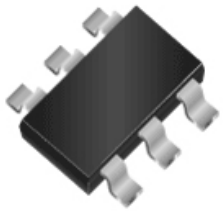
WNMD2167

Dual N-Channel, 20V, 6.3A, Power MOSFET

Http//:www.willsemi.com

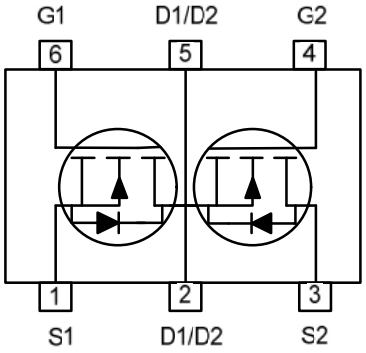
V_{DS} (V)	Typical Rds(on) (Ω)
20	0.016@ V_{GS}=4.5V
	0.018@ V_{GS}=3.1V
	0.020@ V_{GS}=2.5V



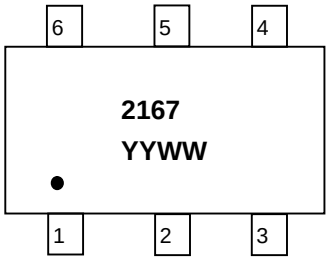
SOT-23-6L

Descriptions

The WNMD2167 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNMD2167 is Pb-free.



Pin configuration (Top view)



2167 = Device Code
YY = Year
WW = Week

Marking

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-23-6L

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

Device	Package	Shipping
WNMD2167-6/TR	SOT-23-6L	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	±10		
Continuous Drain Current [a d]	T_A=25°C	I_D	6.3	5.7	A
	T_A=70°C		5.0	4.6	
Maximum Power Dissipation [a d]	T_A=25°C	P_D	1.1	0.9	W
	T_A=70°C		0.7	0.6	
Continuous Drain Current [b]	T_A=25°C	I_D	5.8	5.2	A
	T_A=70°C		4.6	4.1	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.9	0.7	W
	T_A=70°C		0.6	0.5	
Pulsed Drain Current [c]		I_{DM}	30		A
Operating Junction Temperature		T_J	150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal resistance ratings

Single Operation					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	76	94	°C/W
	Steady State		115	145	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	92	115	
	Steady State		135	175	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	63	78	
Dual Operation					
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	79	97	°C/W
	Steady State		118	148	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	96	118	
	Steady State		138	180	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	66	81	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR-4 board using minimum pad size, 1oz copper

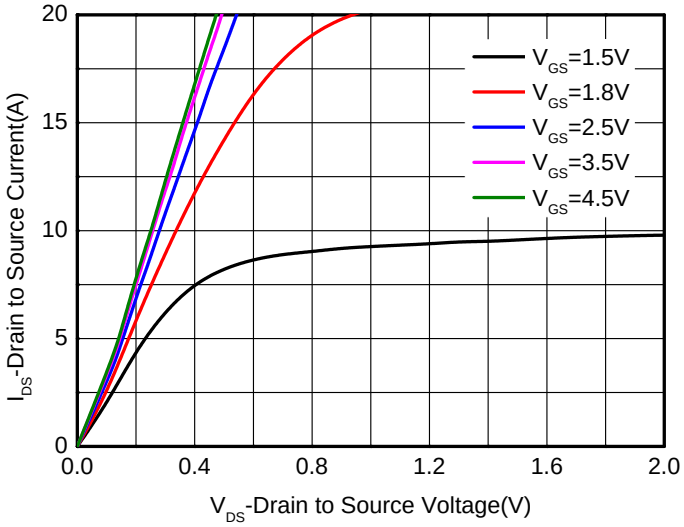
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

