

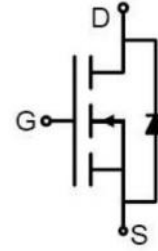
N-Channel Enhancement Mosfet

Features

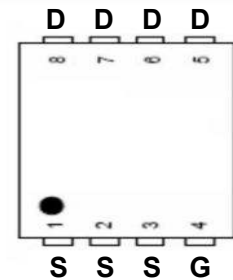
- 60V,50A
 $R_{DS(on)} < 9.5m\Omega @ V_{GS}=10V$ TYP:8 m Ω
 $R_{DS(on)} < 14m\Omega @ V_{GS}=4.5V$ TYP:11 m Ω
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge

Applications

- PWM applications
- Load Switch
- UPS
- Halogen-free
- P/N suffix V means AEC-Q101 qualified, e.g:RM50N60D3V



Schematic Diagram



pin Assignment

Package Marking and Ordering Information

Device Marking	Device	Package	Packaging Code	Reel Size	Quantity(Pcs)	Carton(Pcs)
50N60	RM50N60D3V	DFN3X3	-W	13inch	5000	80000

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^{\circ}C$) ⁽¹⁾	I_D	50	A
Continuous Drain Current ($T_c=100^{\circ}C$)	I_D	35	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	168	A
Drain Power Dissipation	P_D	22	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	81	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62	$^{\circ}C/W$
Thermal Resistance from Junction to Case ⁽³⁾	$R_{\theta JC}$	5.6	$^{\circ}C/W$
Junction Temperature	T_J	-55~ +175	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +175	$^{\circ}C$

2026-06/59
REV:0

Notes:

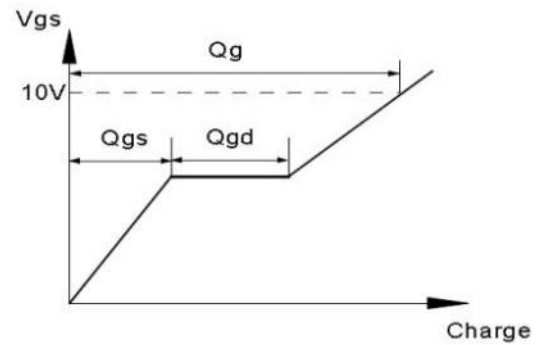
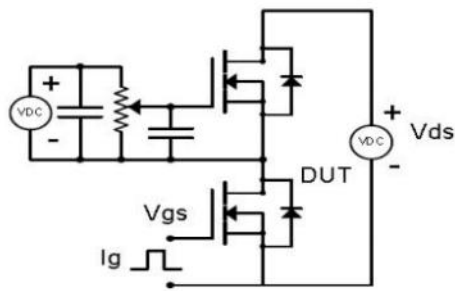
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : $T_J=25^{\circ}C$, $V_{DD}=20V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=18A$
- 3) The value of $R_{\theta JA}$ Mounted on FR4 Board (25.4mm*25.4mm*t1.6mm) With 2oz Copper $T_A=25^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$ unless otherwise noted)

