650V N-Channel Power MOSFET

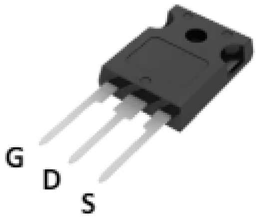
Features

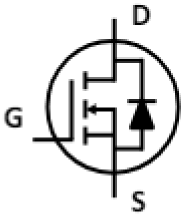
- Multi-Epi Super Junction MOSFET
- Fast Switching
- East to Drive/Use
- Fast Recovery-Body Diode

Applications

- SMPS
- Motor Drivers
- Charger/Power Supply
- Server PSU

TO-247-3L Pin Description





Absolute Ratings (T_A = 25℃ unless otherwise noted)

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current, T_C = 25°C	I_{DS}	118	A
Pulsed Drain Current	$I_{DS,\ pulse}$	285	A
Total Power Dissipation	P_D	1042	W
Thermal Resistance	$R_{th(J\text{-}C)}$	0.12	°C/W
Operating Junction Temperature Range	T_J	-40 to 150	°C
Storage Temperature Range	T_{STG}	-40 to 150	°C

Electrical Characteristics

Static (T_J=25℃ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	650	---	---	V
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V	---	---	±70	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 520V, V_{GS} = 0V	---	1	---	uA
		V_{DS} = 520V, V_{GS} = 0V, T_J = 125℃	---	556	---	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 27A	---	31	34	mΩ
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	3.2	3.9	4.6	V
Gate Resistance	R_G	f = 1MHz, Open Drain	---	11.1	---	V

Dynamic (T_J=25℃ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 400V, f = 250KHz	---	8880	---	pF
Output Capacitance	C_{oss}		---	189	---	
Reverse Transfer Capacitance	C_{rss}		---	3.7	---	
Total Gate Charge	Q_g	V_{DS} = 400V, I_D = 37A, V_{GS} = 0-12V	---	222	---	nC
Gate-Source Charge	Q_{gs}		---	50	---	
Gate-Drain Charge	Q_{gd}		---	77	---	
Gate Plateau Voltage	V_{Plat}		---	6.0	---	V
Turn-on delay time	$T_{d(on)}$	V_{DS} = 400V, I_D = 37A, V_{GS} = 12V, R_G=5Ω	---	109	---	nS
Rise time	T_r		---	28	---	
Turn-off delay time	$T_{d(off)}$		---	405	---	
Fall time	T_f		---	24	---	

Body Diode Reverse Characteristics (T_J=25℃ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_F = 37A,	---	0.95	---	V
Reverse Recovery Time	t_{rr}	V_{DS} = 400V, I_S = 37A, di_F / dt = 100A / uS	---	175	---	nS
Reverse Recovery Charge	Q_{rr}		---	1.3	---	uC
Peak Reverse Recovery Current	I_{rrm}		---	13.6	---	A

