

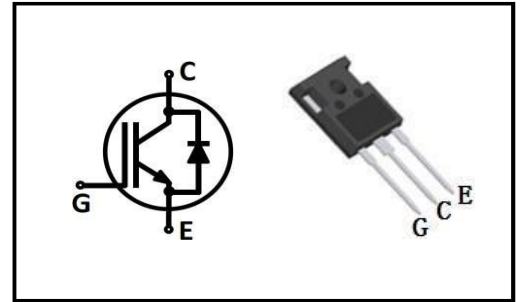
特征/Features

- 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 reliability and thermal stability, good parameter consistency

应用领域/Applications

- 太阳能转换器/Solar energy converter
- 不间断电源/UPS
- 焊接转换器/Welding converter

型号/Type	打标/Marking	封装/Package
QMW75N65E	QMW75N65E	TO-247



最大额定值/Maximum Rated Values¹

Item	Symbol	Value	Unit
集电极-发射极电压 Collector-emitter voltage	V_{CE}	650	V
集电极电流 ₂ DC collector current	I_C	90	A
$T_C=25^\circ\text{C}$			
$T_C=100^\circ\text{C}$		75	
集电极脉冲电流 ³ Pulsed collector current	I_{Cpuls}	300	
二极管正向电流 ₂ Diode forward current	I_F	90	
$T_C=25^\circ\text{C}$			
$T_C=100^\circ\text{C}$		75	
二极管脉冲电流 ³ Diode pulsed current	I_{Fpuls}	300	
栅极-发射极电压 Gate-emitter voltage	V_{GE}	± 20	V
瞬态栅极-发射极电压 Transient Gate-emitter voltage ($t_p \leq 10\mu\text{s}$)		± 30	
耗散功率 Power dissipation	P_{tot}	395	W
$T_C=25^\circ\text{C}$			
$T_C=100^\circ\text{C}$		197	
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}	-	-	-	0.38	K/W
二极管结-外壳热阻 Diode thermal resistance, junction-case	R_{thJCD}	-	-	-	0.45	
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	$V_{CE(sat)}$	$V_{GE}=15V, I_C=75A$ $T_j=25^\circ\text{C}$	-	1.55	1.90	
		$T_j=125^\circ\text{C}$	-	1.88	-	
		$T_j=150^\circ\text{C}$	-	1.96	-	
二极管正向压降 Diode forward voltage	V_F	$V_{GE}=0V, I_F=75A$ $T_j=25^\circ\text{C}$	-	1.61	2.10	
		$T_j=125^\circ\text{C}$	-	1.54	-	
		$T_j=150^\circ\text{C}$	-	1.50	-	
阈值电压 G-E threshold voltage	$V_{GE(th)}$	$I_C=1.2mA,$ $V_{CE}=V_{GE}$	4.4	5.4	6.4	
集电极-发射极漏电流 C-E leakage current	I_{CES}	$V_{CE}=650V,$ $V_{GE}=0V$ $T_j=25^\circ\text{C}$	-	-	0.01	mA
		$T_j=150^\circ\text{C}$	-	-	1.0	
栅极-发射极漏电流 G-E leakage current	I_{GES}	$V_{CE}=0V,$ $V_{GE}=20V$	-	-	250	nA

动态特性/Dynamic Characteristics

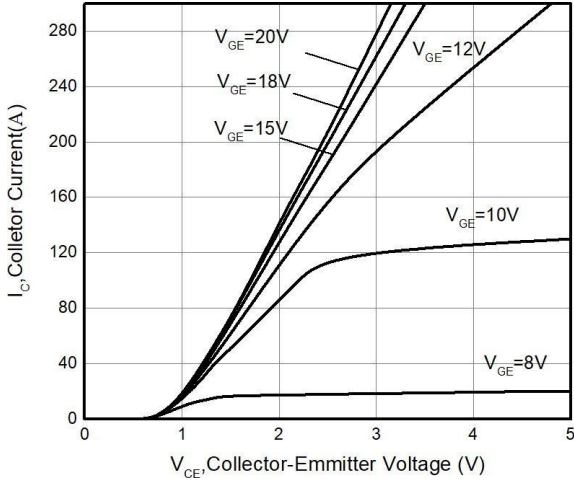
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
输入电容 Input capacitance	C_{iss}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	5052	-	pF
输出电容 Output capacitance	C_{oss}		-	244	-	
反馈电容 Reverse transfer capacitance	C_{rss}		-	68	-	
栅电荷 Gate charge	Q_G	$V_{CC}=100V,$ $I_C=75A, V_{GE}=15V$	-	209	-	nC

