

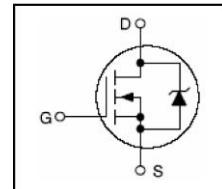
N-Channel Enhancement Mode Field Effect Transistor

Features

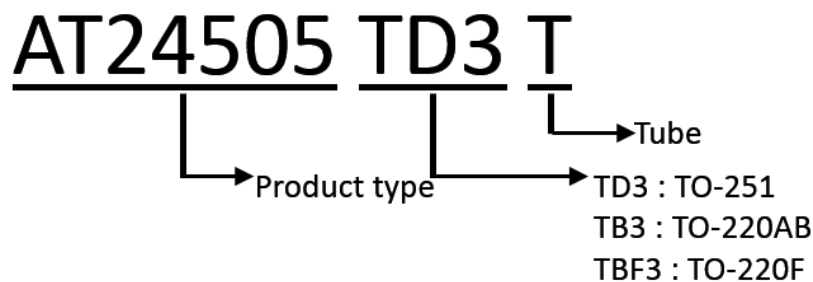
$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
400V	1.4Ω	5A

Application

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- UPS



Order information:



ABSOLUTE MAXIMUM RATINGS

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNITS
Drain-Source Voltage	V_{DS}	400	V
Drain Current –continuous @25°C	I_D	5	A
Drain Current –continuous @100°C	I_D	3.12	A
Pulsed Drain Current ¹	I_{DM}	20	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche ²	E_{AS}	200	mJ
Pulsed Avalanche Rating ²	I_{AS}	5	A
Operating Junction & Storage Temperature	T_j, T_{stg}	-55 to 150	°C
Lead Temperature (¹ / ₁₆ " from case for 10sec.)	T_L	300	°C

Note:

1. Pulse width limited by maximum junction temperature.
2. $V_{DD} = 50V, V_{DS} = 400V, R_G = 25 \Omega, T_J: 25^\circ C$

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ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	400			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0		4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 30V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 400V, V_{GS} = 0V$			1	μA
		$V_{DS} = 400V, V_{GS} = 0V, T_J = 150^\circ C$			10	
On-State Drain Current	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 2.5A$		1.4	1.8	Ω
Forward Transconductance	G_{FS}	$V_{DS} = 40V, I_D = 2.5A$		3.2		S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$		486		pF
Output Capacitance	C_{oss}			38		
Reverse Transfer Capacitance	C_{rss}			16		
Total Gate Charge	Q_g	$V_{DD} = 400V, I_D = 5A, V_{GS} = 10V$		12		nC
Gate-Source Charge	Q_{gs}			3.1		
Gate-Drain Charge	Q_{gd}			8		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C = 25^\circ C$)						
Continuous Current	I_S				5	A
Forward Voltage	V_{SD}	$I_F = I_S, V_{GS} = 0V$			1.5	V
Reverse Recovery Time	t_{rr}	$I_S = 5A, dI_F/dt = 100A / \mu S$		291		nS
Reverse Recovery Charge	Q_{rr}	$V_{GS} = 0V$		1.3		μC
THERMAL DATA						
Thermal Resistance Junction to Case	$R_{\theta JC}$	AT24505 (TO-251)			3.0	$^\circ C/W$
		AT24505 (TO-220AB)			2.3	$^\circ C/W$
		AT24505 (TO-220F)			4.5	$^\circ C/W$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	AT24505 (TO-251)			100	$^\circ C/W$
		AT24505 (TO-220AB)			62.5	$^\circ C/W$
		AT24505 (TO-220F)			62.5	$^\circ C/W$

