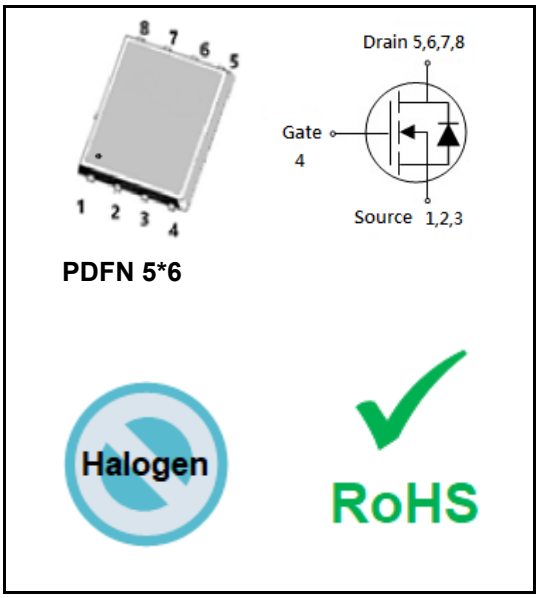
Nano Meter Coated (NMC)SIC MOSFET

Features

- Effectively lower down Tj and Rth, High anti- EMI ability
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(ON)}$
- Easy to drive and parallel
- RoHS Compliant



Benefits

- Increased Power Density
- Higher Operating Frequency
- Reduced Heat Sink Requirements
- Higher Efficiency
- EMI Reduction

Applications

- Power Factor Correction Modules
- Switch Mode Power Supplies
- Power Inverters
- High Voltage Converters

Top Mark: CSiC650380T5		
Ordering P/N: CSiC650380T5		
Parameter	**Value**	**Unit**
V_{DS}	650	V
I_D(Tc=25℃)	12	A
$R_{DS(ON)}$	360	mΩ

Absolute Maximum Ratings (Tj=25℃ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
V_{DS}	Drain-Source Voltage		650	V
I_D	Continuous Drain Current	Tc=25°C	12	A
		Tc=100°C	9	A
I_{DM}	Peak Drain Current	Pulse width tp limited by Tjmax	26	A
V_{GSmax}	Gate-Source Voltage		-5/26	V
V_{GSop}	Recommend Gate-Source Voltage		0/15	V
P_{tot}	Power Dissipation	Tc=25°C	52	W
		Tc=100°C	25	W
T_j	Operating Junction Temperature		-55~175	°C
T_{stg}	Storage Temperature		-55~175	°C

■ Electrical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	650			V	V_{GS} = 0V, I_D = 1 mA	
I_{DSS}	Zero Gate Voltage Drain Current		2	100	μA	V_{GS} = 0 V, V_{DS} = 650 V	
I_{GSS+}	Gate-Source Leakage Current			200	nA	V_{DS} = 0 V, V_{GS} = +22 V	
I_{GSS-}	Gate-Source Leakage Current			200	nA	V_{DS} = 0 V, V_{GS} = -10 V	
$V_{GS(th)}$	Gate Threshold Voltage	2.2	3.5	4.2	V	V_{GS} = V_{DS}, I_{DS} = 1 mA, T_J = 25˚C	Fig. 14
			2.6			V_{GS} = V_{DS}, I_{DS} = 1 mA, T_J = 175˚C	
$R_{DS(ON)}$	Static Drain-Source On-Resistance		380	440	mΩ	V_{GS} = 15 V, I_D = 6 A, T_J = 25˚C	Fig. 15
			420			V_{GS} = 15 V, I_D = 6 A, T_J = 175˚C	
Ciss	Input Capacitance		208		pF	V_{DS} = 400 V, f = 1 MHz, V_{GS} = 0 V	Fig. 8
Coss	Output Capacitance		18				
Crss	Reverse Transfer Capacitance		1.8				
Qg	Total Gate Charge		10.6		nC	V_{DD} = 400 V, V_{GS} = -5/18 V, I_D = 5 A	Fig. 7
Qgs	Gate-Source Charge		5.1				
Qgd	Gate-Drain Charge		2.2				
RG(int)	Gate Input Resistance		1.2		Ω	f = 1 MHz, I_D = 0 A	
Eon	Turn-On Switching Energy		25		μJ	V_{DD} = 400 V, I_D = 5 A, R_G = 10 Ω, V_{GS} = -5/18 V	Fig. 12
Eoff	Turn-Off Switching Energy		10				
td(on)	Turn-On Delay Time		5		ns	V_{DD} = 400 V, I_D = 5 A, R_G = 10 Ω, V_{GS} = -5/18 V	
tr	Rise Time		17				
td(off)	Turn-Off Delay Time		8				
tf	Fall Time		10				

