

CMHG120R050/CMAG120R050

1200V, 50mΩ typ., 60A 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

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Simple to Drive
- RoHS Compliant

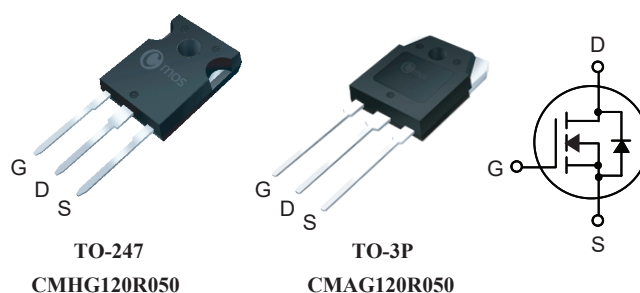
Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
1200V	55mΩ	60A

Applications

- DC-AC Inverters
- Switch Mode Power Supplies
- Power Factor Correction Modules

TO-247/TO-3P Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	1200	V
V_{GS}	Absolute maximum values	-8/+22	V
V_{GSop}	Recommended operational values	0/+18	V
$I_D@T_C=25^\circ C$	Continuous Drain Current	60	A
$I_D@T_C=100^\circ C$	Continuous Drain Current	42	A
I_{DM}	Pulsed Drain Current	160	A
EAS	Single Pulse Avalanche Energy ¹	1815	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation	280	W
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	40	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.54	°C/W

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=1mA$	1200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=18V$, $I_D=30A$	---	50	55	mΩ
		$V_{GS}=18V$, $I_D=30A$, $T_J=175^{\circ}\text{C}$	---	56	---	
		$V_{GS}=15V$, $I_D=30A$	---	70	---	
		$V_{GS}=15V$, $I_D=30A$, $T_J=175^{\circ}\text{C}$	---	85	---	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=0.65mA$ (tested after $V_{GS}=22V$, 1ms pulse)	2.0	3.1	5.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=1200V$, $V_{GS}=0V$	---	1	100	μA
		$V_{DS}=1200V$, $V_{GS}=0V$, $T_J=175^{\circ}\text{C}$	---	10	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=+22V$, $V_{DS}=0V$	---	---	+250	nA
		$V_{GS}=-8V$, $V_{DS}=0V$	---	---	-250	
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	0.7	---	Ω
$Q_{g(tot)}$	Total Gate Charge	$V_{DS}=800V$, $I_D=40A$ $V_{GS}=-4V$ to 18V	---	122	---	nC
Q_{gs}	Gate-Source Charge		---	35	---	
Q_{gd}	Gate-Drain Charge		---	34	---	
E_{on}	Turn-on Switching Energy	$V_{DS}=800V$ $I_D=40A$	---	232	---	μJ
E_{off}	Turn-off Switching Energy		---	187	---	
E_{tot}	Total Switching Energy		---	419	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=-4V$ / 18V $R_G=2.5\Omega$ $L=200\mu H$	---	17	---	ns
T_r	Rise Time		---	16	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	8	---	
C_{iss}	Input Capacitance	$V_{DS}=100V$, $V_{GS}=0V$, $f=1kHz$	---	2250	---	pF
C_{oss}	Output Capacitance		---	240	---	
C_{rss}	Reverse Transfer Capacitance		---	12	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	160	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_{SD}=20A$, $T_J=25^{\circ}\text{C}$	---	4.4	---	V
t_{rr}	Reverse Recovery Time	$di/dt=5800A/\mu s$, $V_{GS}=-4V$	---	13	---	ns
Q_{rr}	Reverse Recovery Charge	$V_R=800V$, $I_{SD}=40A$	---	343	---	nC

Note :

1.The EAS data shows Max. rating . The test condition is $V_{DD}=100V$, $V_{GS}=10V$, $L=30mH$, $I_{AS}=11A$.

