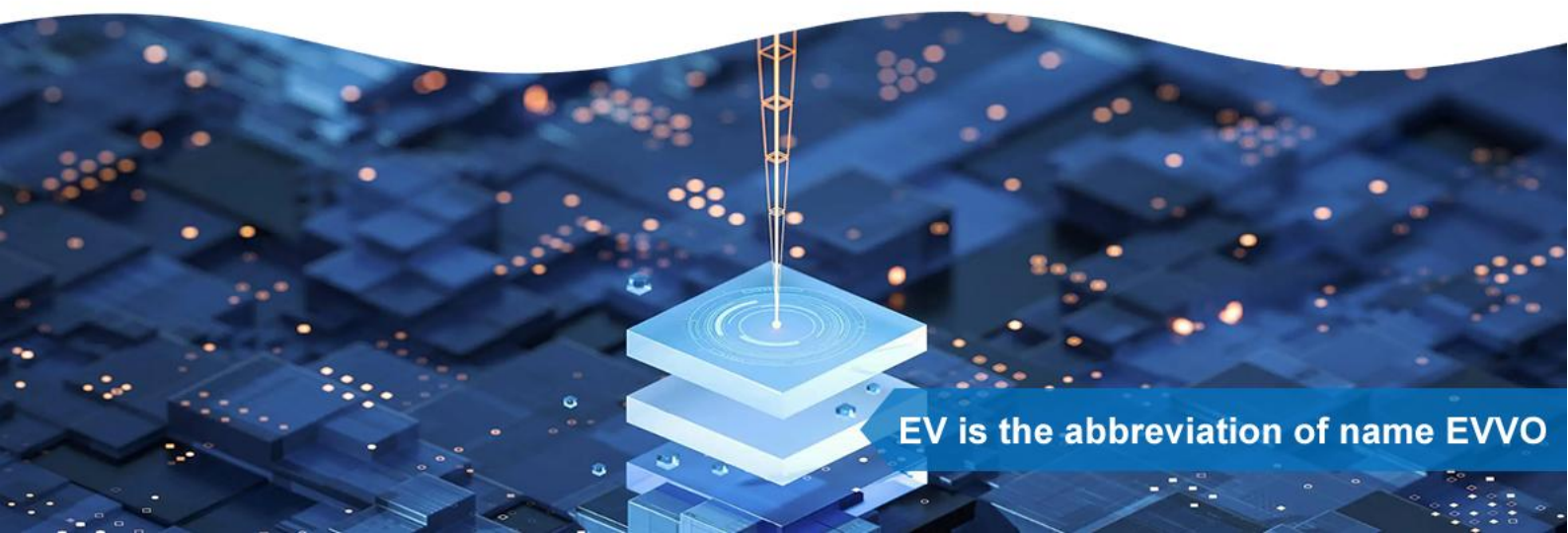
EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

Domestic Part Number	IPD60R280P7
Overseas Part Number	IPD60R280P7
Equivalent Part Number	IPD60R280P7



N-channel 650V, 14A, Super-Junction Power MOSFET

Description

Super-junction power MOSFET is a revolutionary technology for high voltage power MOSFET , designed according to the SJ principle. The resulting device has extremely low on resistance,making it especially suitable for applications which require superior power density and outstanding efficiency.

Product Summary

V_{DS} @ $T_{j,25℃}$	650V
$R_{DS(on),max}$	0.28 Ω
I_D	14A

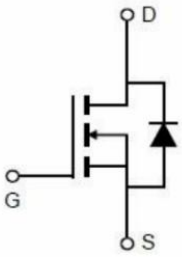
Features

- Very low FOM RDS(on)×Qg
- 100% UIS tested
- RoHS compliant

Applications

- Power factor correction (PFC).
- Switched mode power supplies (SMPS).
- Uninterrupted power supply (UPS).

