

CMHG65R020/CMAG65R020

650V, 21mΩ typ., 100A N-Channel Silicon Carbide Power MOSFET

General Description

This silicon carbide Power MOSFET device has been developed using Cmos's advanced SiC MOSFET technology. The device features a very low $R_{DS(on)}$ over the entire temperature range combined with low capacitances and very high switching operations, which improve application performance in frequency, energy efficiency, system size and weight reduction.

Features

- Wide Bandgap SiC MOSFET Technology
- Easy to Parallel and Simple to Drive
- Low On-Resistance with High Blocking Voltage
- RoHS Compliant

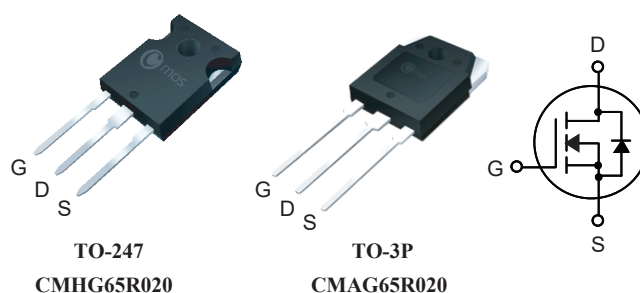
Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	26mΩ	100A

Applications

- inverter
- EV charging infrastructure
- uninterruptable power supplies

TO-247/TO-3P Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Absolute maximum values	-10/+22	V
V_{GSop}	Recommended operational values	0/+18	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current	100	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	70	A
I_{DM}	Pulsed Drain Current	300	A
EAS	Single Pulse Avalanche Energy (Note 1)	2030	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	350	W
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	40	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.43	$^{\circ}C/W$

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Electrical Characteristics (T_J=25°C , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =100μA	650	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =18V , I _D =30A	---	21	26	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =11.7mA (tested after V _{GS} =V _{DS} , 1ms pulse)	2.7	3.6	4.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =650V , V _{GS} =0V	---	---	10	μA
		V _{DS} =650V , V _{GS} =0V , T _J =150°C	---	10	---	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =-10V to 22V , V _{DS} =0V	---	---	±250	nA
g _{fs}	Forward Transconductance	V _{DS} =20V , I _D =30A	---	1	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	0.8	---	Ω
Q _{g(tot)}	Total Gate Charge	V _{DS} =520V , I _D =50A V _{GS} =-5V to 18V	---	162	---	nC
Q _{gs}	Gate-Source Charge		---	45	---	
Q _{gd}	Gate-Drain Charge		---	49	---	
E _{on}	Turn-on Switching Energy	V _{DS} =400V I _D =50A V _{GS} =-5V to 18V R _G =2.2Ω Inductive load	---	130	---	μJ
E _{off}	Turn-off Switching Energy		---	210	---	
E _{tot}	Total Switching Energy		---	340	---	
T _{d(on)}	Turn-On Delay Time		---	26	---	ns
T _r	Rise Time		---	16	---	
T _{d(off)}	Turn-Off Delay Time		---	58	---	
T _f	Fall Time		---	38	---	
C _{iss}	Input Capacitance	V _{DS} =100V , V _{GS} =0V , f=1MHz	---	3550	---	pF
C _{oss}	Output Capacitance		---	450	---	
C _{rss}	Reverse Transfer Capacitance		---	25	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	100	A
I _{SM}	Pulsed Source Current		---	---	300	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _{SD} =10A , T _J =25°C	---	3.0	---	V
t _{rr}	Reverse Recovery Time	di/dt=2140A/μs , V _{GS} =-5V to 18V	---	26	---	ns
Q _{rr}	Reverse Recovery Charge	V _{DD} =520V , I _F =50A , R _G =10Ω	---	370	---	nC

Note :

1. The EAS data shows Max. rating . The test condition is V_{DD}=50V , V_{GS}=10V , L=5mH , R_G=25Ω , I_{AS}=28.5A.

This product has been designed and qualified for the consumer market.