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

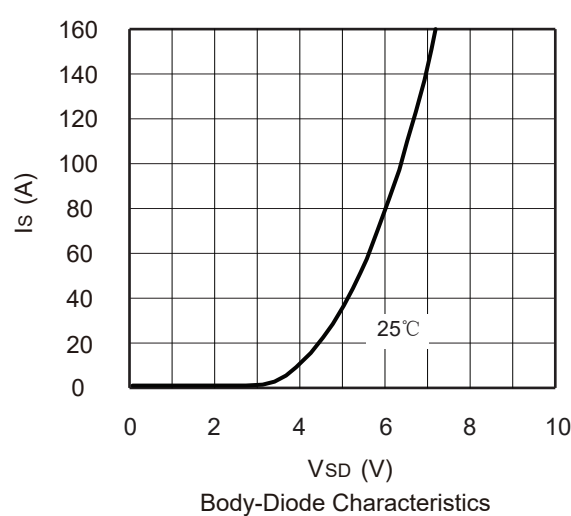
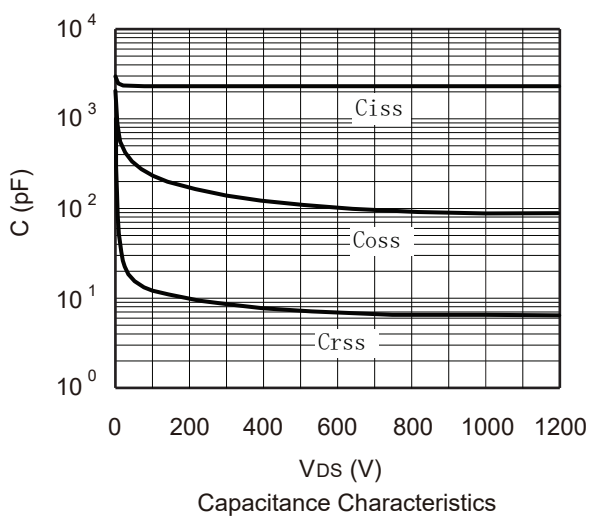
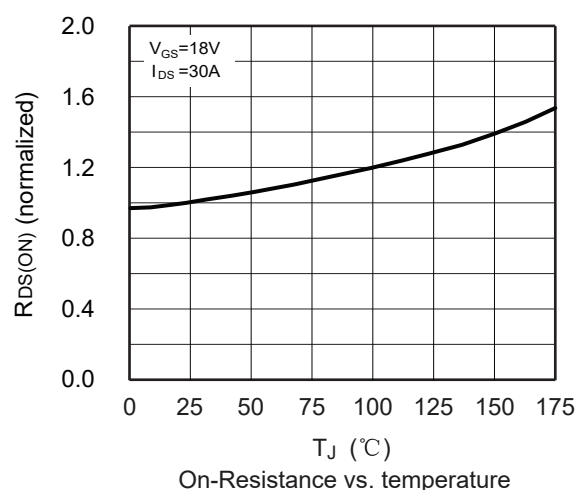
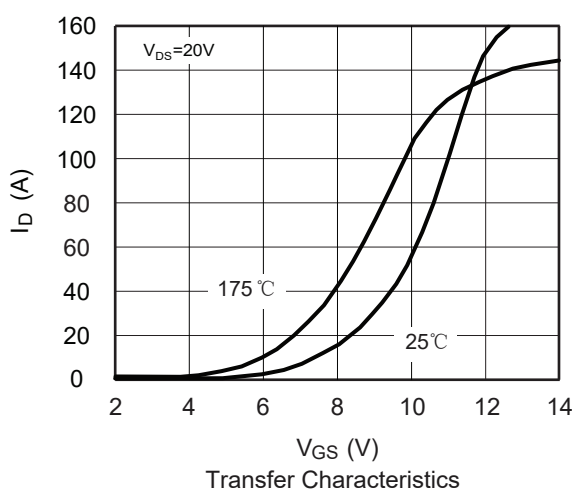
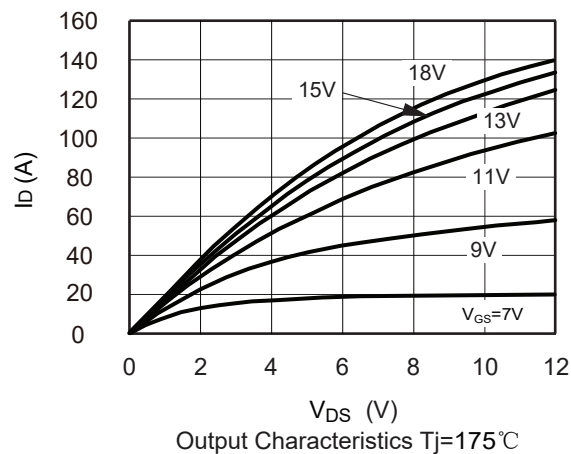
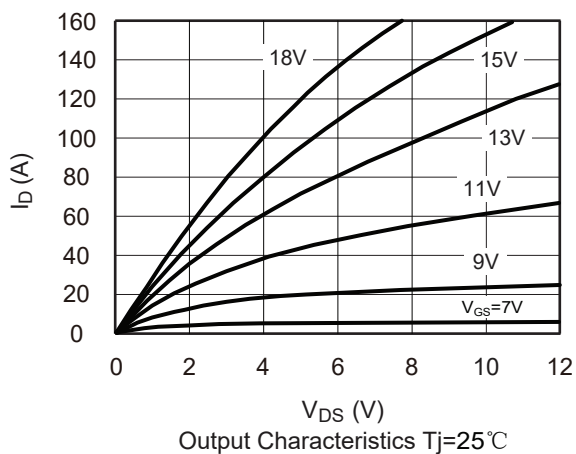
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Cmos reserves the right to improve product design ,functions and reliability without notice.Please refer to the latest version of specification.