■ Reverse SiC Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage		4.0		V	V_{GS} = -4V, I_{SD} = 5A,T_J= 25°C	Fig. 16
			3.6			V_{GS} = -4 V, I_{SD} = 5 A, T_J= 175°C	Fig. 17
*I_{SD}	Continuous Diode Forward Current			11	A	T_C= 25˚C	
				6		T_C= 175˚C	
trr	Reverse Recovery Time		50		ns	I_{SD}= 5 A, di/dt=1000A/μs, V_{DD} = 400 V, V_{GS} = -5 V	
Qrr	Reverse Recovery Charge		38		nC		
I_{RRM}	Peak Reverse Recovery Current		2.4		A		

*** Depends on bonding wireΦ**

■ Thermal Data

SYMBOL	PARAMETER	Typ.	UNIT
R_{thJC}	Thermal Resistance from Junction to Case (Note Fig.2)	2.88	°C/W
R_{thJA}	Thermal Resistance from Junction to Ambient	40	°C/W

■ Typical Characteristics

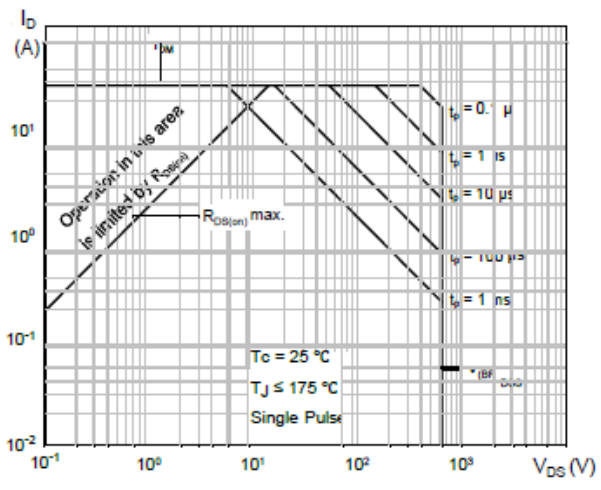


Figure 1. Safe Operating Area

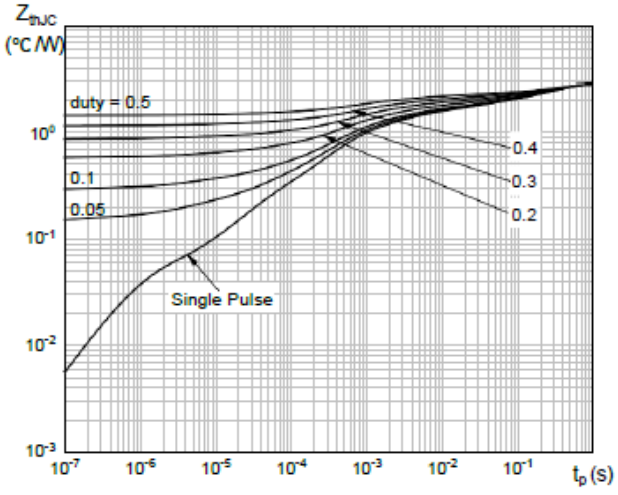


Figure 2. Maximum Transient Thermal Impedance

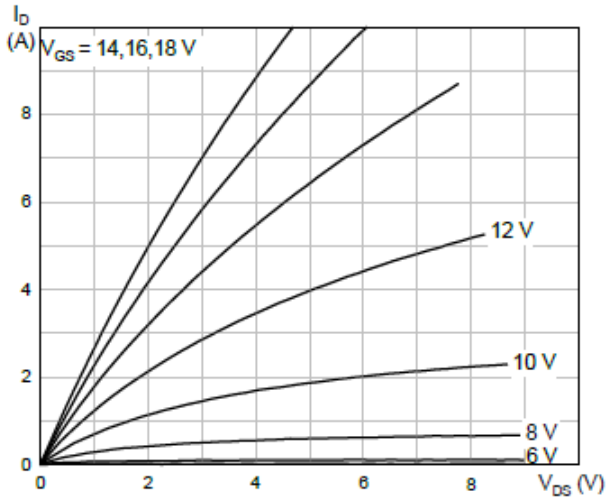


Figure 3. Typical Output Characteristics, T_J=25°C

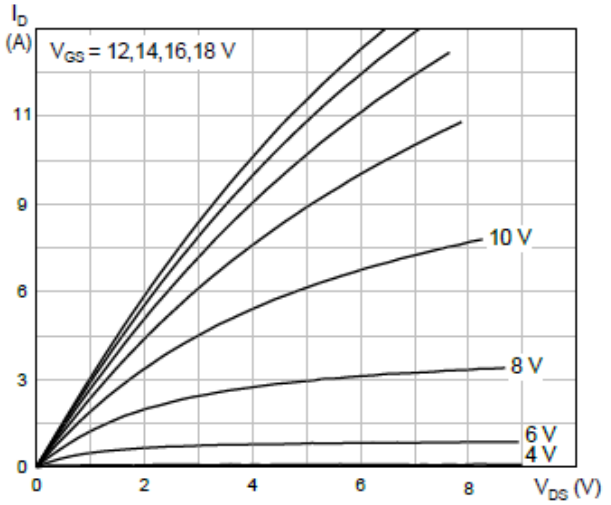