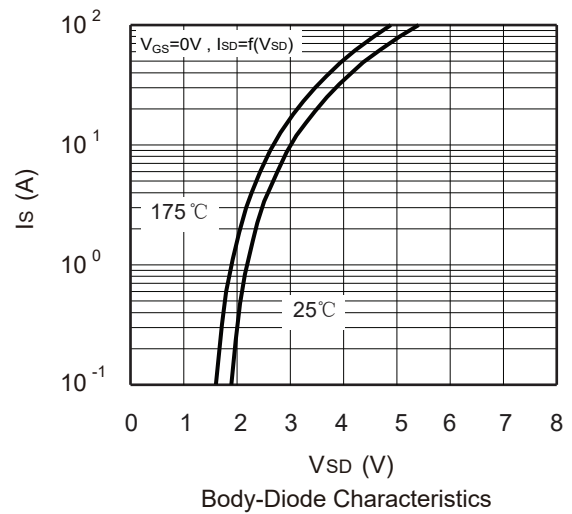
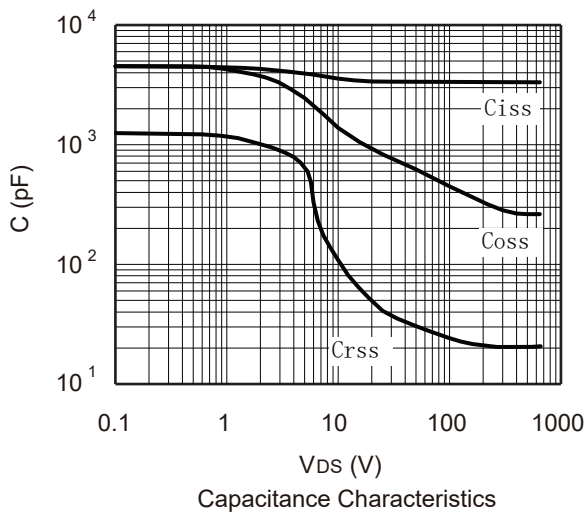
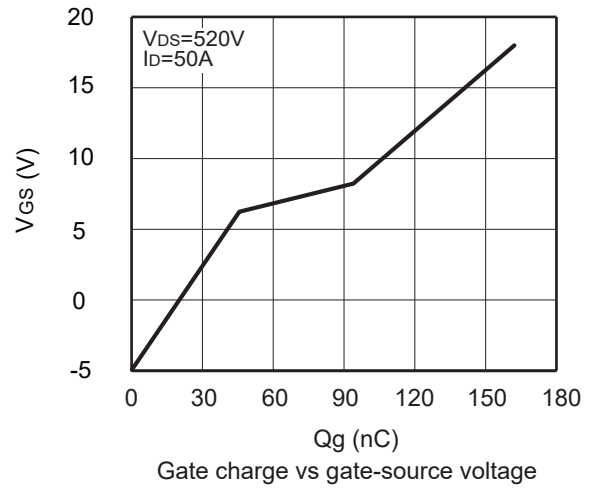
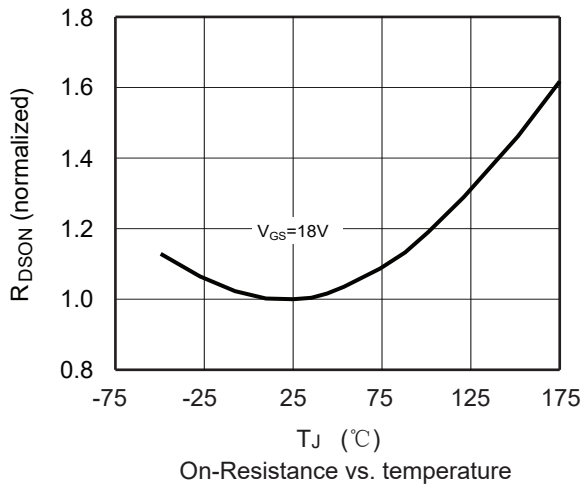
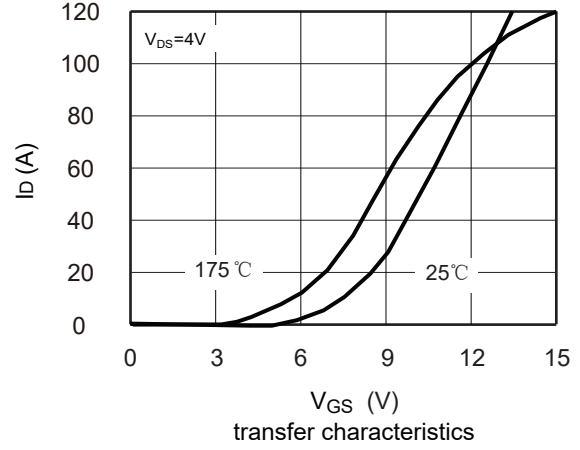
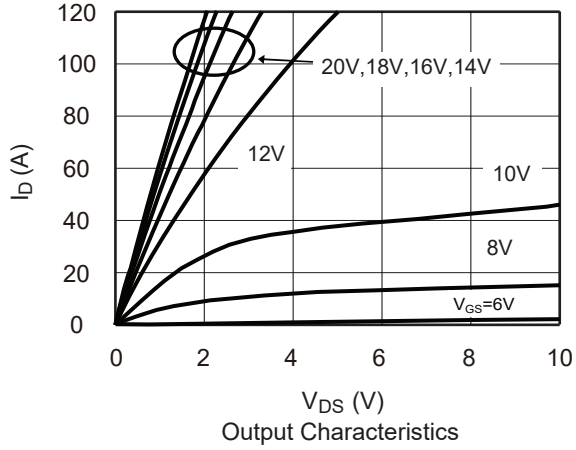
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Cmos reserves the right to improve product design ,functions and reliability without notice. Please refer to the latest version of specification.