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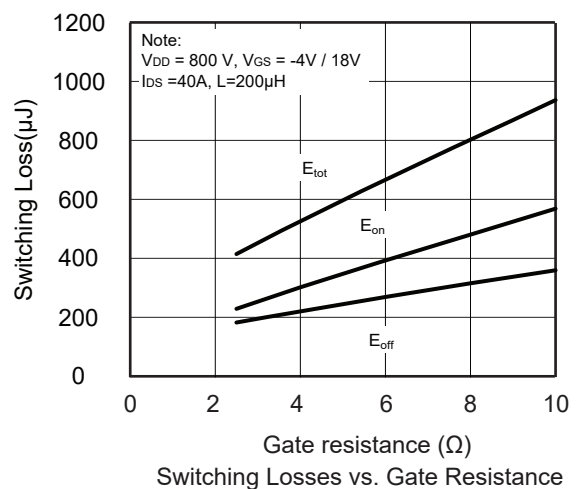
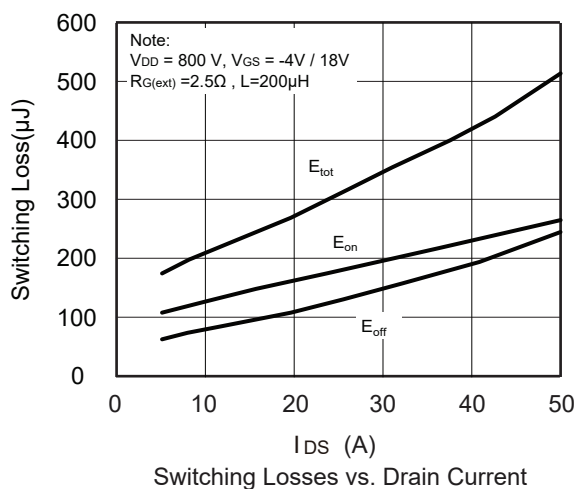
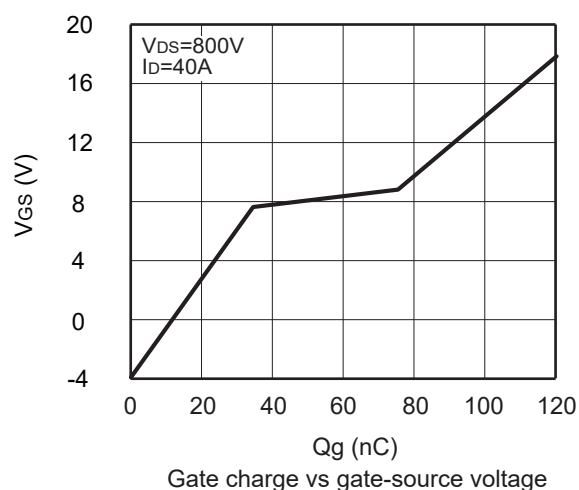
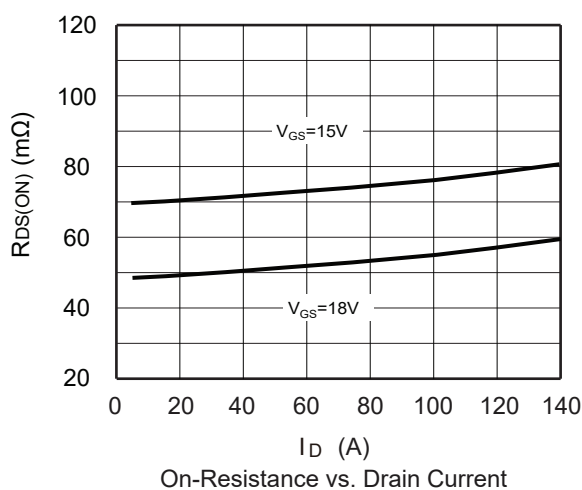
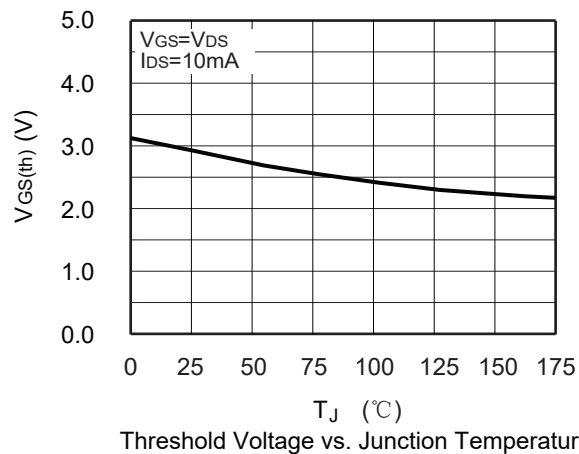
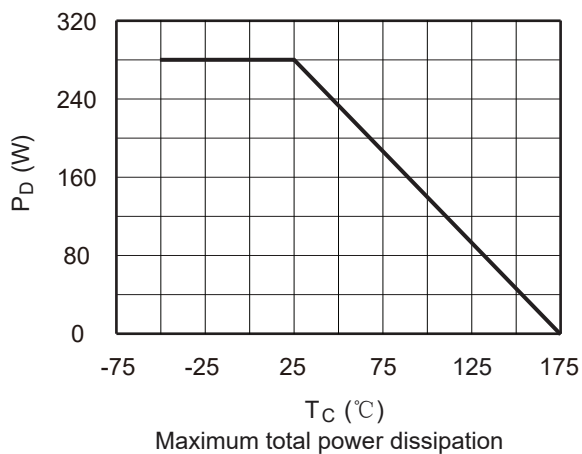
Typical Characteristics



