

CMHG65R027/CMAG65R027

650V, 27mΩ typ., 75A 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 switching speed with a low gate charge
- Fast intrinsic diode with low reverse recovery
- 100% Avalanche Tested
- RoHS Compliant

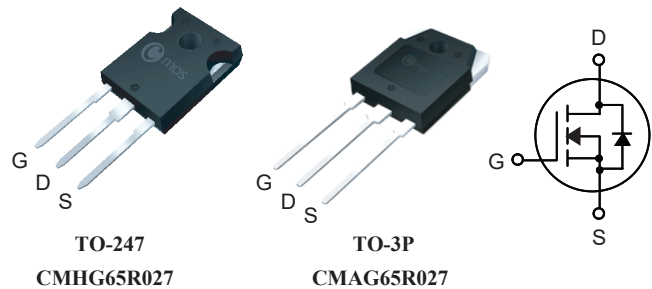
Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	38mΩ	75A

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	-5/+18	V
$I_D@T_C=25^\circ C$	Continuous Drain Current	75	A
$I_D@T_C=100^\circ C$	Continuous Drain Current	53	A
I_{DM}	Pulsed Drain Current	220	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	275	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	---	0.55	$^\circ C/W$

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 =1mA	650	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =18V , I _D =35A	---	27	38	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =11.7mA (tested after V _{GS} =22V, 1ms pulse)	1.8	2.5	4.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =650V , V _{GS} =0V	---	1	100	μA
		V _{DS} =650V , V _{GS} =0V , T _J =175°C	---	10	---	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =+22V , V _{DS} =0V	---	---	+100	nA
		V _{GS} = -10V , V _{DS} =0V	---	---	-100	
g _{fs}	Forward Transconductance	V _{DS} =20V , I _D =20A	---	70	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	3.0	---	Ω
Q _{g(tot)}	Total Gate Charge	V _{DS} =400V , I _D =35A V _{GS} =-5V / 18V	---	91	---	nC
Q _{gs}	Gate-Source Charge		---	25	---	
Q _{gd}	Gate-Drain Charge		---	21	---	
E _{oss}	Stored Energy in Output Capacitance	V _{DS} =0V to 400V	---	20.6	---	μJ
C _{o(er)}	Energy Related Output Capacitance	V _{GS} =0V	---	257	---	pF
C _{o(tr)}	Time Related Output Capacitance	Inductive load	---	372	---	
E _{on}	Turn-on Switching Energy	V _{DS} =400V I _D =35A V _{GS} =-5V / 18V	---	274	---	μJ
E _{off}	Turn-off Switching Energy		---	134	---	
E _{tot}	Total Switching Energy		---	408	---	
T _{d(on)}	Turn-On Delay Time	R _G =5.6Ω FWD = 650V 20A SiC Diode Inductive load	---	20	---	ns
T _r	Rise Time		---	37	---	
T _{d(off)}	Turn-Off Delay Time		---	40	---	
T _f	Fall Time		---	9	---	
C _{iss}	Input Capacitance	V _{DS} =400V , V _{GS} =0V , f=250kHz	---	1850	---	pF
C _{oss}	Output Capacitance		---	210	---	
C _{rss}	Reverse Transfer Capacitance		---	11	---	