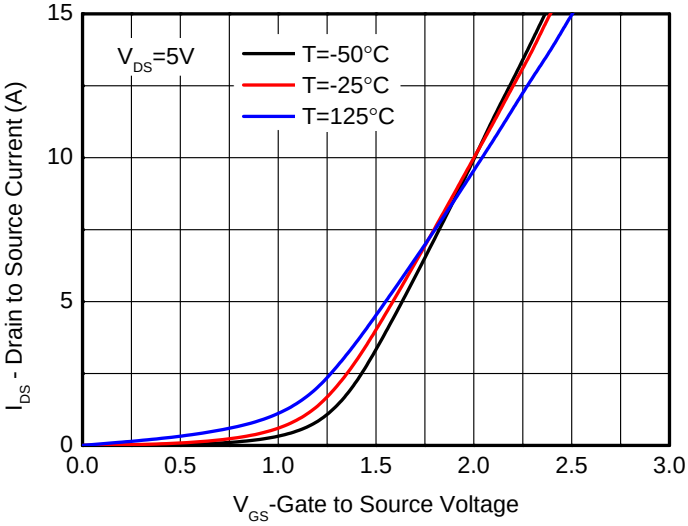
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =16 V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±10V			±1	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.5	0.7	1.0	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 6.3A	12	16	21	mΩ
		V_{GS} = 3.1V, I_D = 6.0A	14	18	23	
		V_{GS} = 2.5V, I_D = 5.5A	15	20	26	
Forward Transconductance	g_{FS}	V_{DS} = 5.0 V, I_D = 6.3A		16		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1MHz, V_{DS} = 10 V		850		pF
Output Capacitance	C_{OSS}			127		
Reverse Transfer Capacitance	C_{RSS}			115		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DD} = 10 V, I_D =6.3 A		10.9		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.62		
Gate-to-Source Charge	Q_{GS}			1.92		
Gate-to-Drain Charge	Q_{GD}			2.0		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = 4.5 V, V_{DD} = 10 V, R_L= 2Ω, R_G=6 Ω		22		ns
Rise Time	tr			18		
Turn-Off Delay Time	td(OFF)			62		
Fall Time	tf			28		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1.0A		0.65	1.5	V

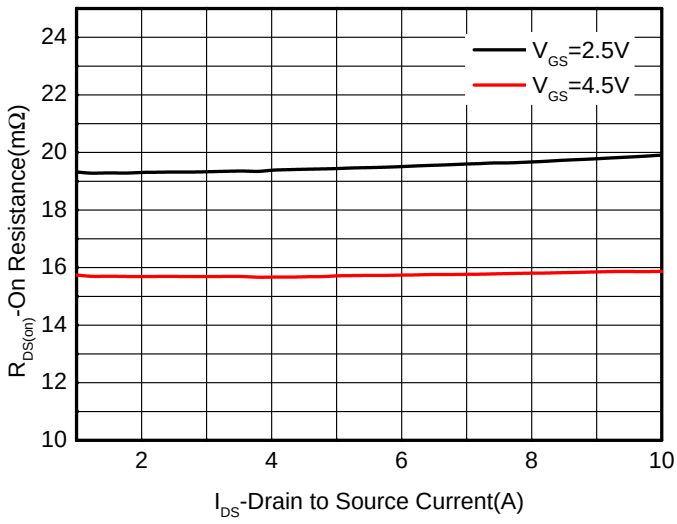
Typical Characteristics (Ta=25°C, unless otherwise noted)