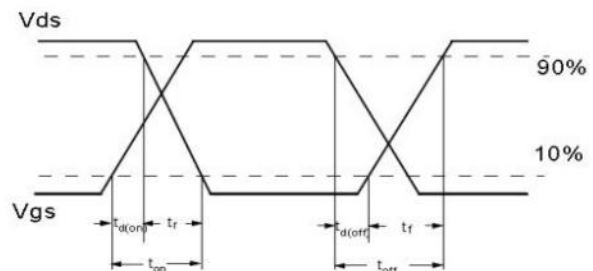
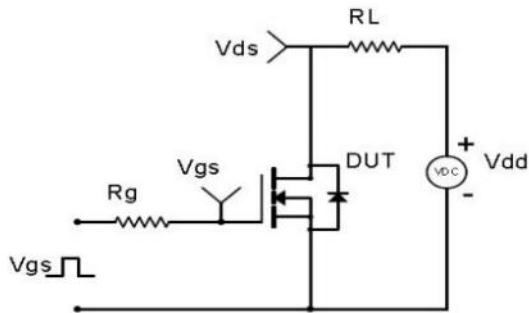
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =± 20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.9	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =25A	-	8.0	9.5	mΩ
		V _{GS} =4.5V, I _D =25A	-	11	14	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f = 1MHz	-	1.5	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =30V, VGS=0V, f=1MHz	-	805	-	pF
Output Capacitance	C _{oss}		-	190	-	
Reverse Transfer Capacitance	C _{rss}		-	14	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =30V, I _D =20A, V _{GS} =10V, R _G =3Ω	-	12	-	ns
Turn-on rise time	t _r		-	4.2	-	
Turn-off delay time	t _{d(off)}		-	31	-	
Turn-off fall time	t _f		-	4	-	
Total Gate Charge	Q _g	V _{DS} =30V, I _D =20A, V _{GS} =10V	-	16	-	nC
Gate-Source Charge	Q _{gs}		-	2.5	-	
Gate-Drain Charge	Q _{gd}		-	4.2	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	T _J =25℃, V _{GS} =0V, I _S =20A	-	0.8	1.2	V
Diode Forward current	I _S	T _C =25℃	-	-	42	A
Body Diode Reverse Recovery Time	t _{rr}	T _J =25℃, I _F =20A,di/dt=100A/us	-	25	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	10.5	-	nC

Test Circuit & Waveform

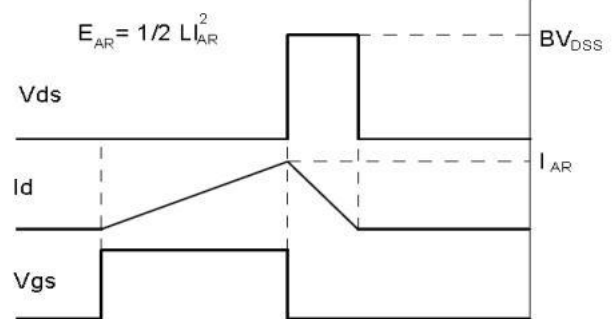
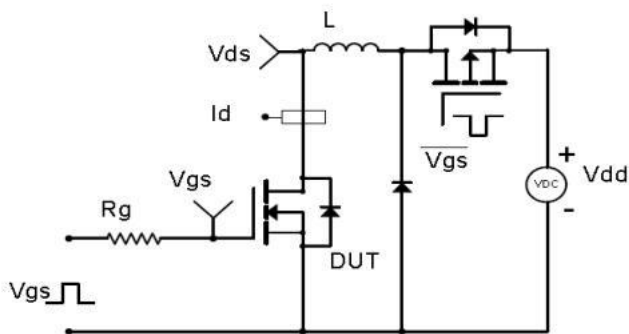
Gate Charge Test Circuit & Waveform



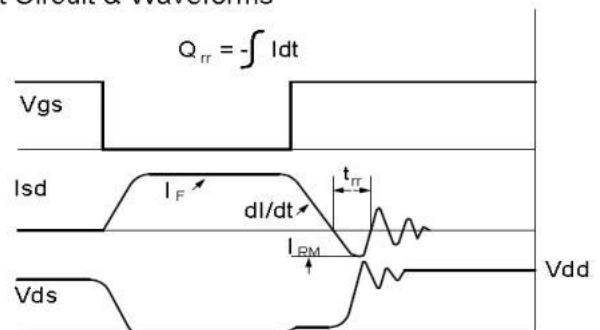
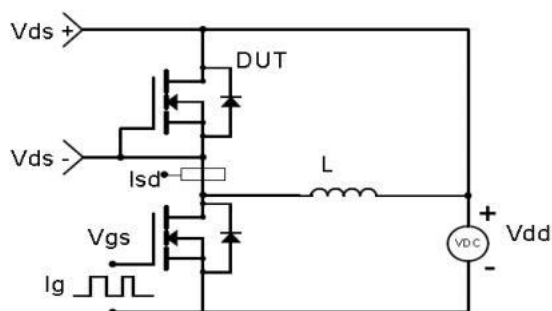
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



