

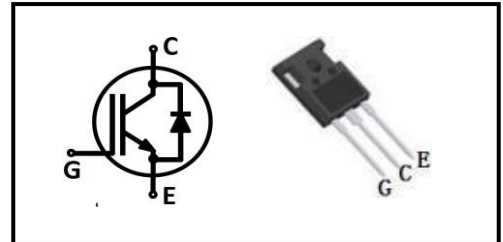
## 特征/Features

- 饱和压降为正温度系数，易于并联使用  
Easy parallel switching capability due to positive temperature coefficient in  $V_{CEsat}$
- 低饱和压降，快速开关  
Low  $V_{CEsat}$ , fast switching
- 高可靠性及热稳定性，良好的参数一致性  
High ruggedness, good thermal stability very tight parameter distribution

型号/Type	打标/Marking	封装/Package
QMGW40N65E	QMG40N65E	TO-247

## 应用领域/Applications

- 空气压缩机/Climate Compressor
- 不间断电源/UPS
- 功率因数校正/PFC
- PTC加热器/PTC Heater



## 最大额定值/Maximum Rated Values <sup>1</sup>

Item	Symbol	Value	Unit
集电极-发射极电压 Collector-emitter voltage	$V_{CE}$	650	V
集电极电流 DC collector current <sup>2</sup>	$I_C$	80	A
$T_C=25^\circ\text{C}$		40	
$T_C=100^\circ\text{C}$			
集电极脉冲电流 Pulsed collector current <sup>3</sup>	$I_{Cpuls}$	160	
栅极-发射极电压 Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
瞬态栅极-发射极电压 Transient Gate-emitter voltage ( $t_p \leq 10\mu\text{s}$ )		$\pm 30$	
耗散功率 Power dissipation	$P_{tot}$	250	W
$T_C=25^\circ\text{C}$		125	
$T_C=100^\circ\text{C}$			
工作结温 Operating junction temperature	$T_j$	-55~175	°C
储存温度 Storage temperature	$T_{stg}$	-55~150	

1: Reference standard: JESD-022

2: limited by  $T_{jmax}$

3:  $T_p$  limited by  $T_{jmax}$  ;

## 热学特性/Thermal Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
结-外壳热阻 IGBT thermal resistance, junction-case	$R_{thJC}$	-	-	-	0.6	K/W
结-环境热阻 Thermal Resistance, junction-ambient	$R_{thJA}$	-	-	-	40	