Figure 4. Typical Output Characteristics, T_J=175°C

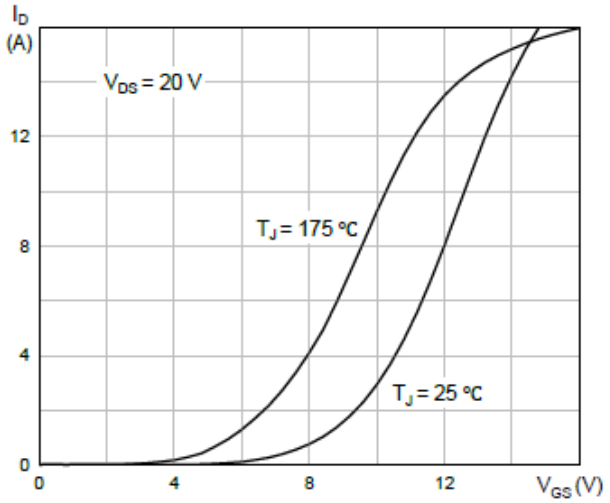


Figure 5. Typical Transfer Characteristics

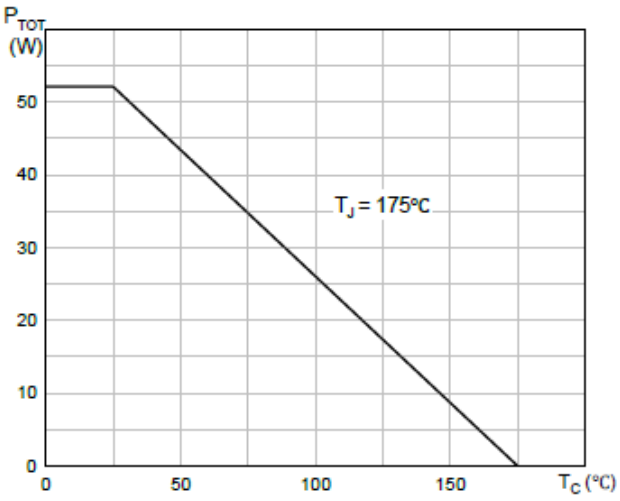


Figure 6. Total Power Dissipation

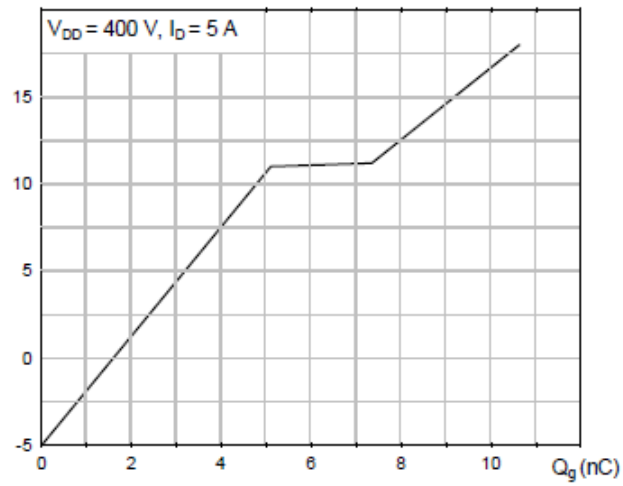


Figure 7. Typical Gate Charge Characteristics

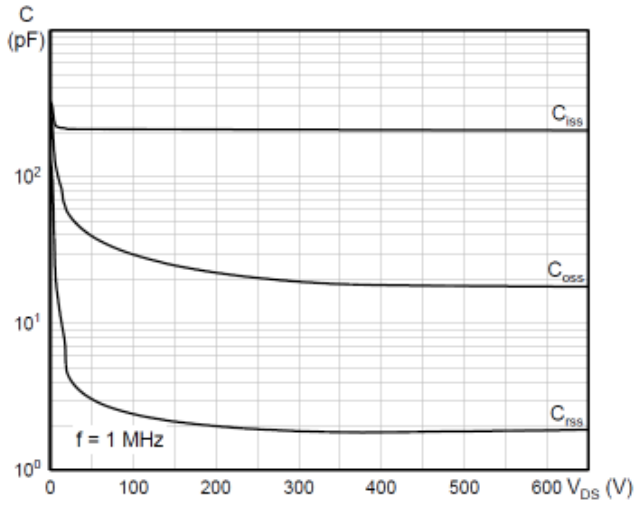


Figure 8. Typical Capacitance Characteristics

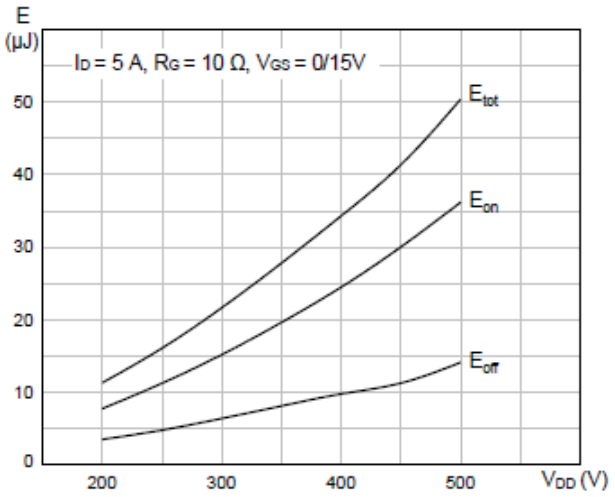


Figure 9. Typical Switching Energy vs. Supply Voltage