TO-252-2L Pin Configuration



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	14	A
(T_C = 100°C)		9	A
Pulsed drain current [1]	I_{DM}	56	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	380	mJ
Avalanche current, repetitive [3]	I_{AR}	1.6	A
Power Dissipation TO-263 (T_C = 25°C)	P_D	125	W
- Derate above 25°C		36	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	11	A
Diode pulse current	$I_{S,pulse}$	33	A

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Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

Electrical Characteristics

T_c = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=250uA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.0	3.0	4.0	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V, T_j = 25°C T_j = 125°C	 - -	 - 10	 1 	µA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=8A	- - -	235	280	mΩ
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V,	-	1033	-	pF
Output capacitance	C_{oss}	f = 1MHz	-	38	-	
Reverse transfer capacitance	C_{rss}		-	0.2	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400V, I_D = 5.5A	-	17	-	ns
Rise time	t_r	R_G = 25Ω, V_{GS}=10V	-	18	-	
Turn-off delay time	$t_{d(off)}$		-	89	-	
Fall time	t_f		-	20	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520 V, I_D=5.5A,	-	26	-	nC
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	4.8	-	
Gate charge total	Q_g		-	11	-	
Gate plateau voltage	$V_{plateau}$		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_S=11A	-	-	1.4	V
Reverse recovery time	t_{rr}	V_R=400 V, I_F=5.5A,	-	310	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/µs	-	3.2	-	µC
Peak reverse recovery current	I_{rrm}		-	16	-	A

Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.
2. I_{AS} = 3A, V_{DD} = 50V, Starting T_j= 25°C.

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Electrical Characteristics Diagrams