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

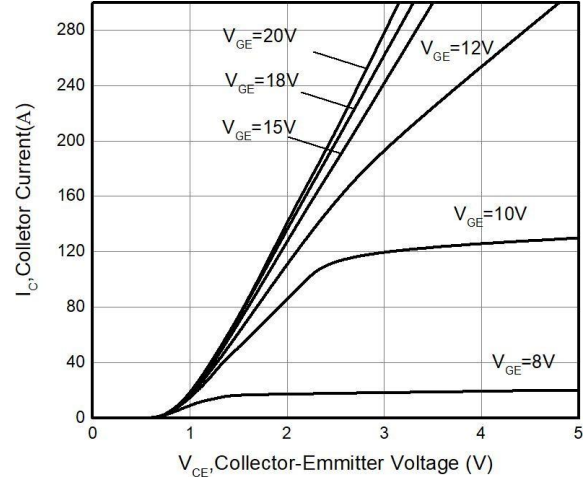
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
开通延迟时间 Turn-on delay time	$t_{d(on)}$	$T_j=25^{\circ}\text{C}$, $V_{CC}=400\text{V}$, $I_C=75\text{A}$, $V_{GE}=0/15\text{V}$, $R_G=10\Omega$, Inductive load	-	106	-	ns	
上升时间 Rise time	t_r		-	83	-		
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	245	-		
下降时间 Fall time	t_f			-	100	-	
开通损耗 Turn-on energy	E_{on}			-	2.16	-	mJ
关断损耗 Turn-off energy	E_{off}			-	2.37	-	
开关损耗 Total switching energy	E_{ts}			-	4.53	-	
开通延迟时间 Turn-on delay time	$t_{d(on)}$		$T_j=150^{\circ}\text{C}$, $V_{CC}=400\text{V}$, $I_C=75\text{A}$, $V_{GE}=0/15\text{V}$, $R_G=10\Omega$, Inductive load	-	103	-	ns
上升时间 Rise time	t_r			-	83	-	
关断延迟时间 Turn-off delay time	$t_{d(off)}$	-		314	-		
下降时间 Fall time	t_f			-	111	-	
开通损耗 Turn-on energy	E_{on}			-	3.31	-	mJ
关断损耗 Turn-off energy	E_{off}			-	2.72	-	
开关损耗 Total switching energy	E_{ts}			-	6.03	-	

二极管开关特性/Diode Characteristics

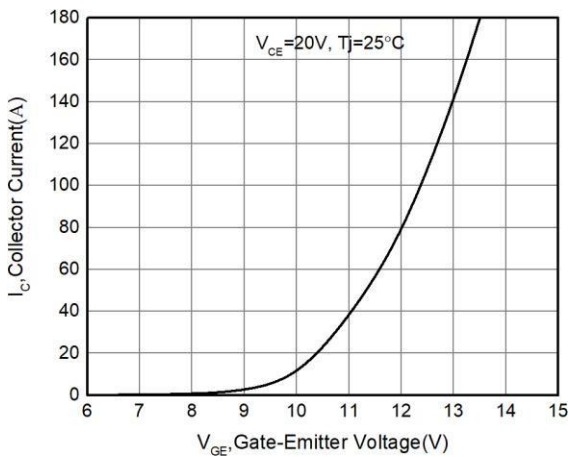
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
反向恢复时间 Diode reverse recovery time	t_{rr}	$T_j=25^{\circ}\text{C}$, $V_R=400\text{V}$, $I_F=75\text{A}$, $di_F/dt=720\text{A}/\mu\text{s}$	-	67	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	0.64	-	μC
反向恢复峰值电流 Diode peak reverse recovery current	I_{rrm}		-	16.5	-	A
反向恢复时间 Diode reverse recovery time	t_{rr}	$T_j=150^{\circ}\text{C}$, $V_R=400\text{V}$, $I_F=75\text{A}$, $di_F/dt=720\text{A}/\mu\text{s}$	-	110	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	2.06	-	μC
反向恢复峰值电流 Diode peak reverse recovery current	I_{rrm}		-	29.5	-	A