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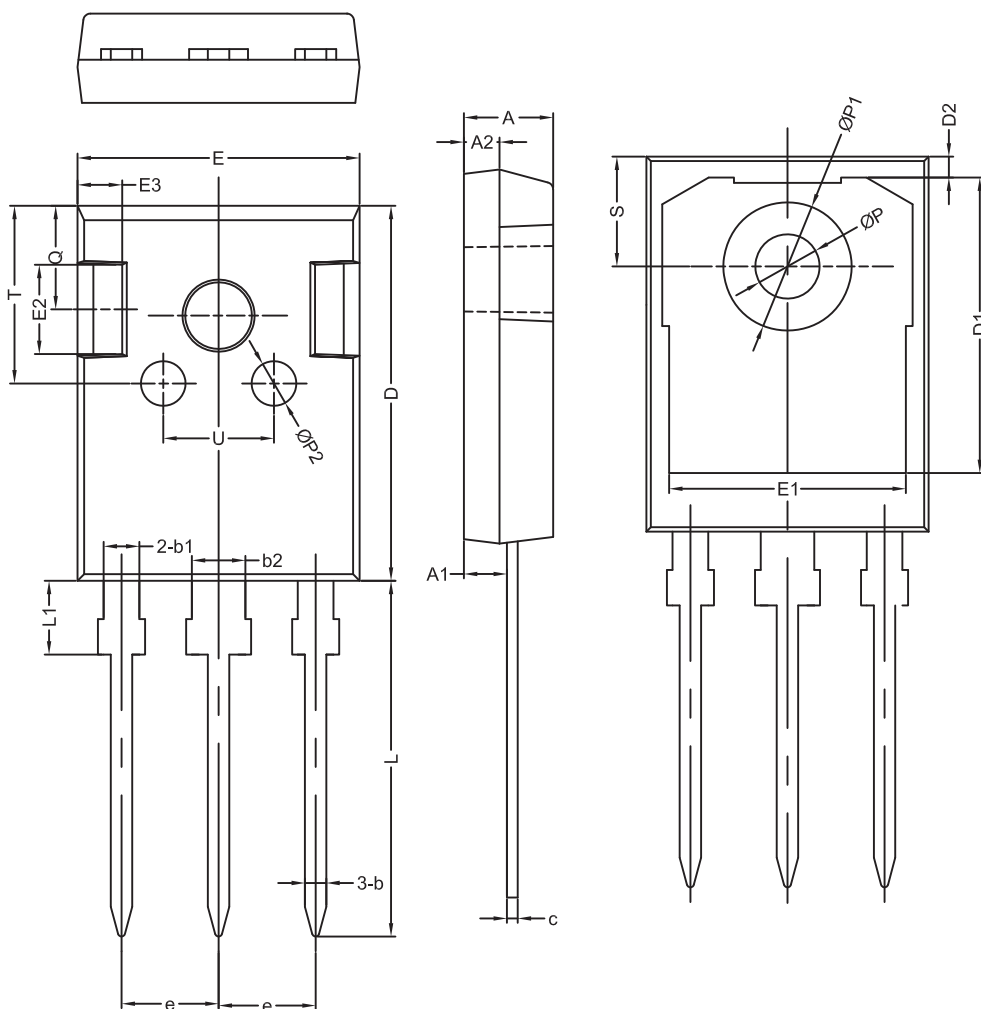
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Package Dimension