Figure 1. Output Characteristics

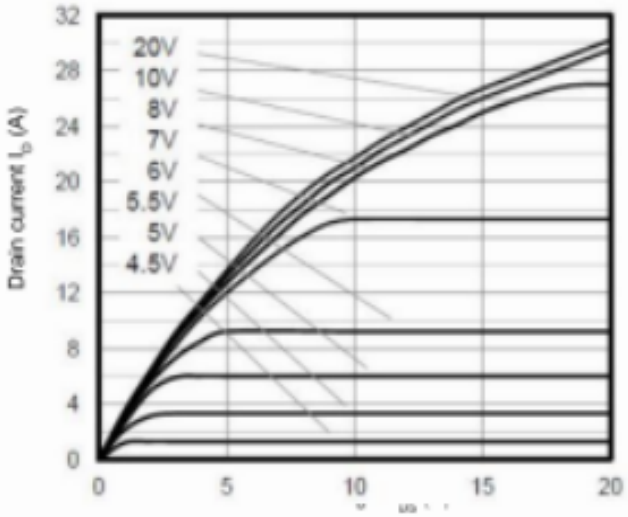

Figure 2. Transfer Characteristics

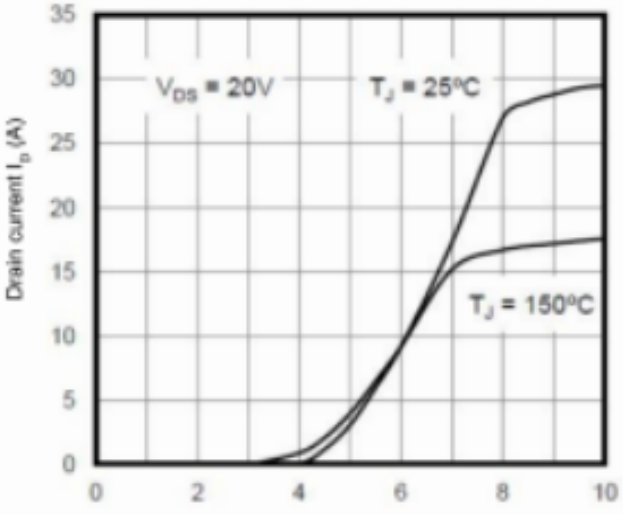

Figure 3. On-Resistance vs. Drain Current

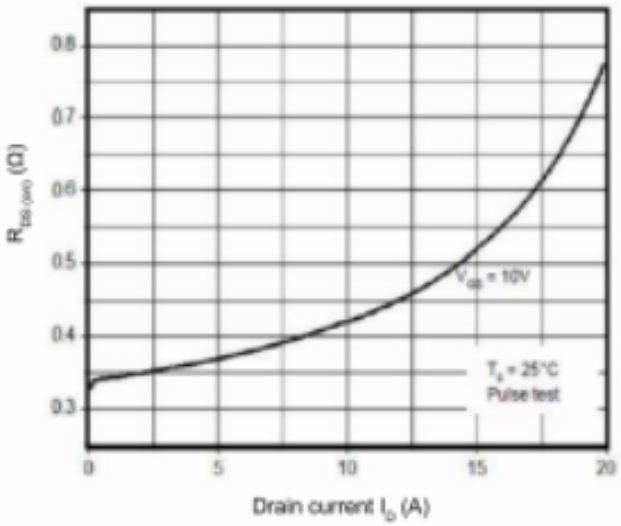

Figure 4. Capacitance Characteristics

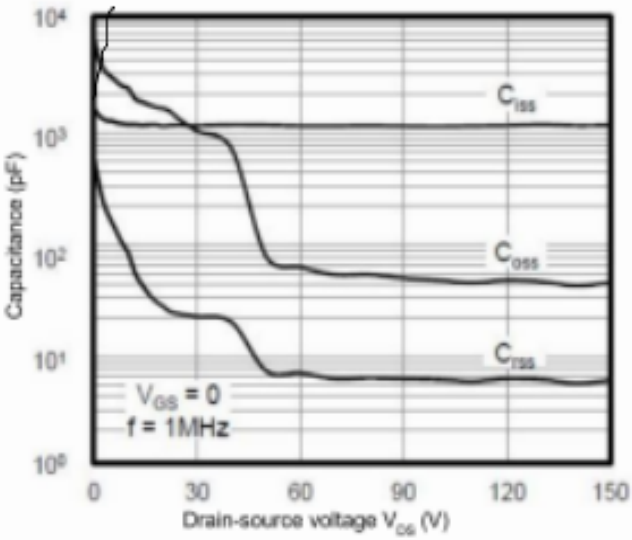

Figure 5. Gate Charge Characteristics

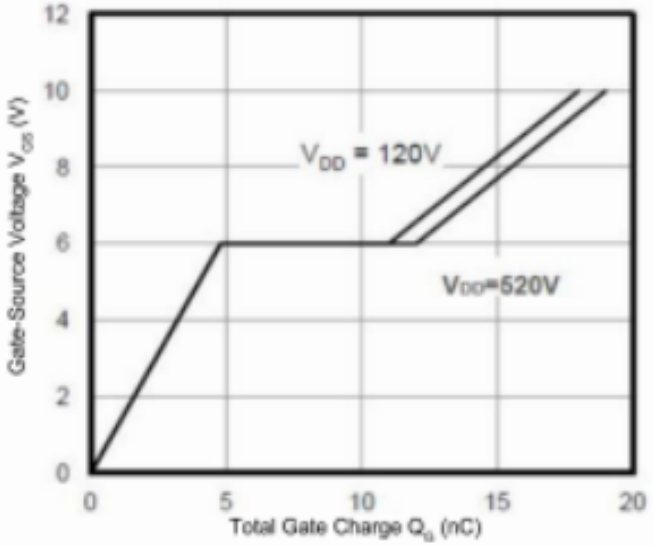

Figure 6. Body Diode Forward Voltage

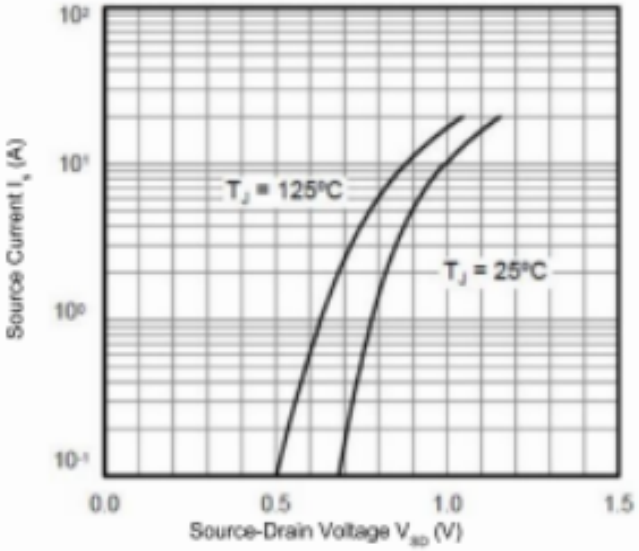

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Figure 7. Breakdown Voltage vs. Temperature