Typical Electrical Characteristics

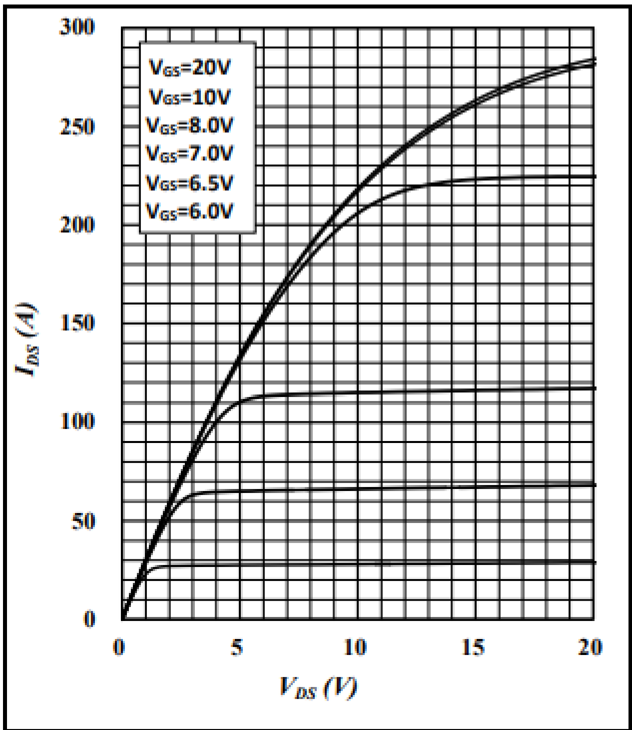


Fig.1 Typ. Output Characteristics $T_j = 25$ °C

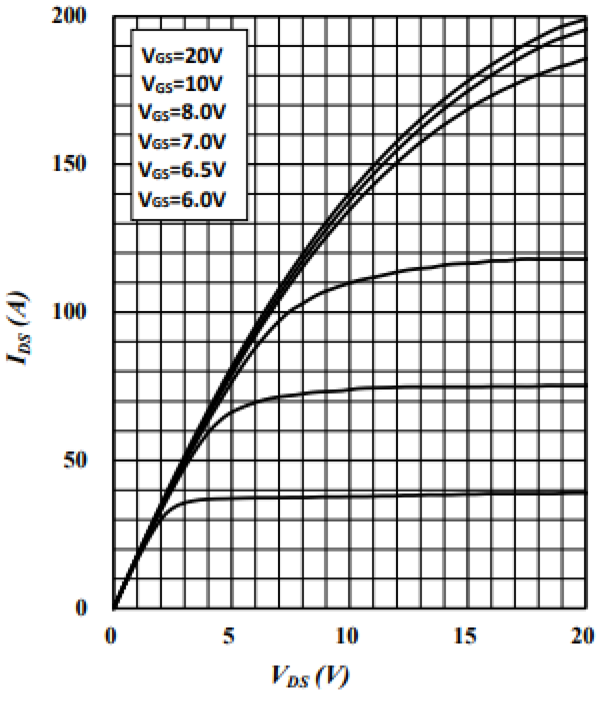
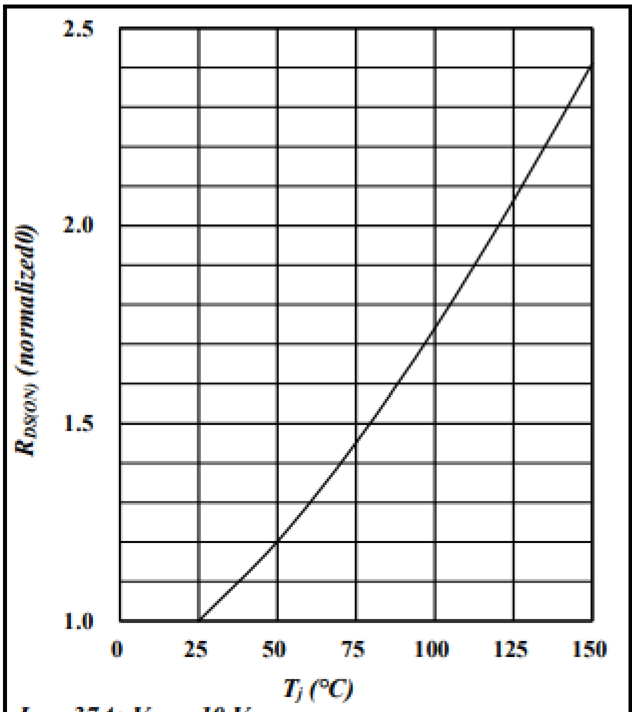