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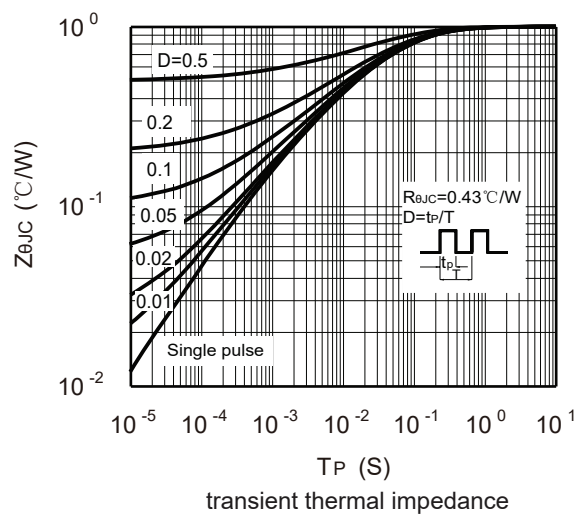
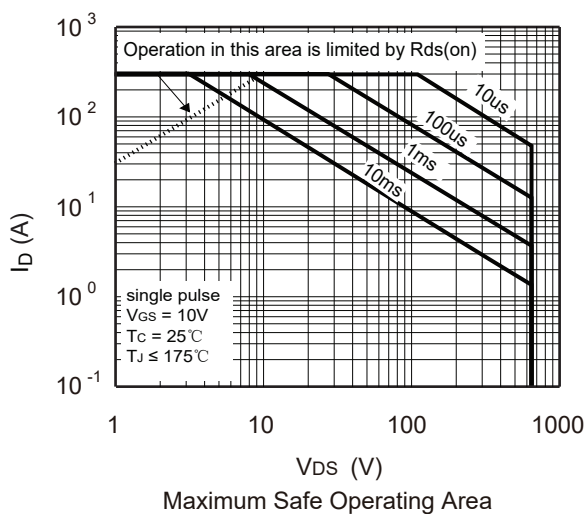
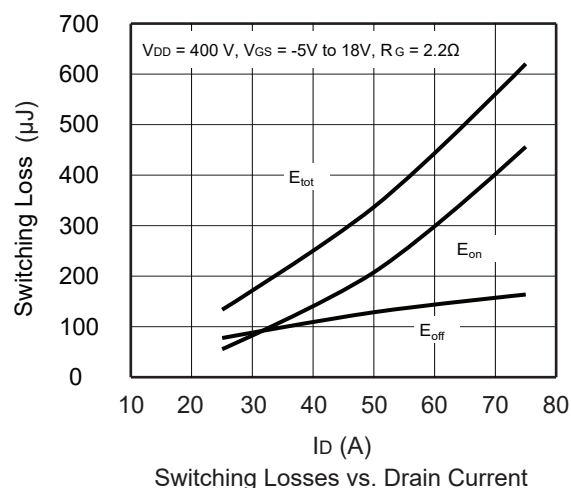
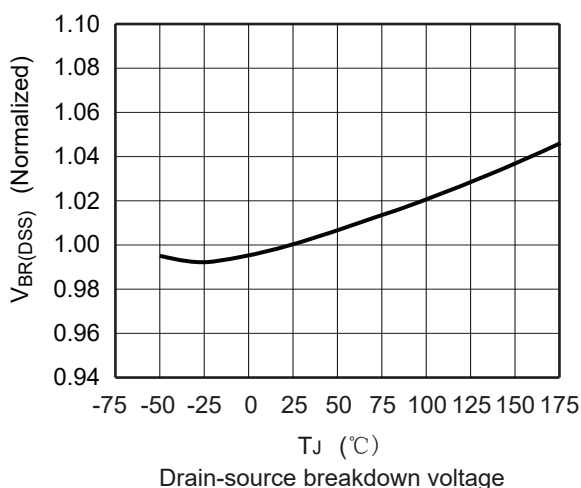
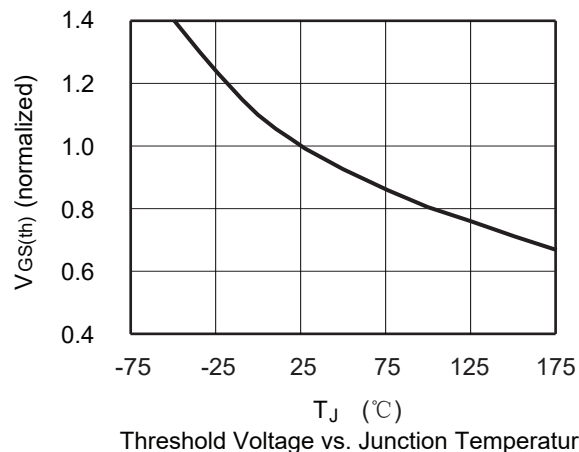
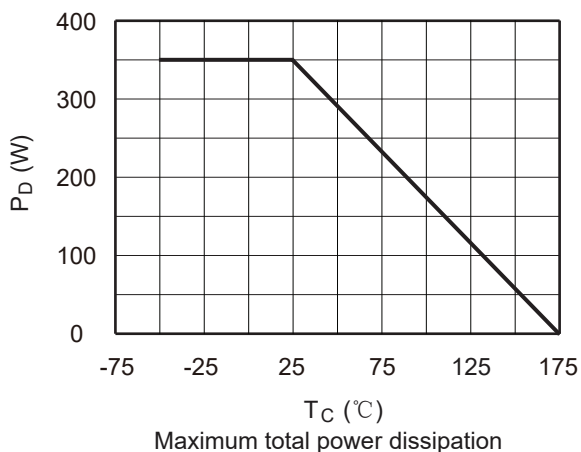
Typical Characteristics