Diode Characteristics

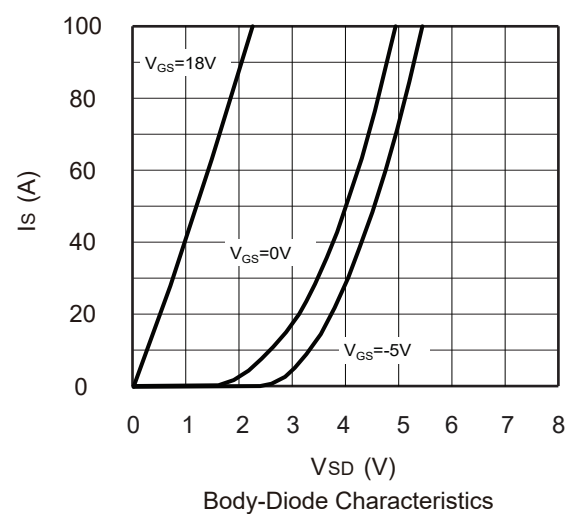
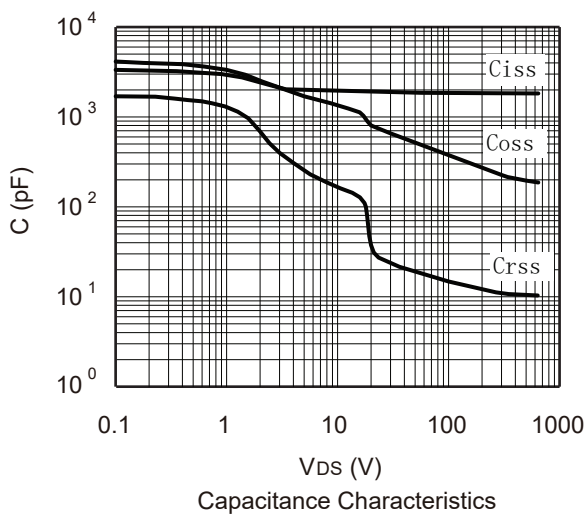
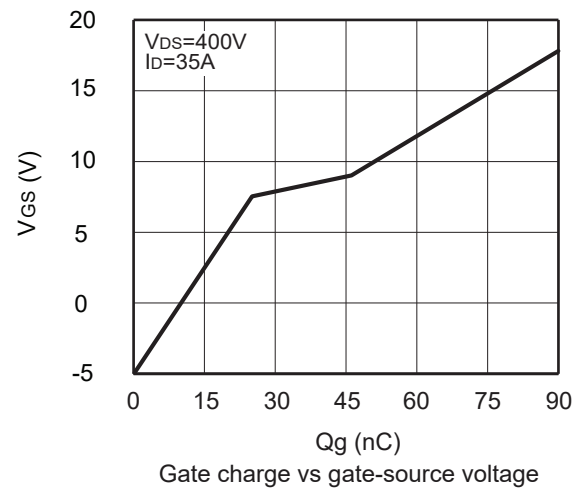
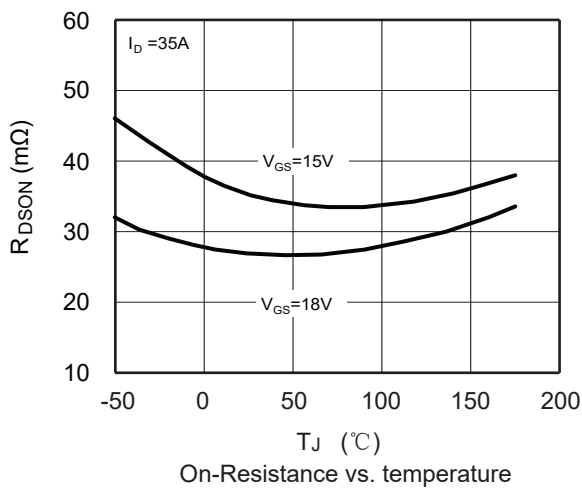
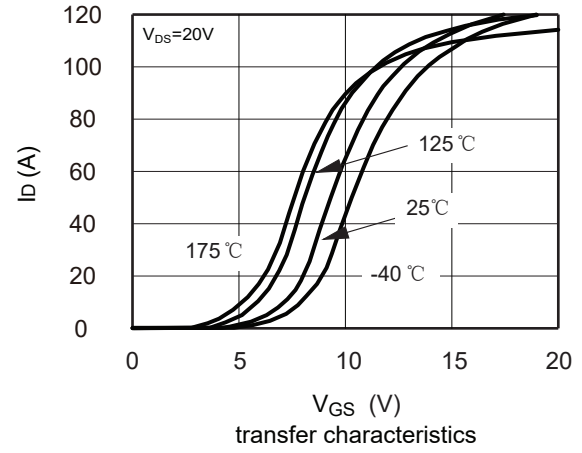
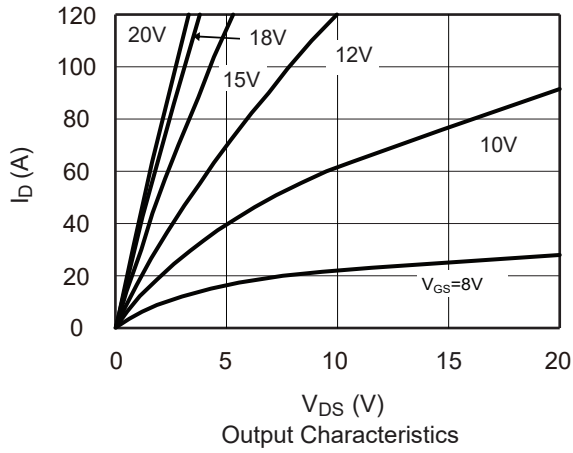
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	75	A
I _{SM}	Pulsed Source Current		---	---	220	A
V _{SD}	Diode Forward Voltage	V _{GS} =-5V , I _{SD} =35A , T _J =25°C	---	4.2	---	V
t _{rr}	Reverse Recovery Time	di/dt=1000A/μs , Includes Q _{OSS}	---	20	---	ns
Q _{rr}	Reverse Recovery Charge	V _{DD} =400V , I _{SD} =35A	---	141	---	nC