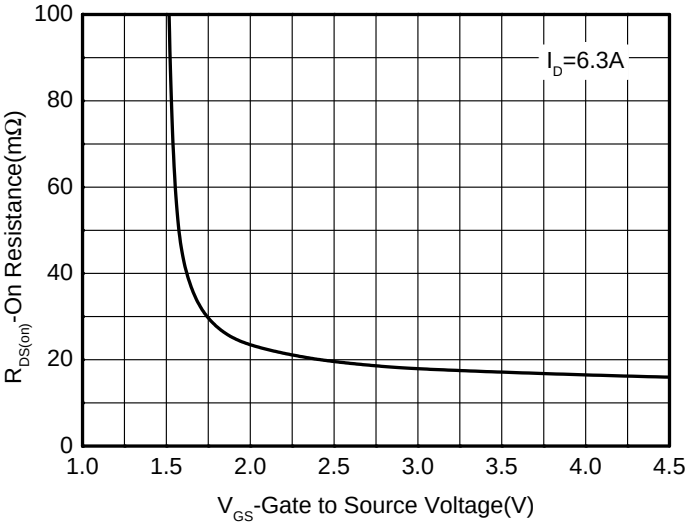
Output characteristics



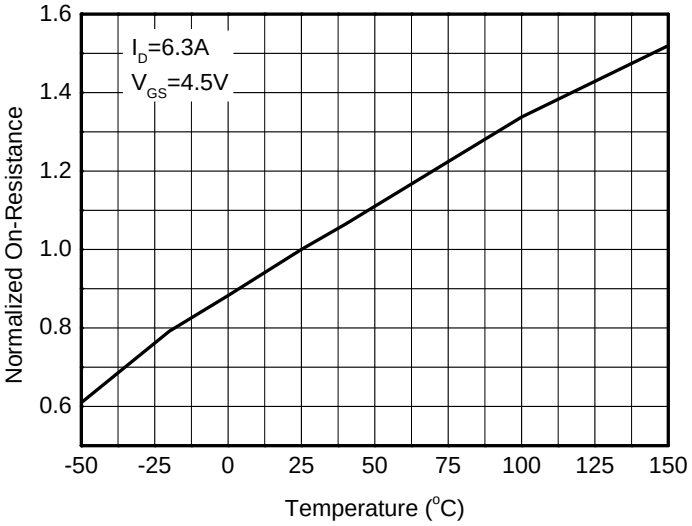
Transfer characteristics



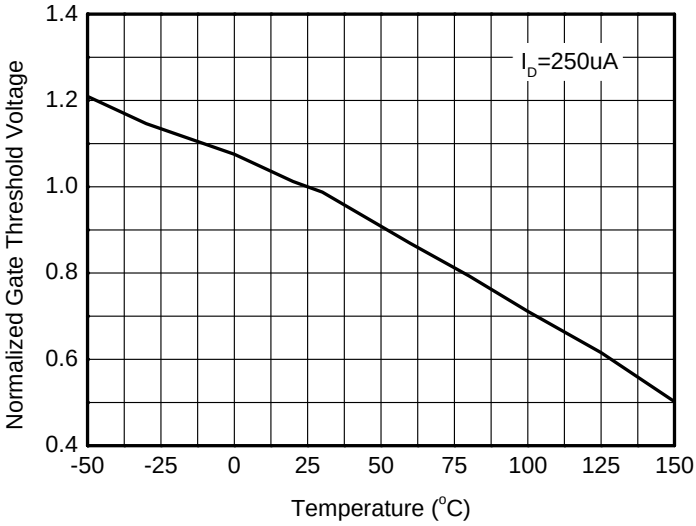
On-Resistance vs. Drain current



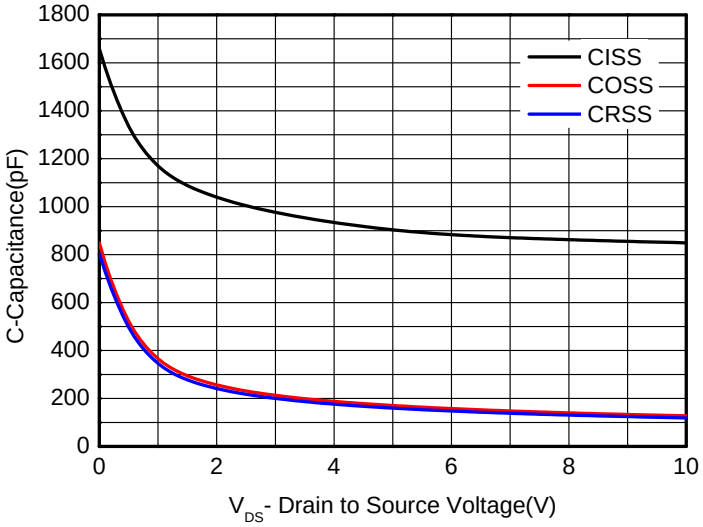
On-Resistance vs. Gate-to-Source voltage