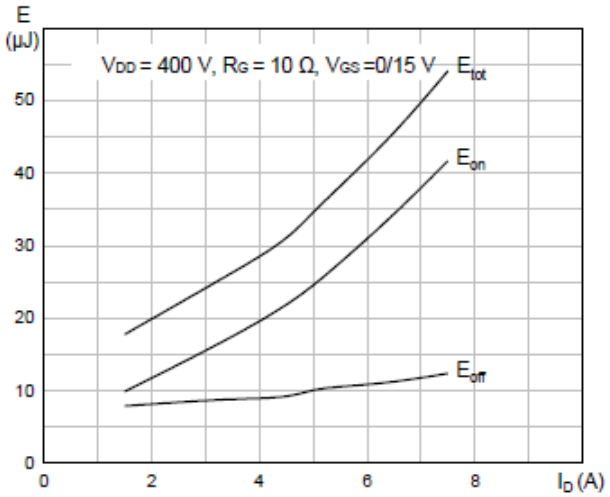


Figure 10. Typical Switching Energy vs. Drain Current

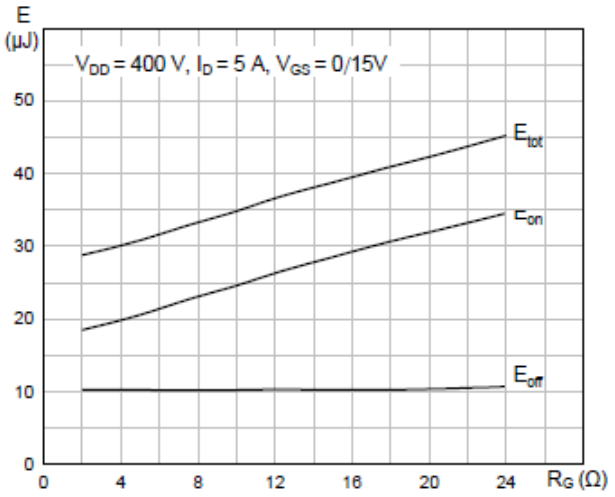


Figure 11. Switching Energy vs. Gate Resistance

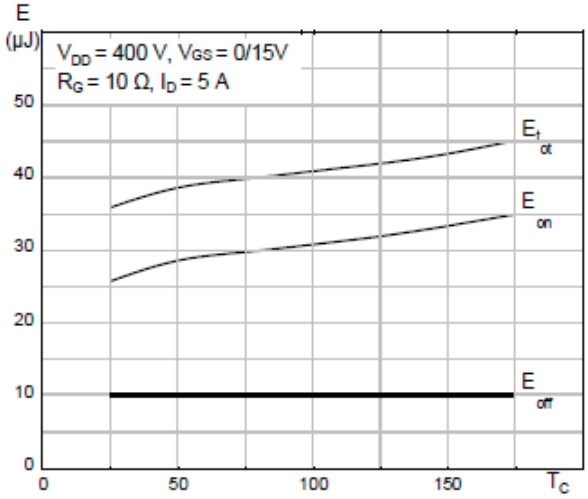


Figure 12. Typical Switching vs. Temperature

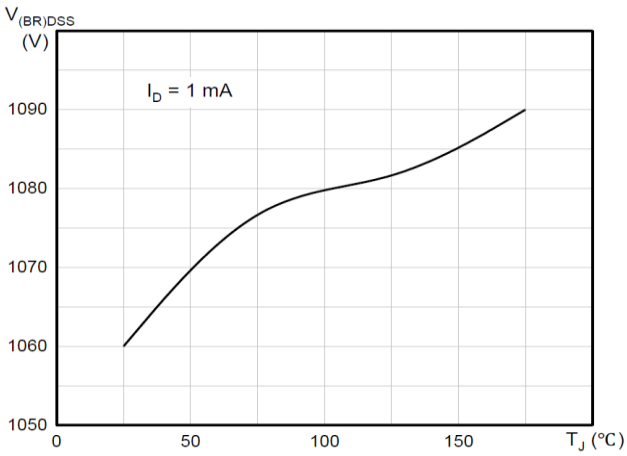


Figure 13. Breakdown Voltage vs. Temperature

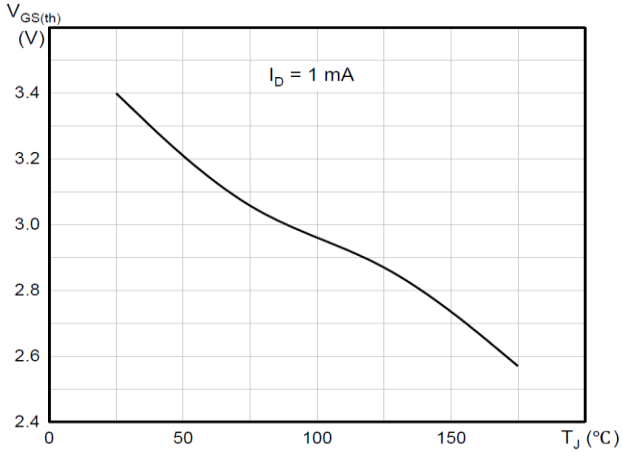


Figure 14. Gate Threshold vs. Temperature

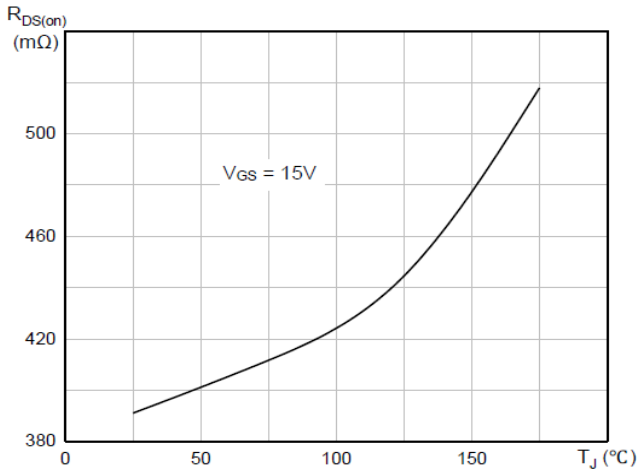