RATING AND CHARACTERISTICS CURVES (RM50N60D3V)

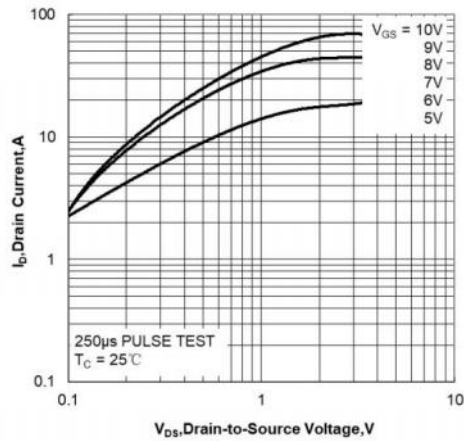


Figure 1. Output Characteristics

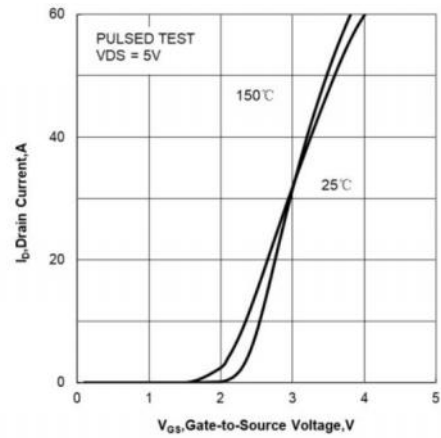


Figure 2. Transfer Characteristics

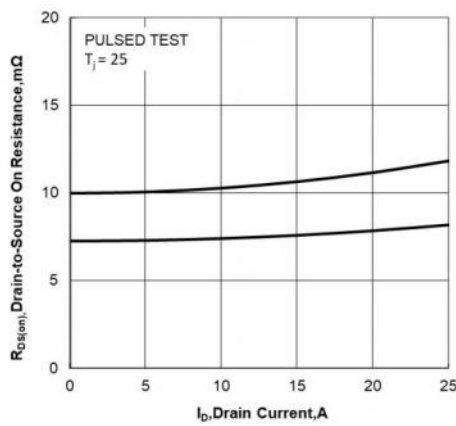


Figure 3. Drain-to-Source On Resistance vs Drain Current

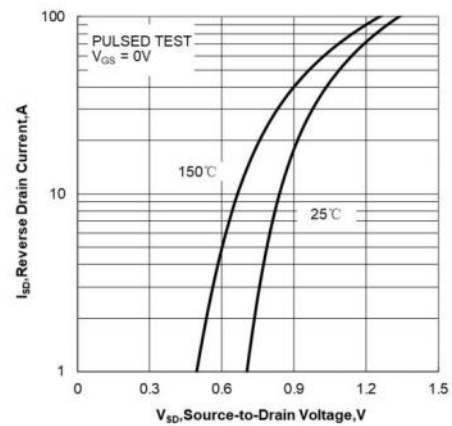


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

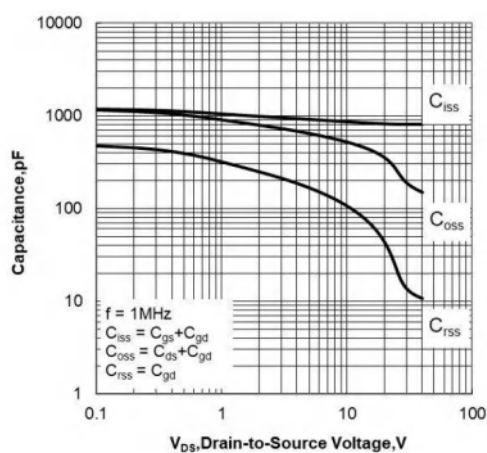


Figure 5. Capacitance Characteristics

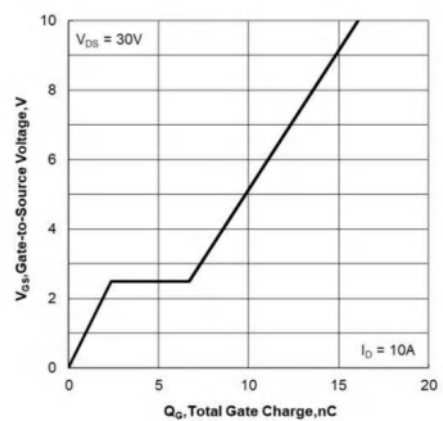


Figure 6. Gate Charge Characteristics

RATING AND CHARACTERISTICS CURVES (RM50N60D3V)