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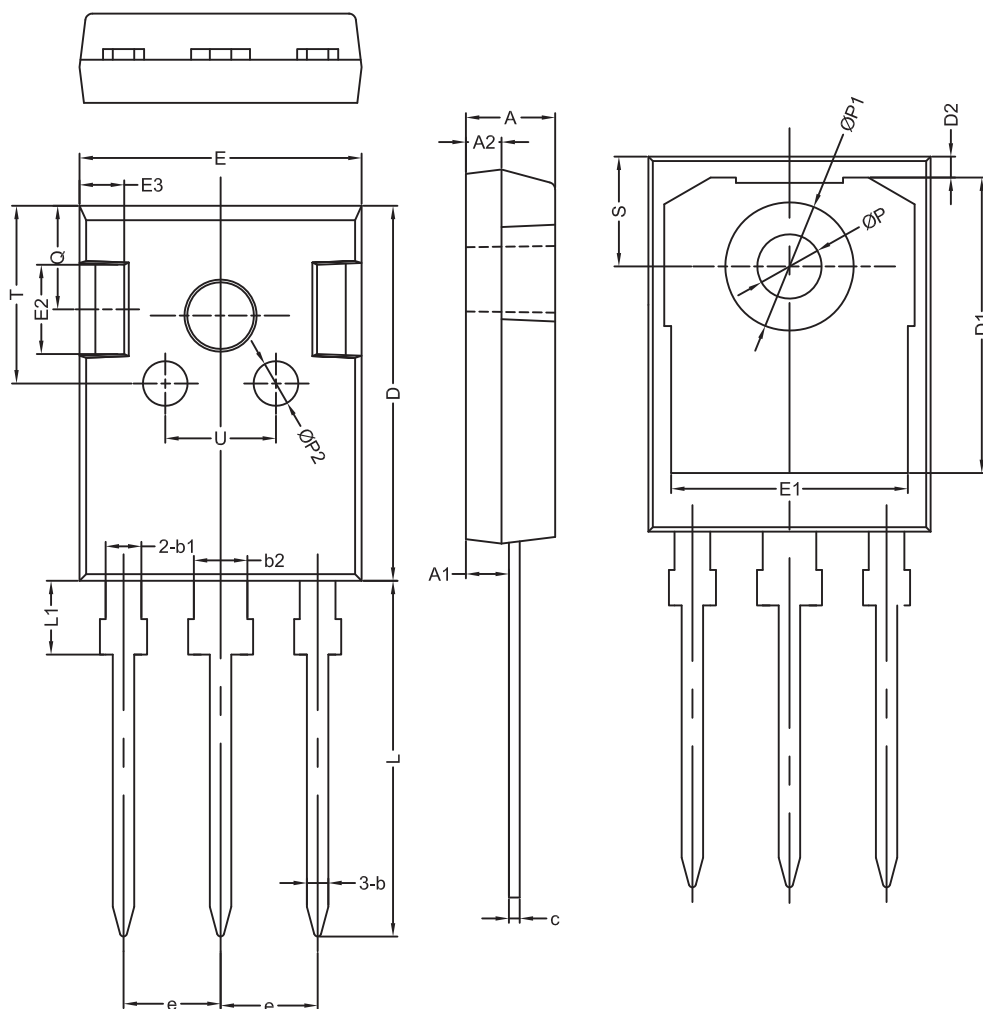
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Package Dimension