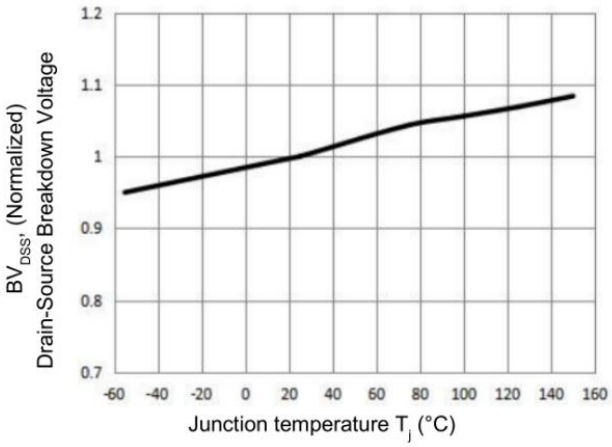

Figure 8. On-Resistance vs. Temperature

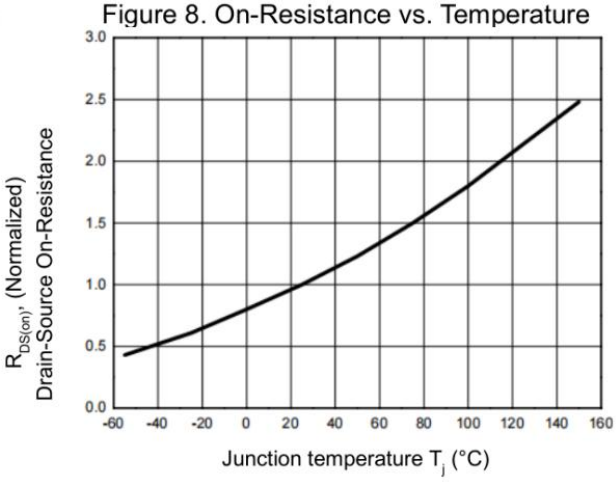

Figure 9. Maximum Safe Operating Area

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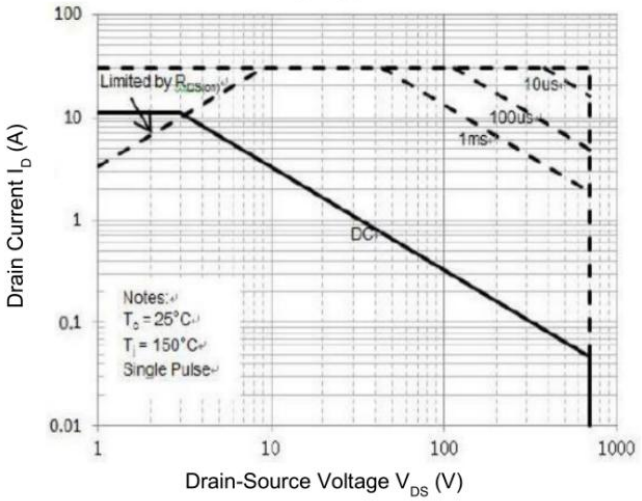

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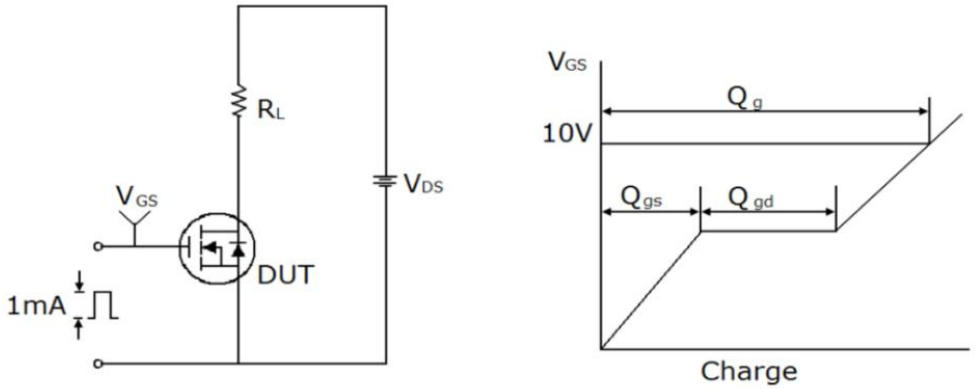
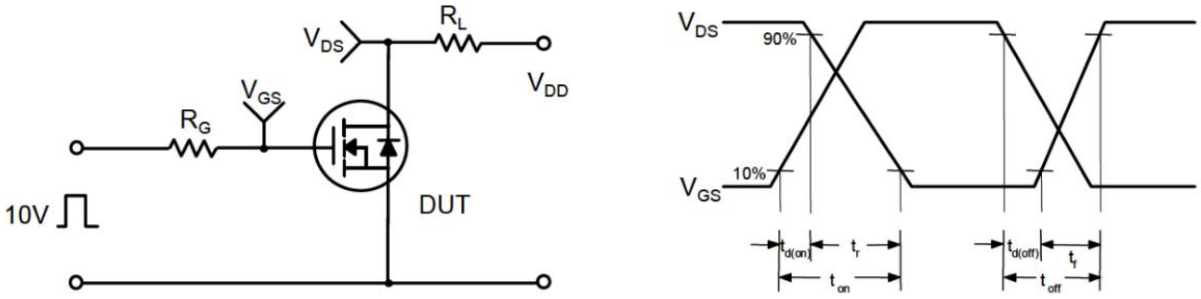
Test Circuits