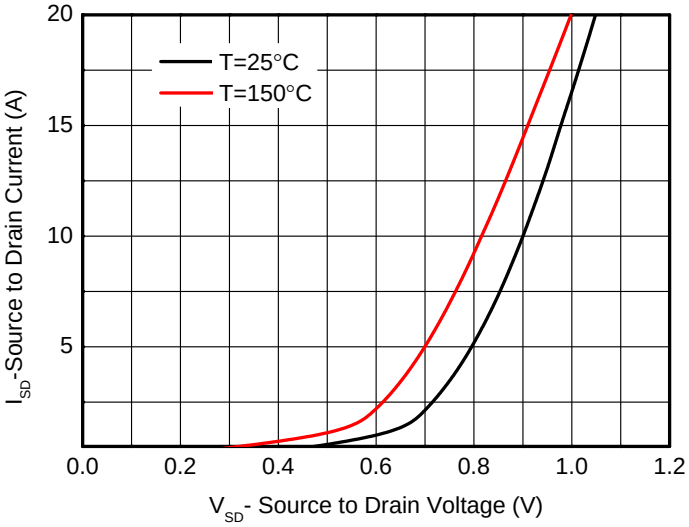
On-Resistance vs. Junction temperature



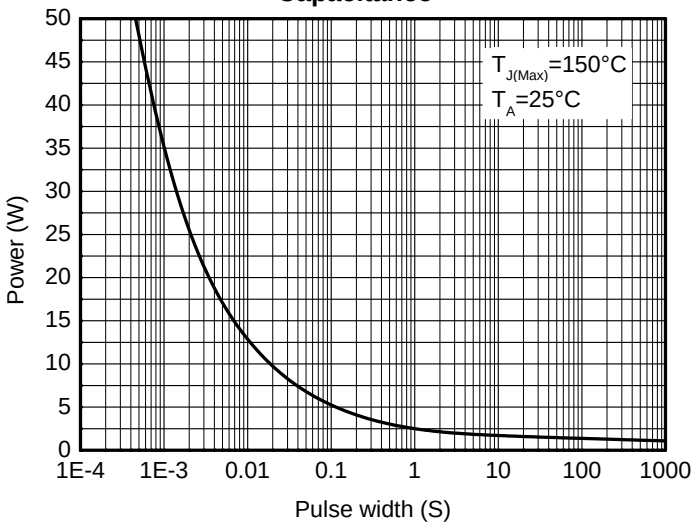
Threshold voltage vs. Temperature



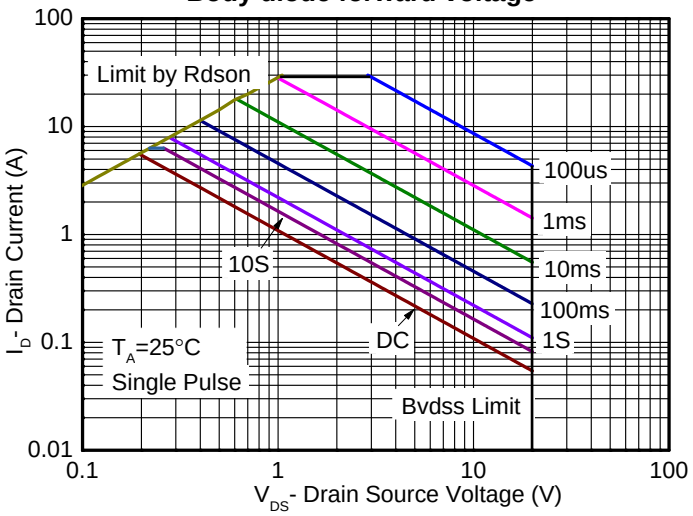
Capacitance



Body diode forward voltage

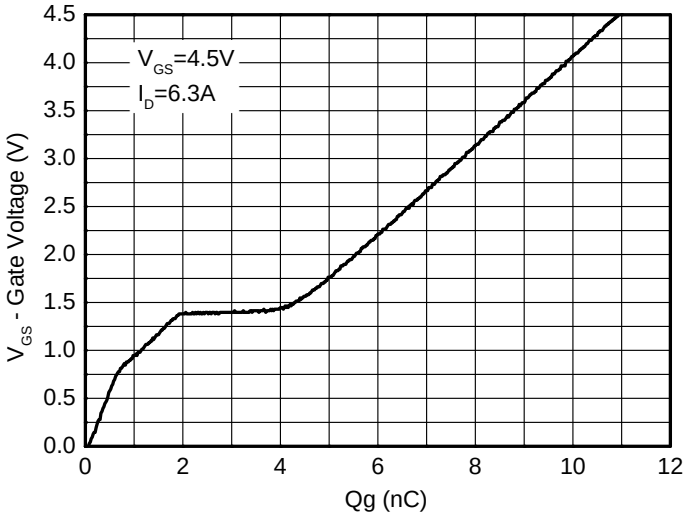


Single pulse power