Note :

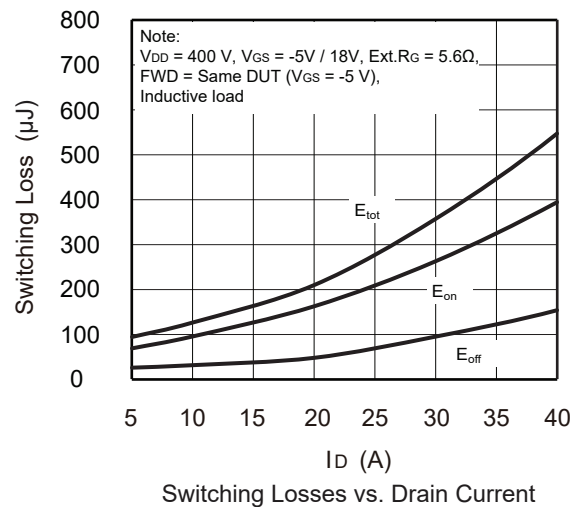
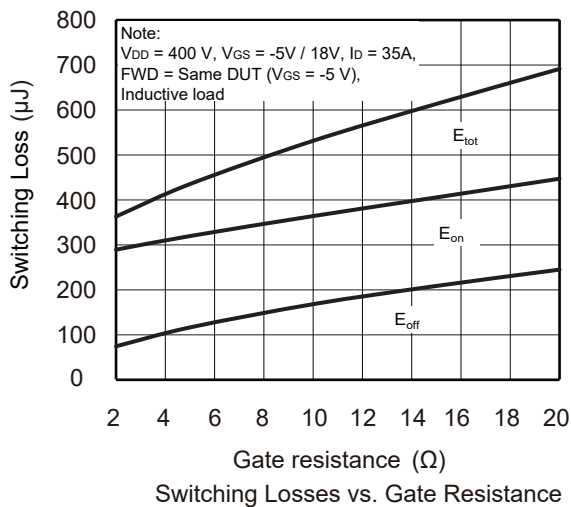
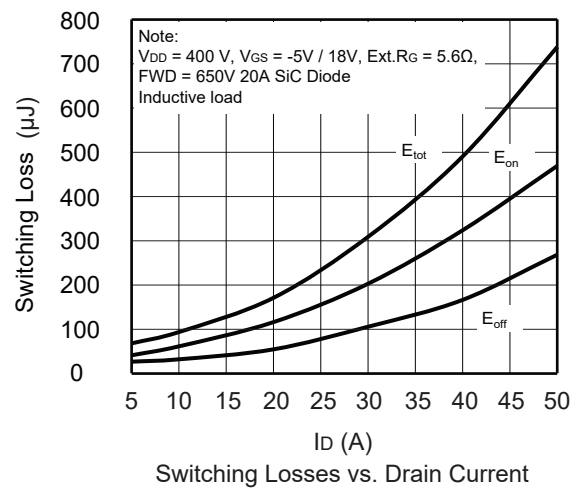
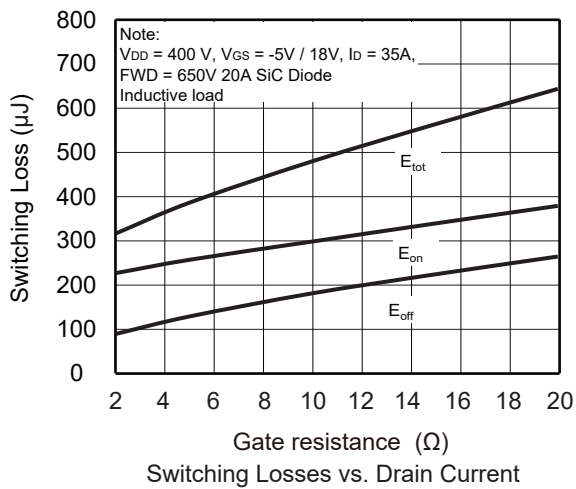
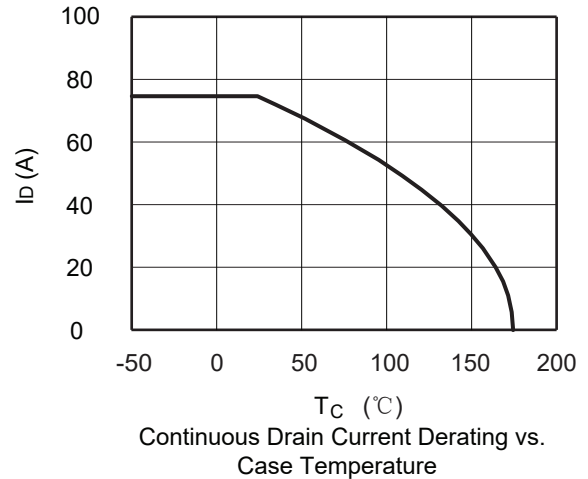
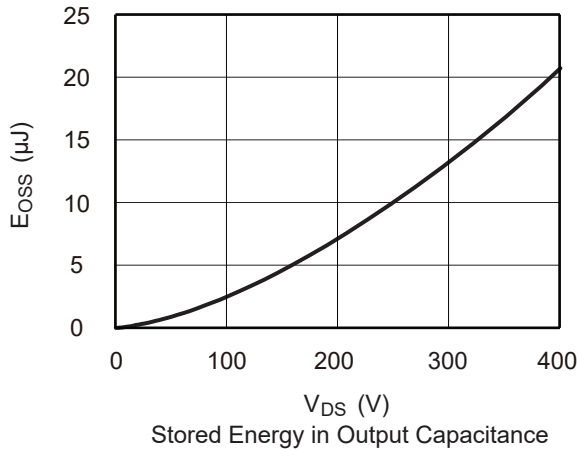