Fig.2 Typ. Output Characteristics $T_j = 125$ °C



I_{DS} =37A; V_{GS} = 10 V

Fig.3 $R_{DS(ON)}$ vs. Junction Temperature

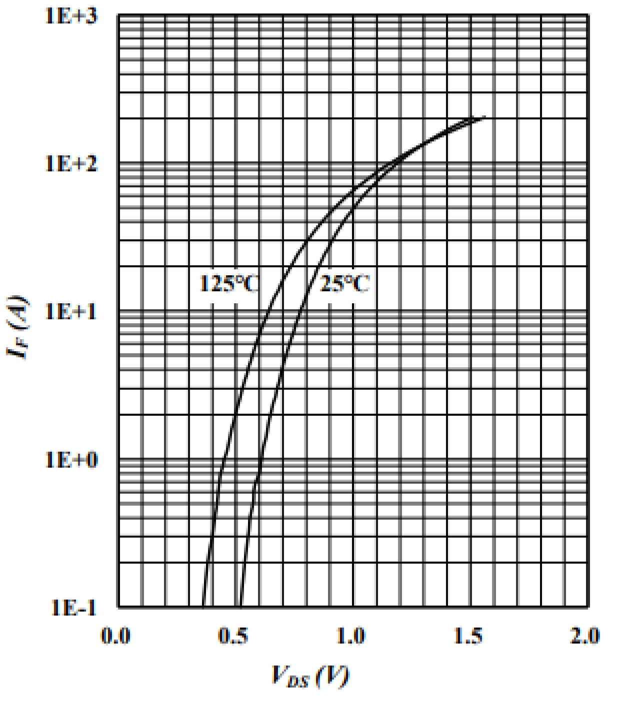


Fig.4 Forward Characteristics of Body Diode

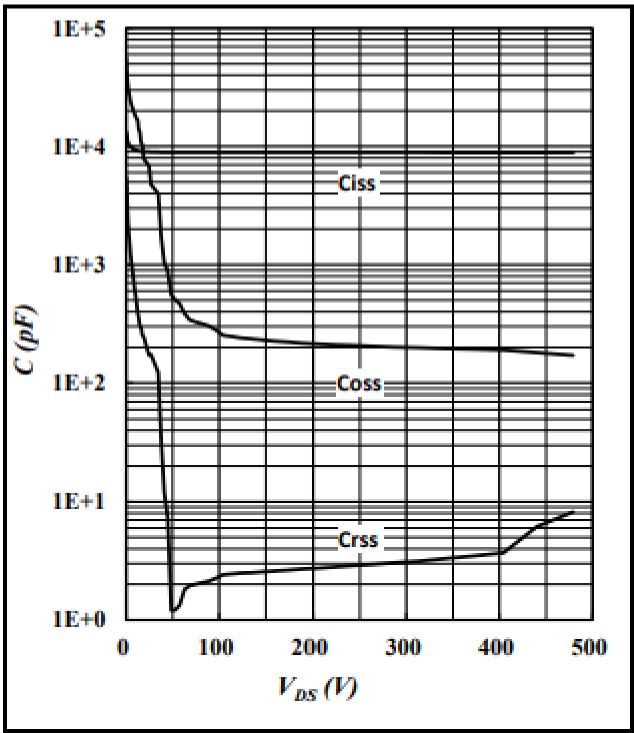
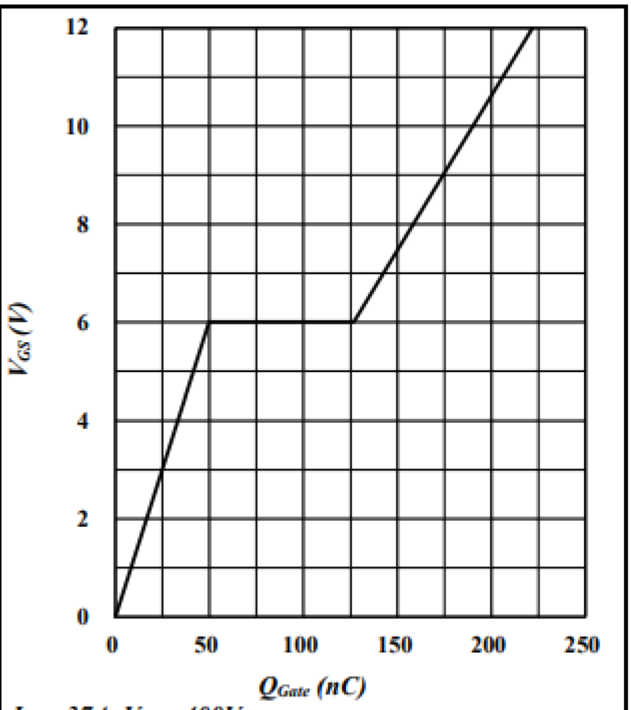
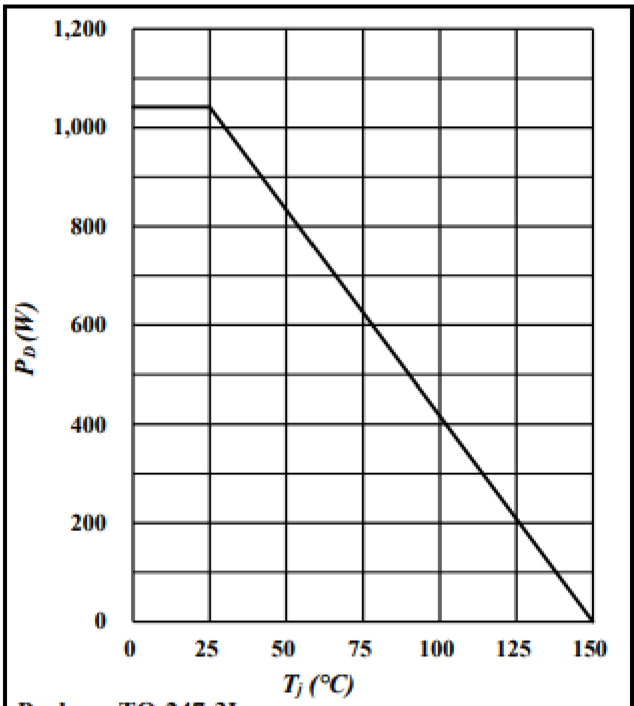