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Typical Characteristics

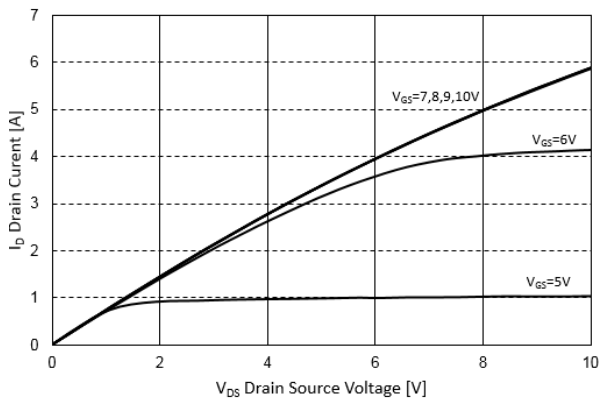


Figure 1. On-Region Characteristics

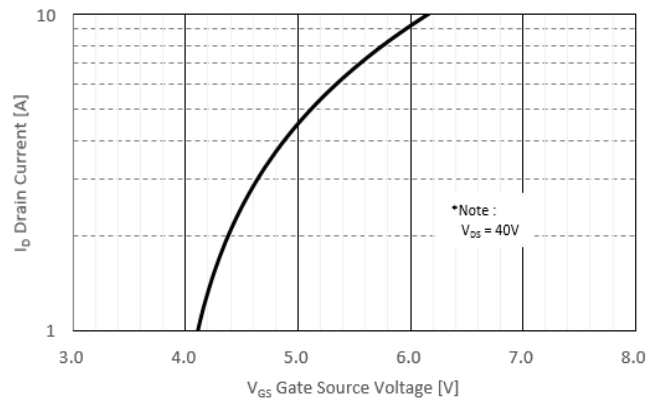


Figure 2. G_{FS} Characteristics

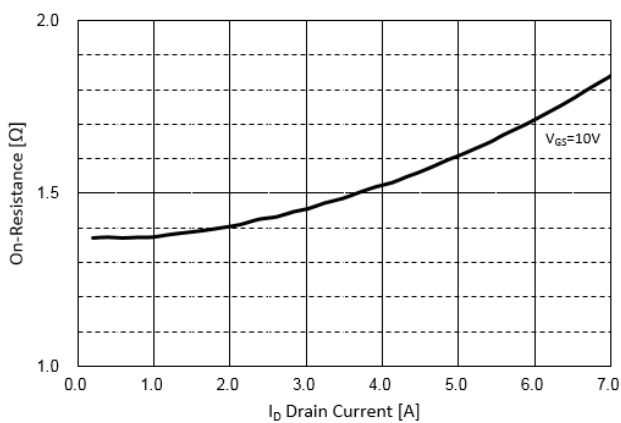


Figure 3. On-Resistance Variation vs Drain Current

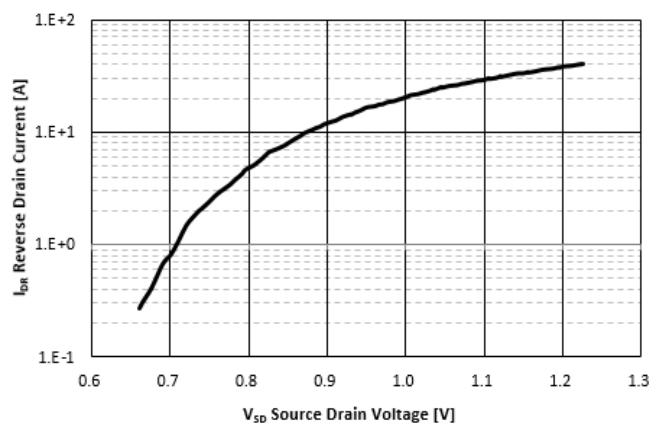


Figure 4. Body diode Forward Voltage