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	

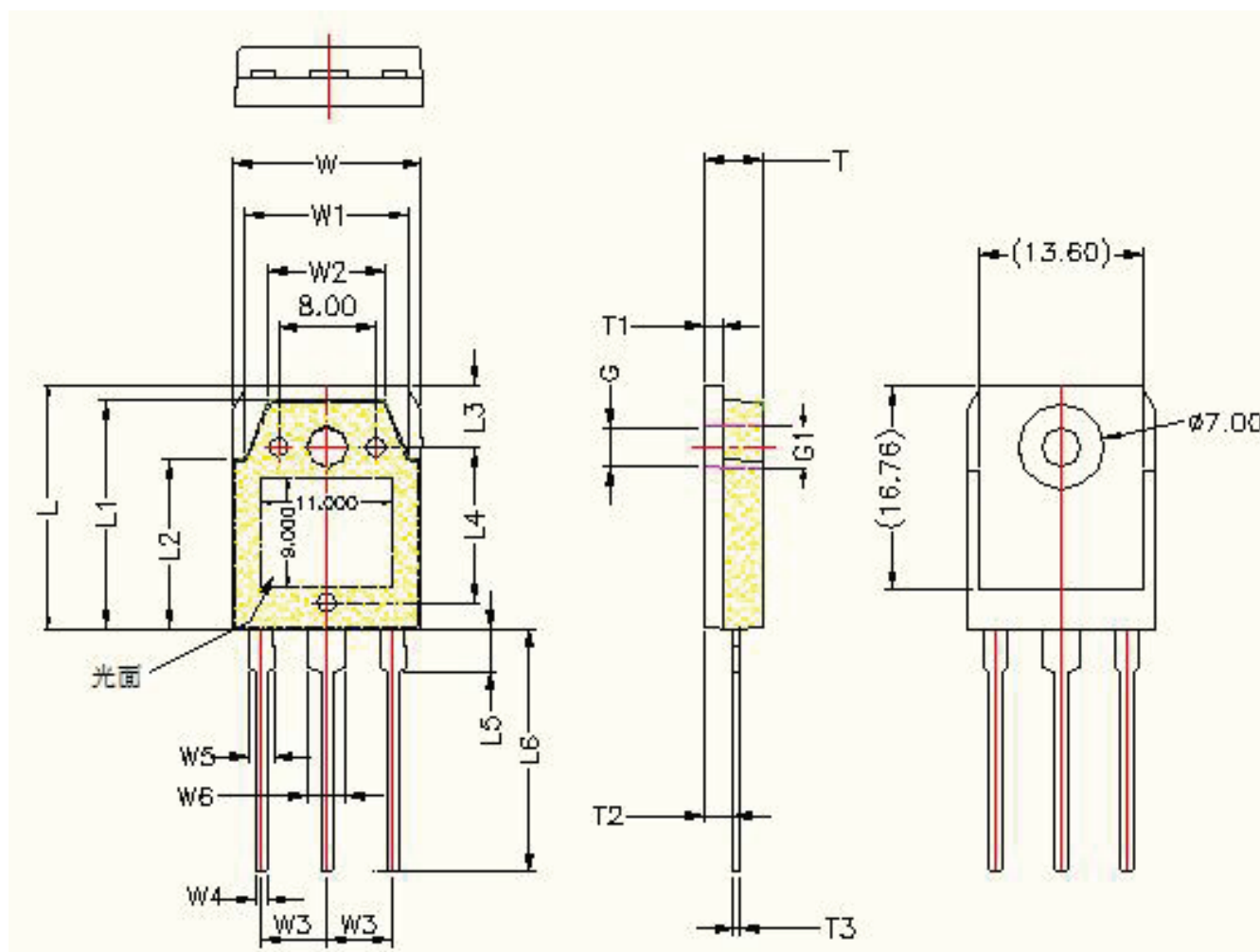
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Package Dimension

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		