Fig.5 Typ. Capacitance vs. V_{DS}



I_{DS} =37A, V_{DS} =400V

Fig.6 Typ. Gate Charge



Package TO-247-3L

Fig.7 Power Dissipation Derating Curve

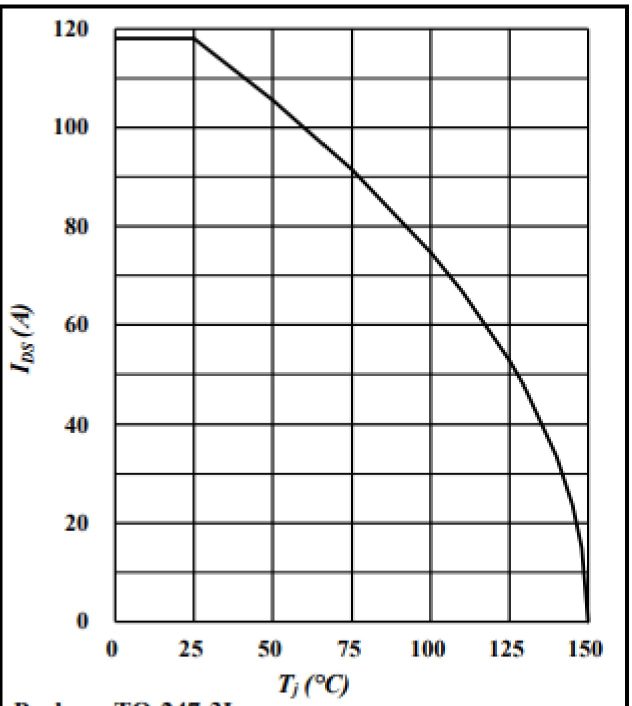


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Fig.8 Drain Current Derating Curve