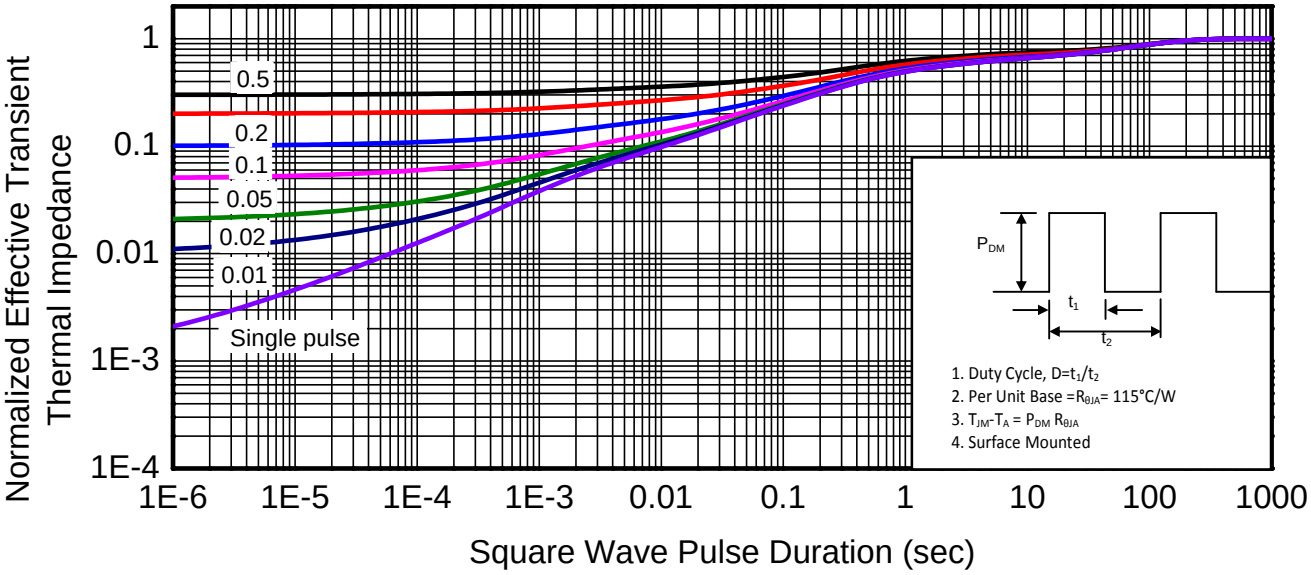


* V_{GS}> minimum V_{GS} at which RDS(on) is specified

Safe operating power



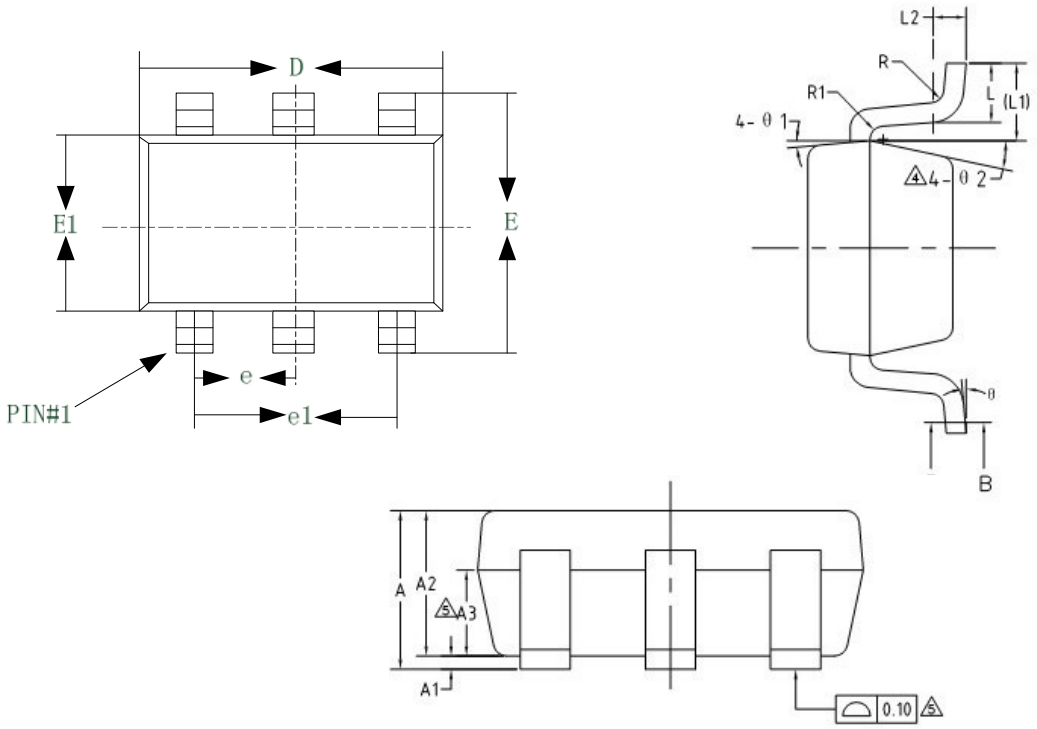
Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions

SOT-23-6



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	-	-
R1	0.10	-	0.20
θ	0^0		8^0
θ1	3^0	5^0	7^0
θ2	6^0		14^0