TO-247

Unit :mm



符号	机械尺寸/mm			符号	机械尺寸/mm		
	最小值	典型值	最大值		最小值	典型值	最大值
A	4.80	5.00	5.20	E2		5.00	
A1	2.21	2.41	2.61	E3		2.50	
A2	1.90	2.00	2.10	e		5.44	
b	1.10	1.20	1.35	L	19.42	19.92	20.42
b1		2.00		L1		4.13	
b2		3.00		P	3.50	3.60	3.70
c	0.55	0.60	0.75	P1		7.19	
D	20.80	21.00	21.20	P2		2.50	
D1		16.55		Q		5.80	
D2		1.20		S	6.05	6.15	6.25
E	15.60	15.80	16.0	T		10.00	
E1		13.30		U		6.20	

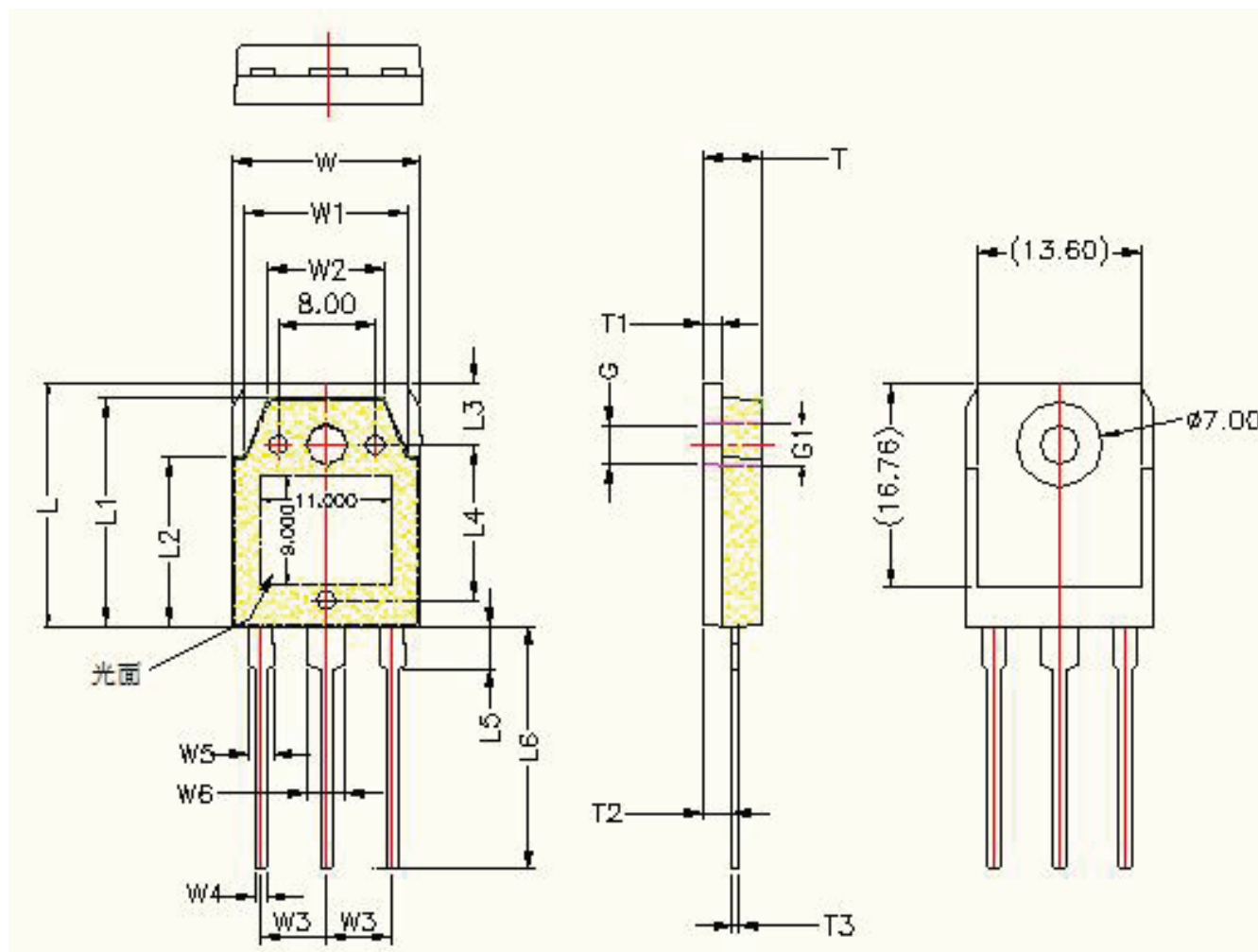
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Package Dimension

TO-3P

Unit :mm



Symbol	Dimensions	Symbol	Dimensions	Symbol	Dimensions
W	15.60±0.3	L	19.90±0.3	T	4.80±0.3
W1	13.60±0.3	L1	18.70±0.3	T1	1.50±0.3
W2	9.60±0.3	L2	13.90±0.3	T2	2.40±0.3
W3	5.45(TYP)	L3	5.00±0.3	T3	0.60±0.3
W4	1.00±0.3	L4	12.76±0.3	G	Ø3.25±0.3
W5	2.10±0.2	L5	3.50±0.3	G1	Ø3.58±0.3
W6	3.10±0.2	L6	20.00±0.3		