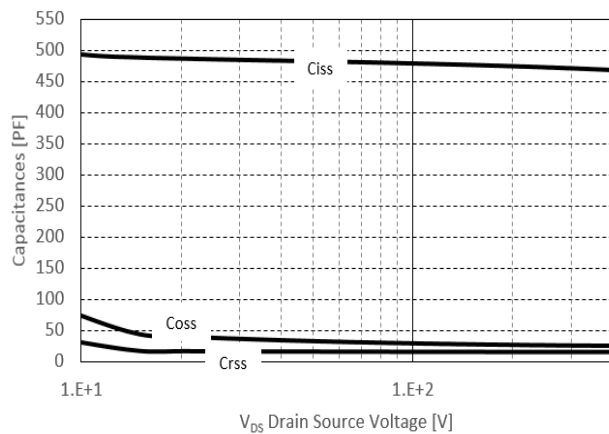


Figure 5. Capacitance Characteristics

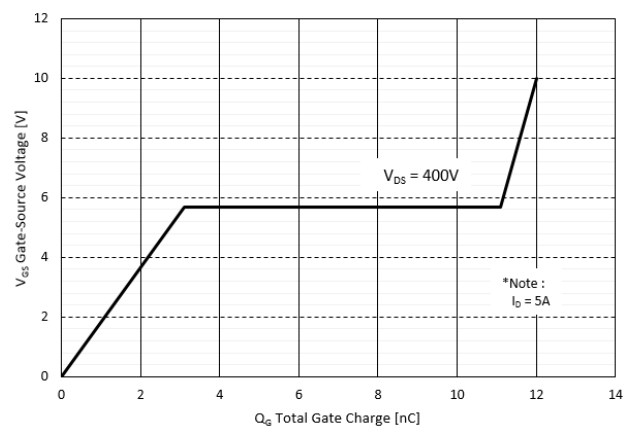
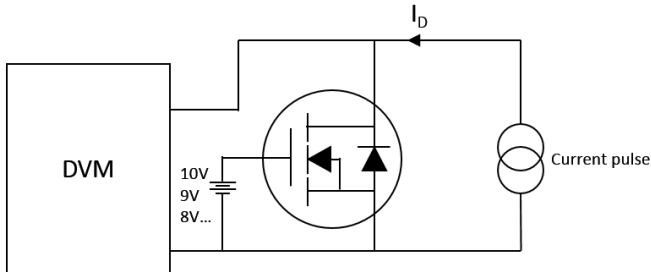


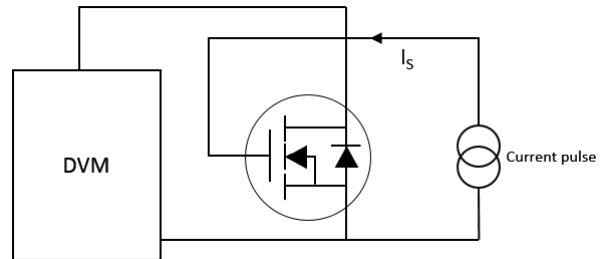
Figure 6. Gate Charge Characteristics

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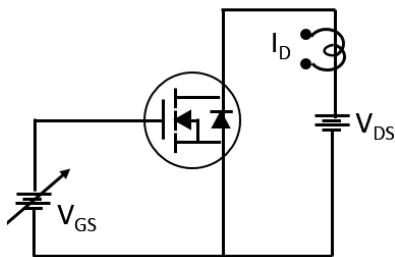
On-Region Characteristics Test Circuit