Figure 15. On-Resistance vs. Temperature

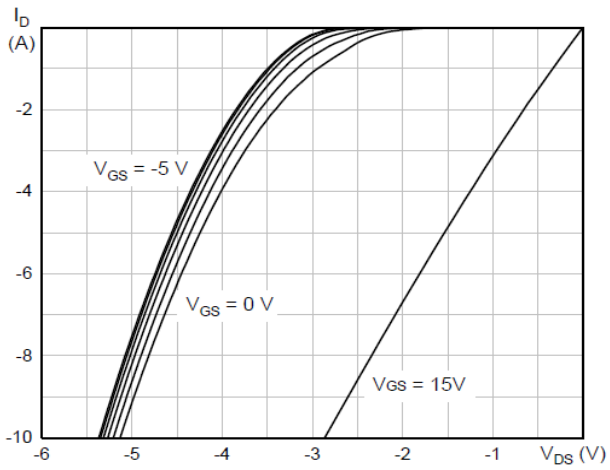


Figure 16. Body Diode Characteristics, T_J = 25°C

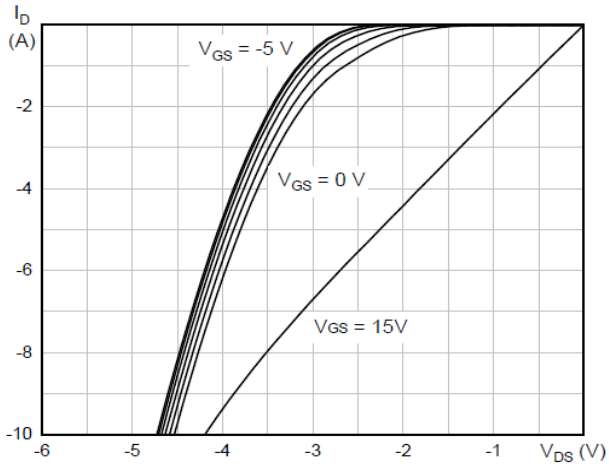
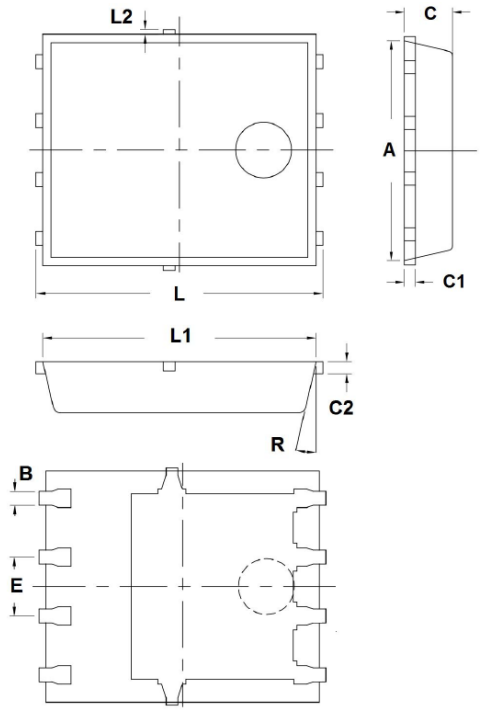


Figure 17. Body Diode Characteristics, T_J = 175°C

■ Package Outline Dimension

PDFN 5*6



Dim.	Min.	Max.
A	4.8	5.2
B	0.25	0.35
C	1.0	1.2
C1	Typ 0.254	
C2	Typ 0.254	
E	Typ 1.27	
L	6.0	6.3
L1	5.7	6.0
L2	MAX 0.2	
R	Typ 13°	

All Dimensions in millimeter