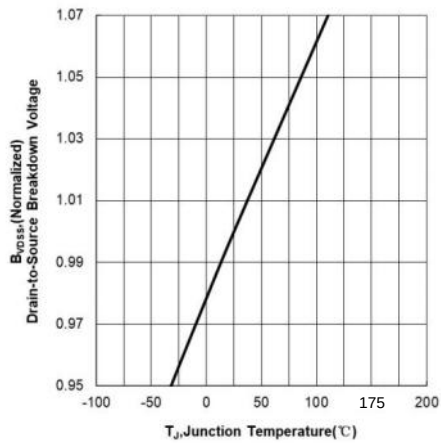


Figure 7. Normalized Breakdown Voltage vs Junction Temperature

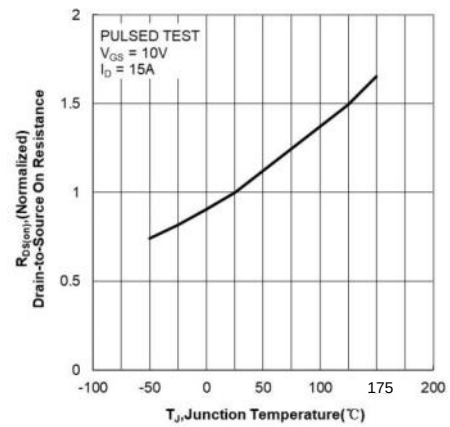


Figure 8. Normalized On Resistance vs Junction Temperature

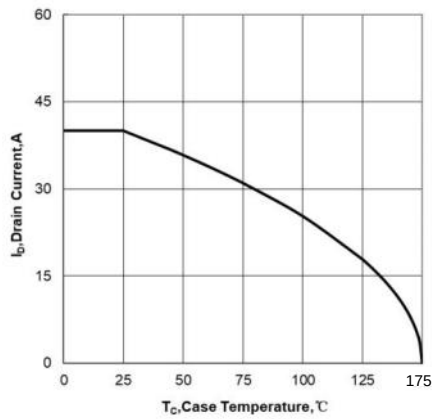


Figure 9. Maximum Continuous Drain Current vs Case Temperature

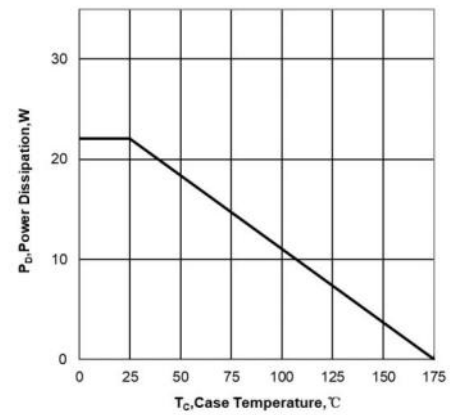