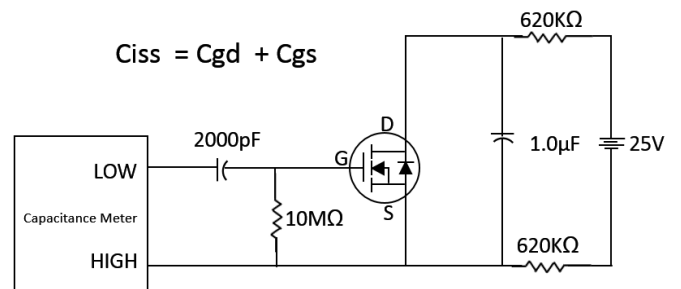
V_{SD} Characteristics Test Circuit



G_{FS} Characteristics Test Circuit

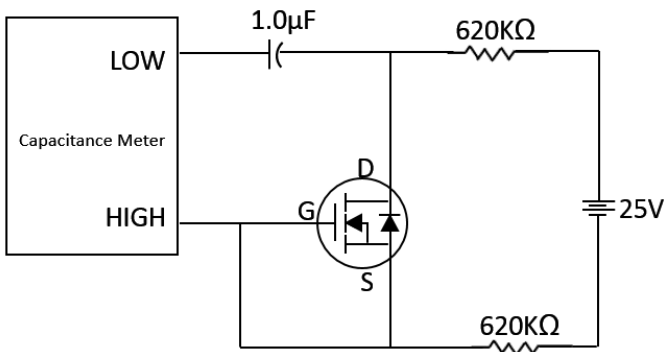


Input Capacitance Characteristics Test Circuit



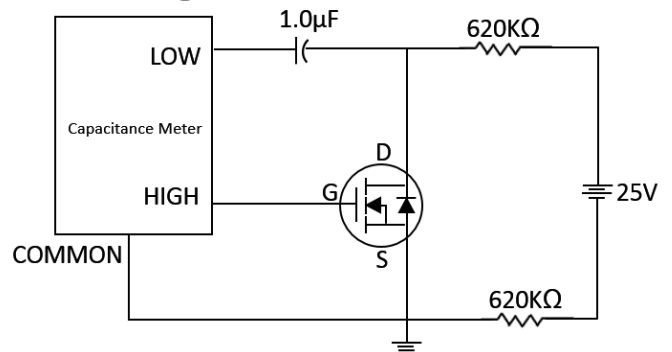
Output Capacitance Characteristics Test Circuit

$$C_{oss} = C_{gd} + C_{ds}$$



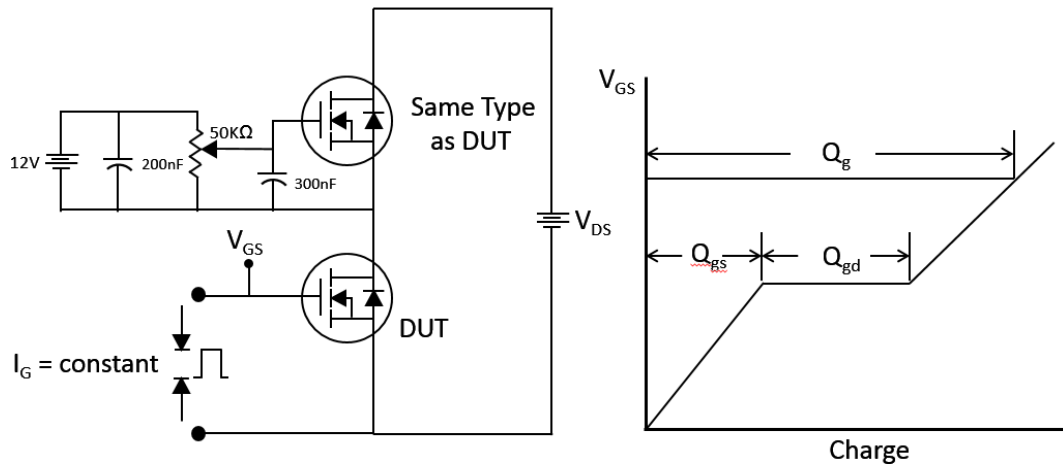
Reverse Capacitance Characteristics Test Circuit