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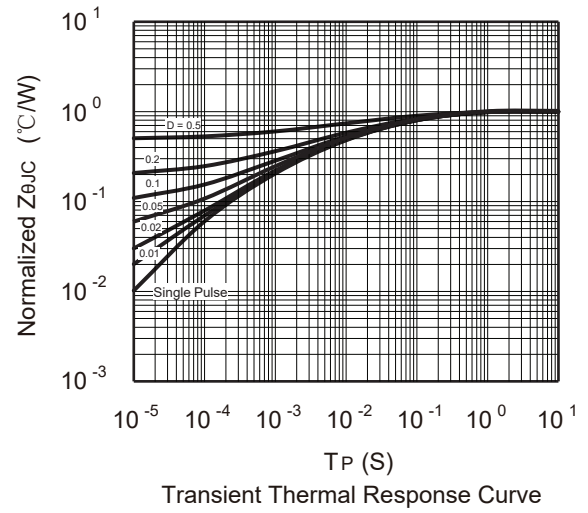
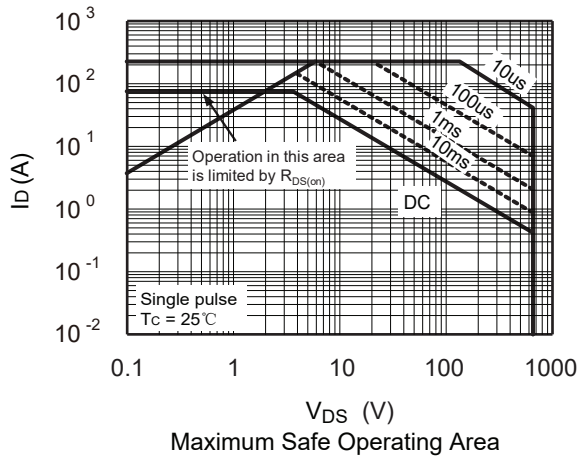
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Typical Characteristics