Figure 10. Maximum Power Dissipation vs Case Temperature

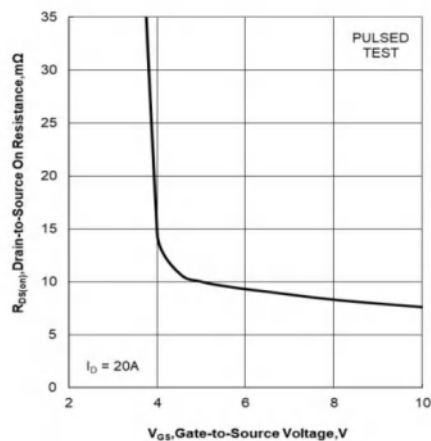


Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

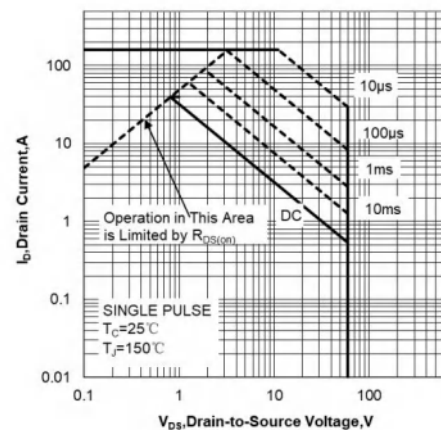


Figure 12. Maximum Safe Operating Area

RATING AND CHARACTERISTICS CURVES (RM50N60D3V)

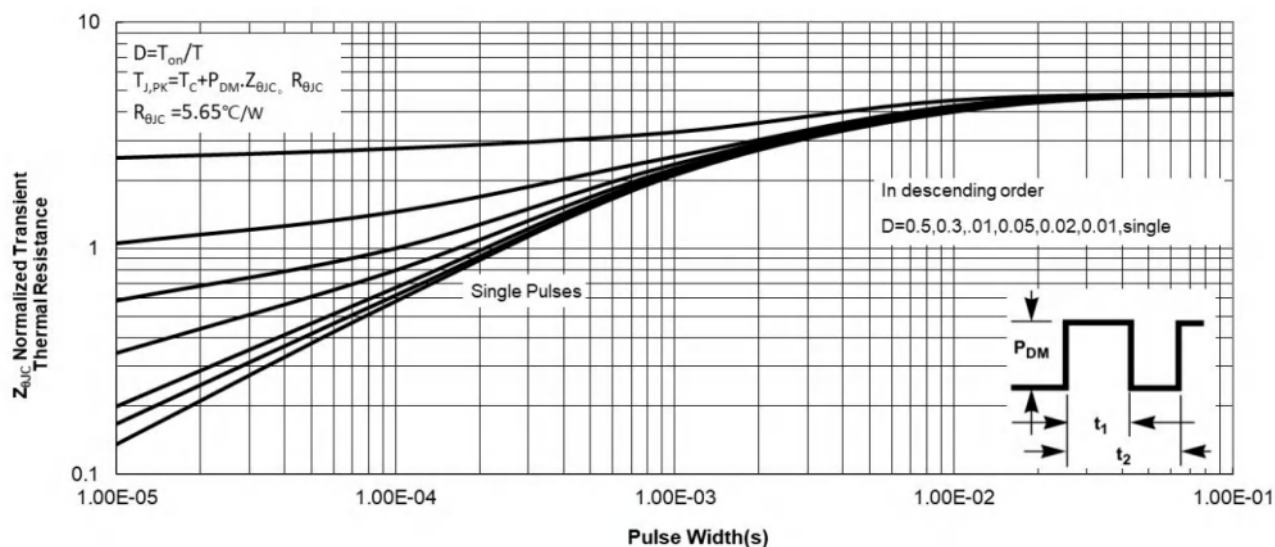
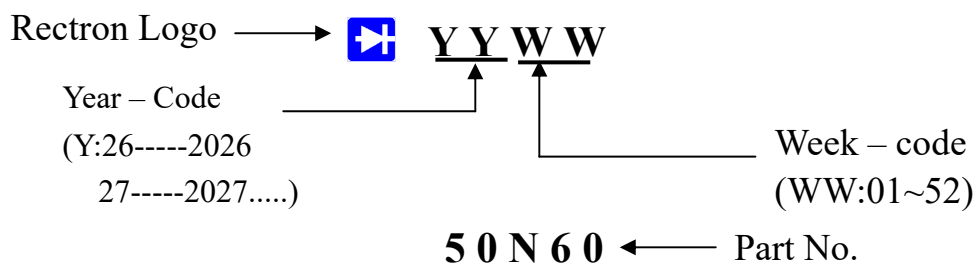