$$C_{rss} = C_{gd}$$

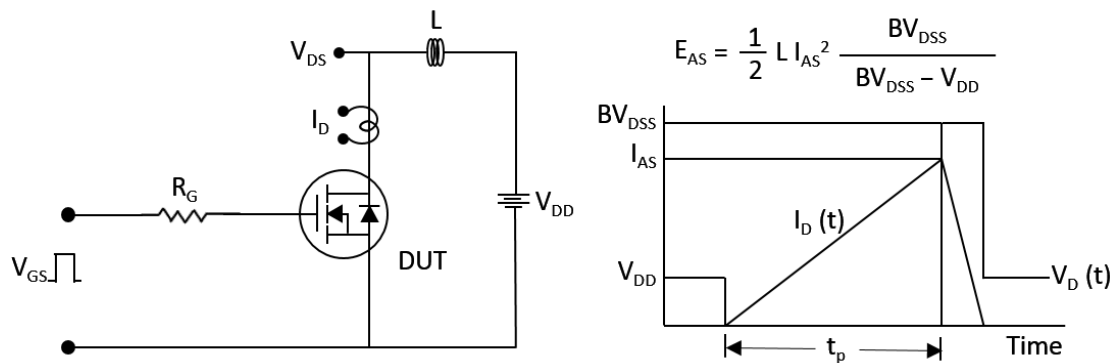


N-Channel Enhancement Mode Field Effect Transistor

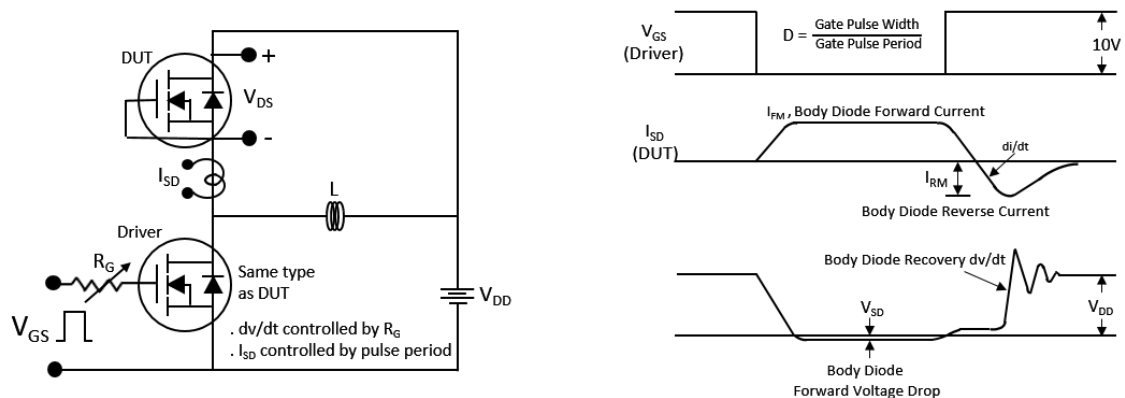
Gate Charge Characteristics Test Circuit



Avalanche Characteristics Test Circuit



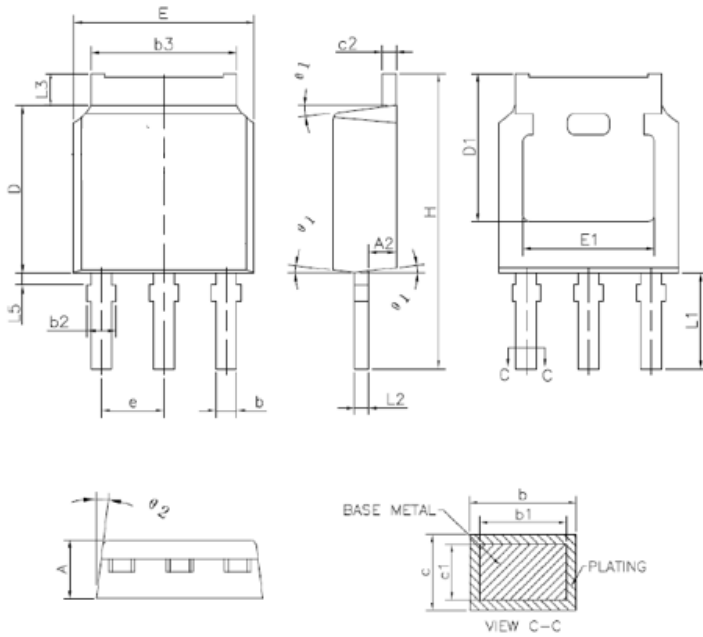
Diode Reverse recovery Characteristics Test Circuit