Typical Characteristics



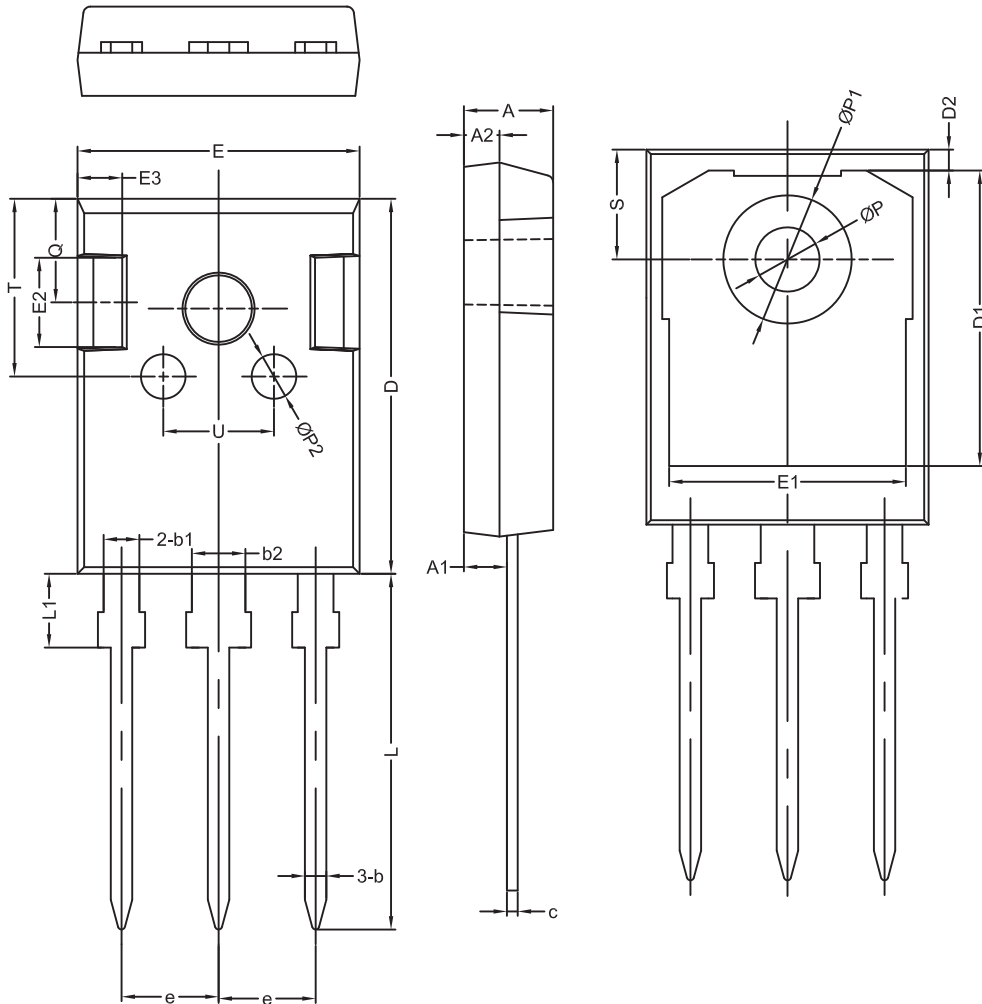
Typical Characteristics



Package Dimension

TO-247

Unit :mm

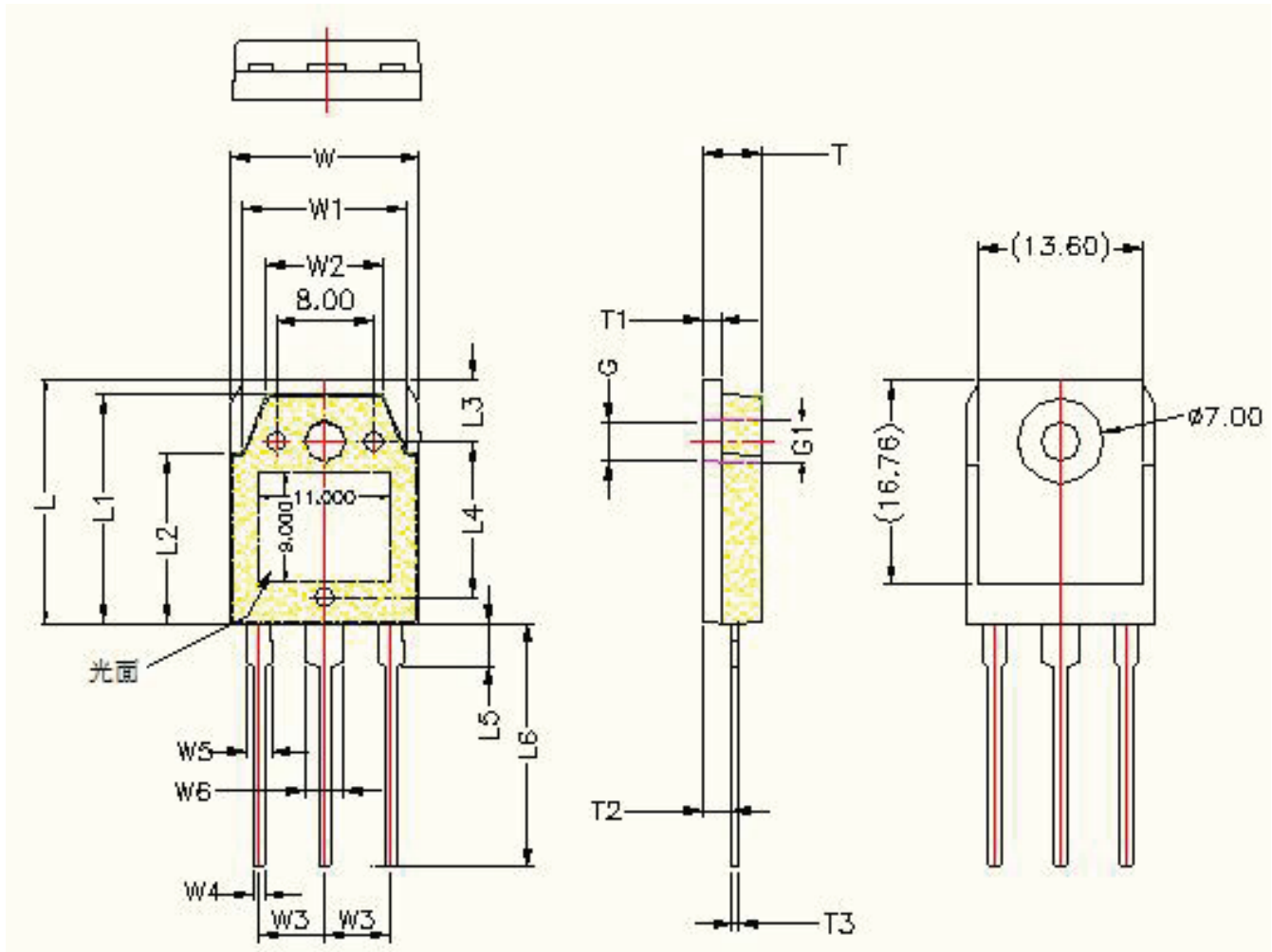


符号	机械尺寸/mm			符号	机械尺寸/mm		
	最小值	典型值	最大值		最小值	典型值	最大值
A	4.80	5.00	5.20	E2		5.00	
A1	2.21	2.41	2.61	E3		2.50	
A2	1.90	2.00	2.10	e		5.44	
b	1.10	1.20	1.35	L	19.42	19.92	20.42
b1		2.00		L1		4.13	
b2		3.00		P	3.50	3.60	3.70
c	0.55	0.60	0.75	P1		7.19	
D	20.80	21.00	21.20	P2		2.50	
D1		16.55		Q		5.80	
D2		1.20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

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		