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

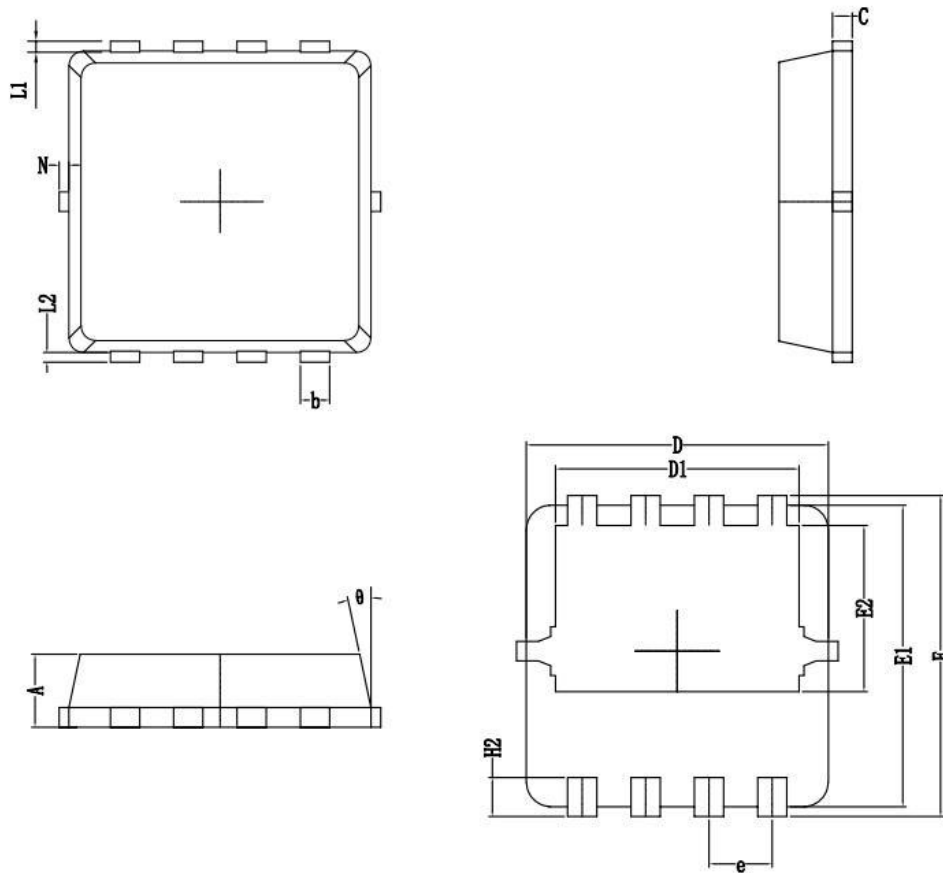


RECTRON

Marking on the body



DFN3X3 Package Information



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.70	0.80	0.90
b	0.25	0.30	0.35
C	0.14	0.15	0.16
D	3.00	3.10	3.20
L1/L2	0.10 REF.		
D1	2.35	2.50	2.60
N	0	-	0.10
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.72	1.82	1.92
e	0.65 BSC.		
θ	11°	12°	13°
H2	0.30	0.40	0.50

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