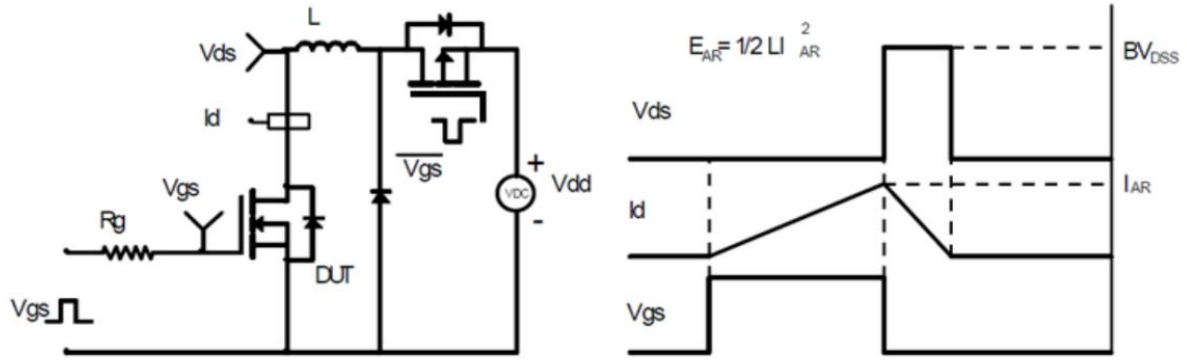
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



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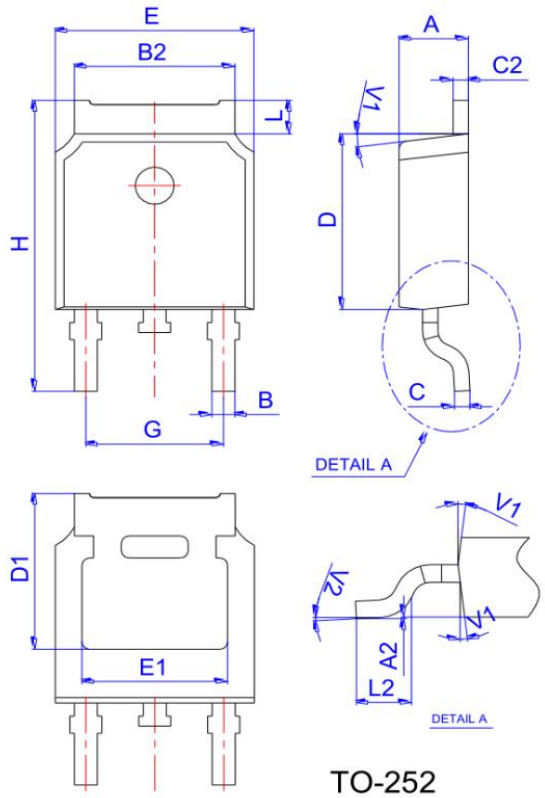
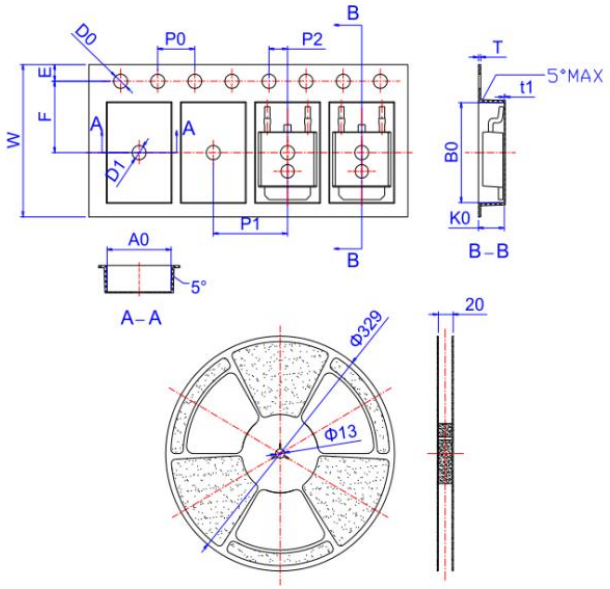
Package Mechanical Data



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 Spectification-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

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