N-Channel Enhancement Mode Field Effect Transistor

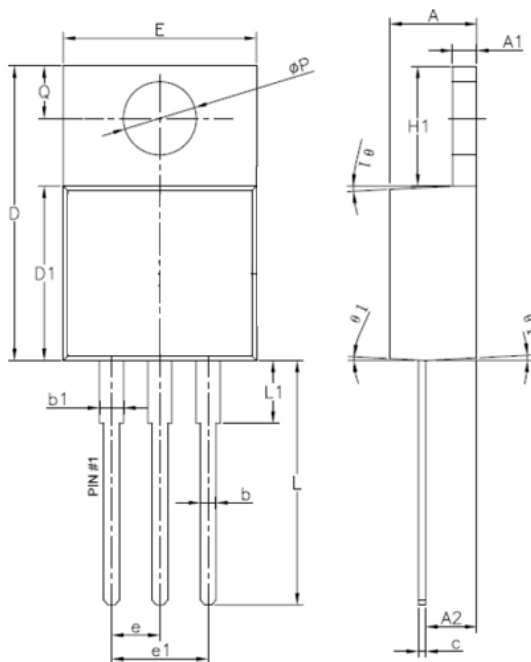
Mechanical Dimensions

TO-251



SYMBOL	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A2	0.90	1.01	1.10
b	0.72	—	0.85
b1	0.71	0.76	0.81
b2	0.72	—	0.90
b3	5.13	5.33	5.46
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	0.47	—	0.60
D	6.00	6.10	6.20
D1	5.25	—	—
E	6.50	6.60	6.70
E1	4.70	—	—
e	2.186	2.286	2.386
H	10.40	10.70	11.00
L1	3.50 REF		
L2	0.508 BSC		
L3	0.90	—	1.25
L5	0.15	—	0.75
theta 1	5°	7°	9°
theta 2	5°	7°	9°

TO-220AB

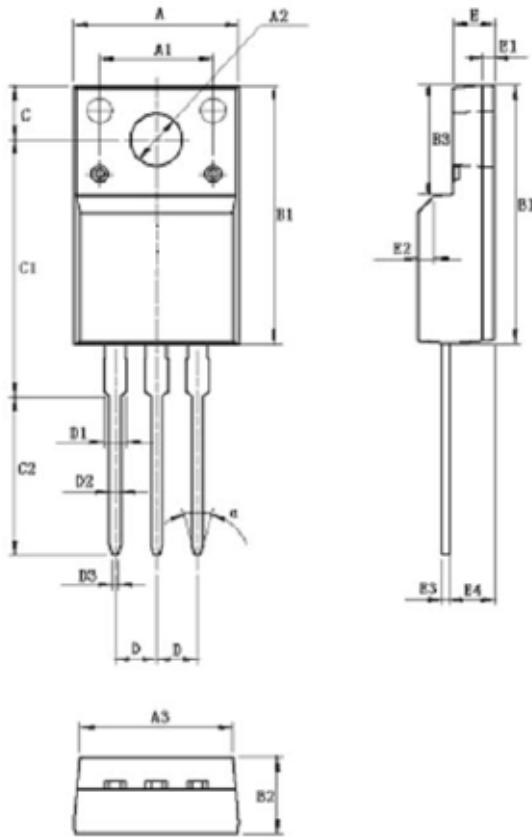


SYMBOL	MM		
	MIN	NOM	MAX
A	4.3	4.5	4.7
A1	1.25	1.27	1.4
A2	2.2	2.5	2.6
b	0.7	0.8	0.95
b1	1.23	1.33	1.43
c	0.33	0.38	0.48
D	15.7		
D1	8.85	9.15	9.25
E	9.6	10.2	10.4
e	2.54		
e1	5.08		
H1	6.4	6.5	6.8
L	12.7	13.15	14.3
L1	—	—	3.5
Phi P	3.7	3.86	4.0
Q	2.7	—	2.9
theta 1 (°)	1°	3°	5°

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Mechanical Dimensions

TO-220F



SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
A1	7.00	
A2	3.08	3.28
A3	9.25	9.65
B1	15.70	16.10
B2	4.50	4.90
B3	6.20	6.80
C	3.20	3.40
C1	15.20	16.00
C2	9.75	10.15
D	2.54	
D1	1.15	1.35
D2	0.70	0.90
D3	0.28	0.48
E	2.34	2.74
E1	0.70	
E2	1.0x45°	
E3	0.36	0.65
E4	2.55	2.95
a (°)	30°	