## 电学特性/Electrical Characteristics

### 静态特性/Static Characteristics (at $T_j=25^\circ\text{C}$ unless otherwise specified)

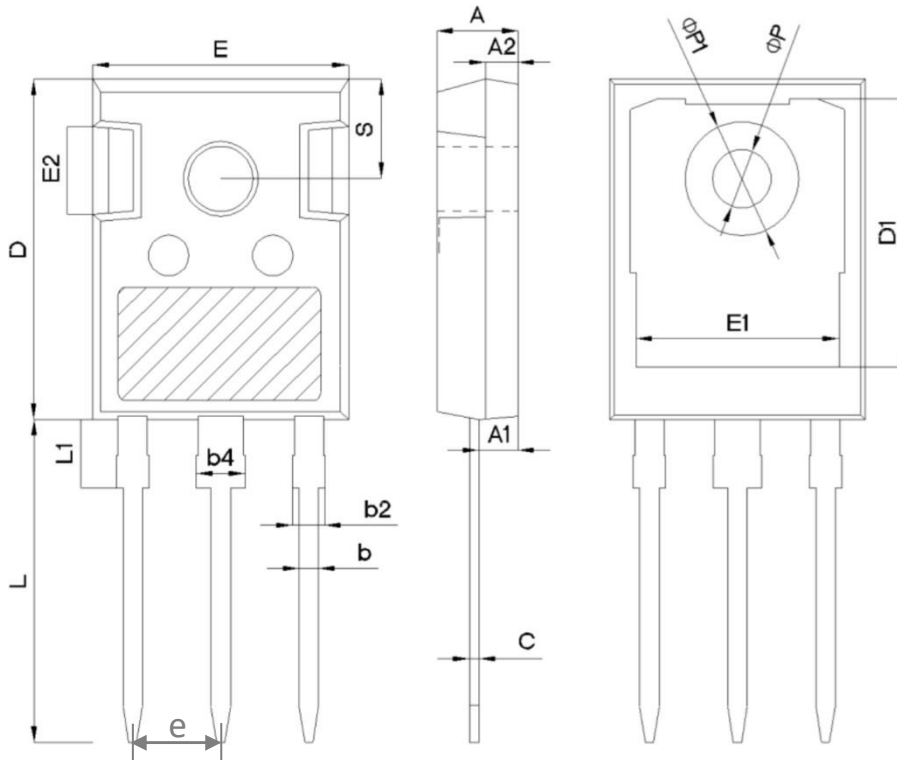
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
集电极-发射极击穿电压 Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V,$ $I_C=0.25mA$	650	-	-	V
集电极-发射极饱和电压 Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C}$	-	1.50	-	
		$T_j=125^\circ\text{C}$	-	1.70	-	
		$T_j=150^\circ\text{C}$	-	1.80	-	
阈值电压 G-E threshold voltage	$V_{GE(th)}$	$I_C=0.8mA,$ $V_{CE}=V_{GE}$	-	5.5	-	V
集电极-发射极漏电流 C-E leakage current	$I_{CES}$	$V_{CE}=650V, V_{GE}=0V$ $T_j=25^\circ\text{C}$	-	-	0.1	mA
		$T_j=150^\circ\text{C}$	-	-	1	
栅极-发射极漏电流 G-E leakage current	$I_{GES}$	$V_{CE}=0V,$ $V_{GE}=20V$	-	-	250	nA
跨导 Transconductance	$g_{FS}$	$V_{CE}=20V,$ $I_C=40A$	-	-	-	S

## 动态特性/Dynamic Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
输入电容 Input capacitance	$C_{iss}$	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1MHz$	-	2700	-	pF
输出电容 Output capacitance	$C_{oss}$		-	120	-	
反馈电容 Reverse transfer capacitance	$C_{rSS}$		-	40	-	
栅电荷 Gate charge	$Q_G$	$V_{CC}=100V,$ $I_C=40A, V_{GE}=15V$	-	110	-	nC

## IGBT开关特性(感性负载)/IGBT Switching Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
开通延迟时间 Turn-on delay time	$t_{d(on)}$	$T_j=25\text{ }^\circ\text{C}$ , $V_{CC}=400\text{V}$ , $I_C=40\text{A}$ , $V_{GE}=0/15\text{V}$ , $R_G=10\Omega$ , <i>Inductive load</i>	-	85	-	ns	
上升时间 Rise time	$t_r$		-	55	-		
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	190	-		
下降时间 Fall time	$t_f$			-	40	-	
开通损耗 Turn-on energy	$E_{on}$			-	0.94	-	mJ
关断损耗 Turn-off energy	$E_{off}$			-	0.85	-	
开关损耗 Total switching energy	$E_{ts}$			-	1.79	-	
开通延迟时间 Turn-on delay time	$t_{d(on)}$		$T_j=150\text{ }^\circ\text{C}$ , $V_{CC}=400\text{V}$ , $I_C=40\text{A}$ , $V_{GE}=0/15\text{V}$ , $R_G=10\Omega$ , <i>Inductive load</i>	-	85	-	ns
上升时间 Rise time	$t_r$			-	70	-	
关断延迟时间 Turn-off delay time	$t_{d(off)}$	-		210	-		
下降时间 Fall time	$t_f$			-	80	-	
开通损耗 Turn-on energy	$E_{on}$			-	1.94	-	mJ
关断损耗 Turn-off energy	$E_{off}$			-	1.12	-	
开关损耗 Total switching energy	$E_{ts}$			-	3.06	-	

**TO-247**


SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b <sub>2</sub>	1.91	2.01	2.21
b <sub>4</sub>	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

**修订历史/Revision History:**

修订 /Revision	主题（自上次修订以来的主要变化） /Subjects (major changes since last revision)	日期 /Date
1.0	Initial Version	2022-09
2.0	Update the English and Chinese versions	2023-04

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