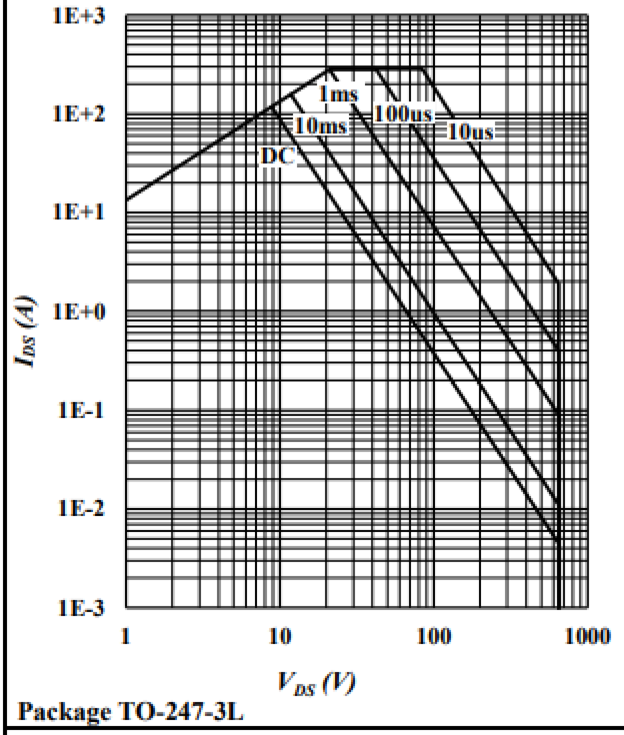


Fig.9 Safe Operating Area

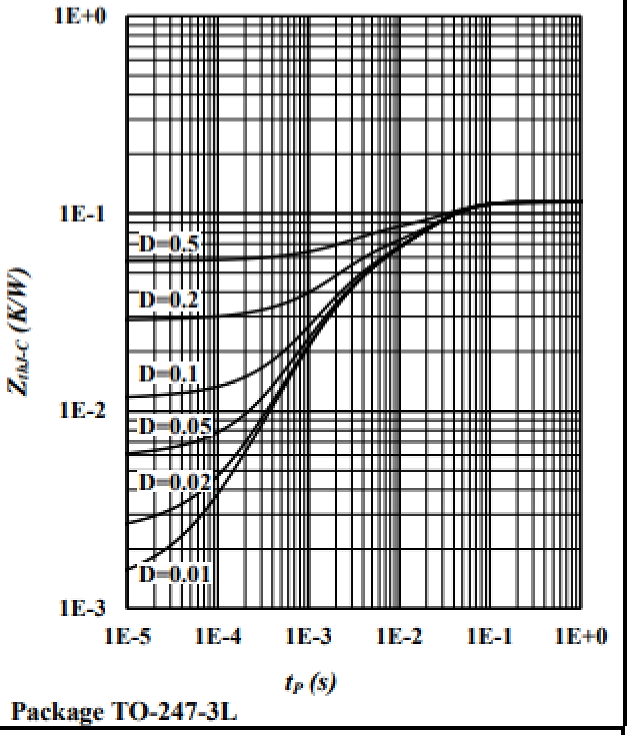


Fig.10 ZthJ-C, D = tP / T

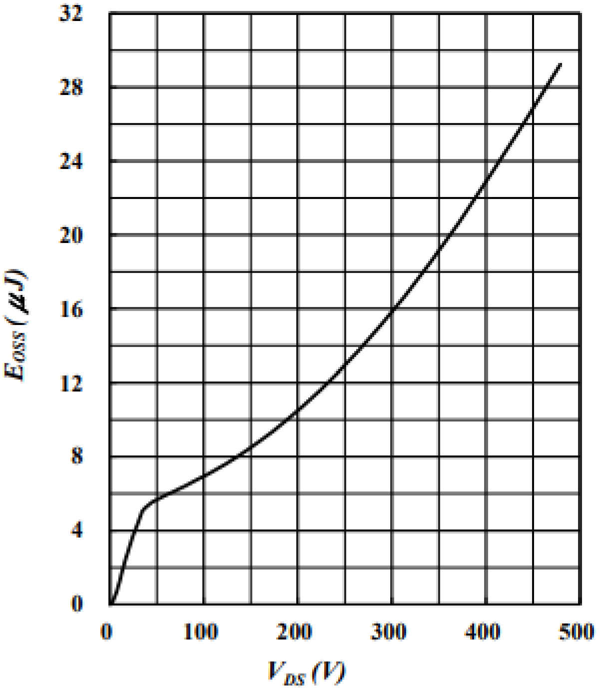
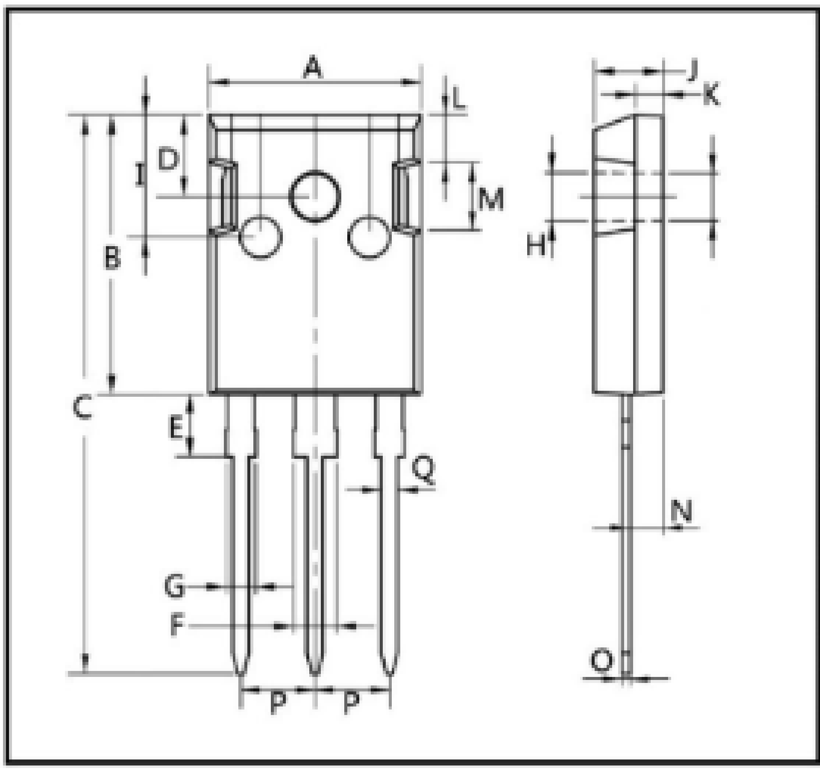
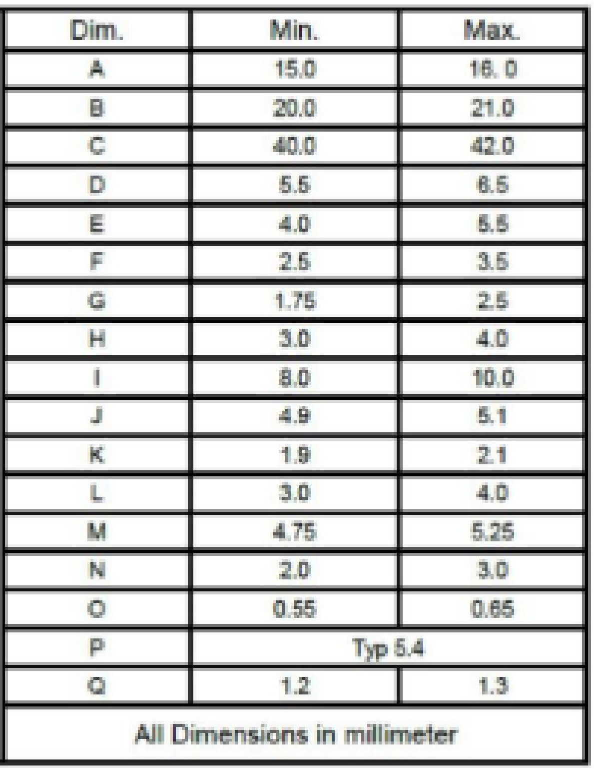


Fig.11 Eoss Curve

TO-247-3L Package Information





Dim.	Min.	Max.
A	15.0	16. 0
B	20.0	21.0
C	40.0	42.0
D	5.5	6.5
E	4.0	5.5
F	2.5	3.5
G	1.75	2.5
H	3.0	4.0
I	8.0	10.0
J	4.9	5.1
K	1.9	2.1
L	3.0	4.0
M	4.75	5.25
N	2.0	3.0
O	0.55	0.65
P	Typ 5.4	
Q	1.2	1.3
All Dimensions in millimeter		