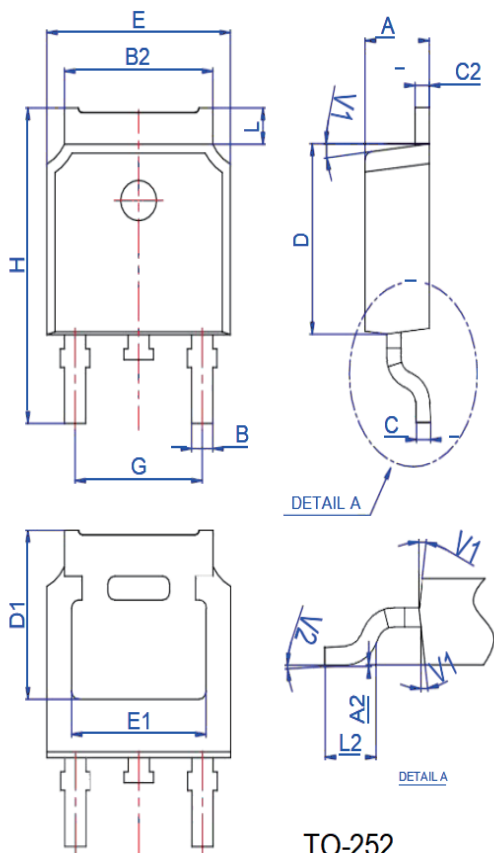


Diode Recovery Test Circuit & Waveforms



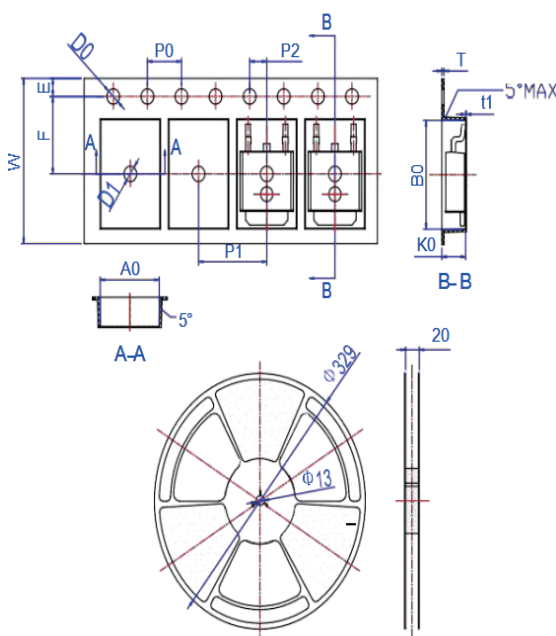
TO-252 Package outline

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-252-4R



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