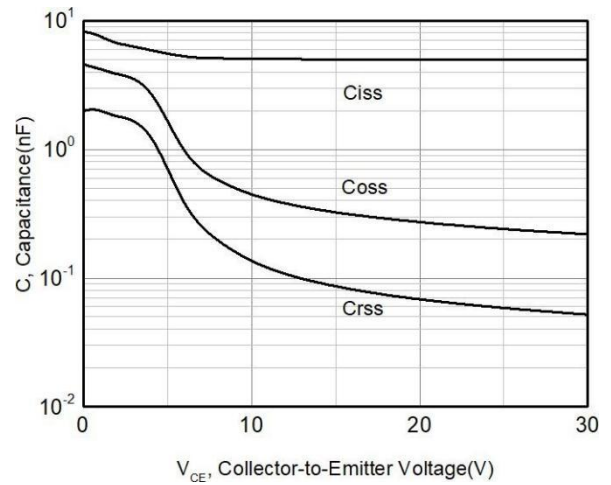
**Figure 1. 典型输出特性/
Typical output characteristic
($T_j=25^\circ\text{C}$)**



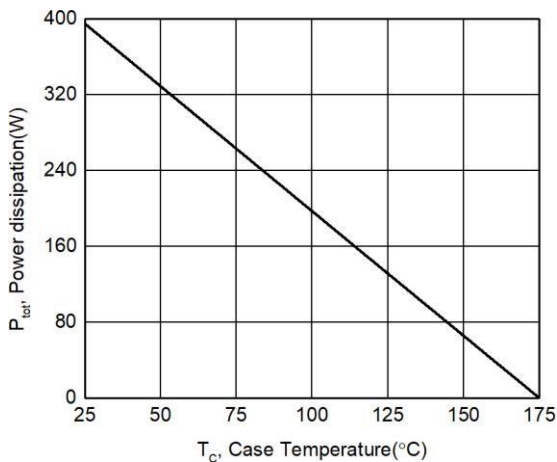
**Figure 2. 典型输出特性/
Typical output characteristic
($T_j=150^\circ\text{C}$)**



**Figure 3. 典型输出特性/
Typical output characteristic
($T_j=25^\circ\text{C}$)**



**Figure 4. 电容特性/
Capacitance characteristics
($V_{GE}=0\text{V}$, $f=1\text{MHz}$)**



**Figure 5. 功耗与外壳温度的关系/
Power dissipation as a function of case
temperature ($T_j \leq 175^\circ\text{C}$)**

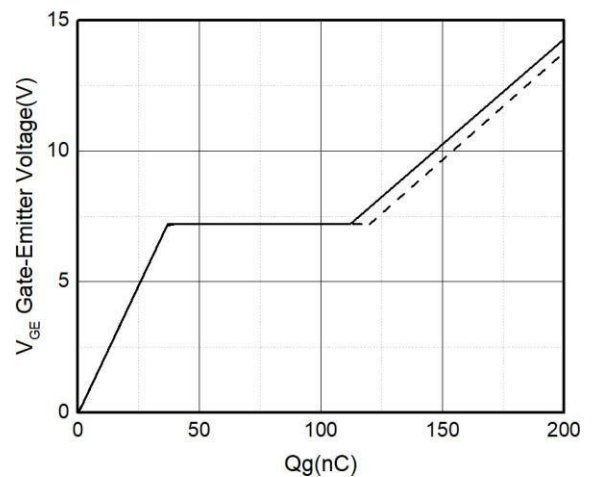
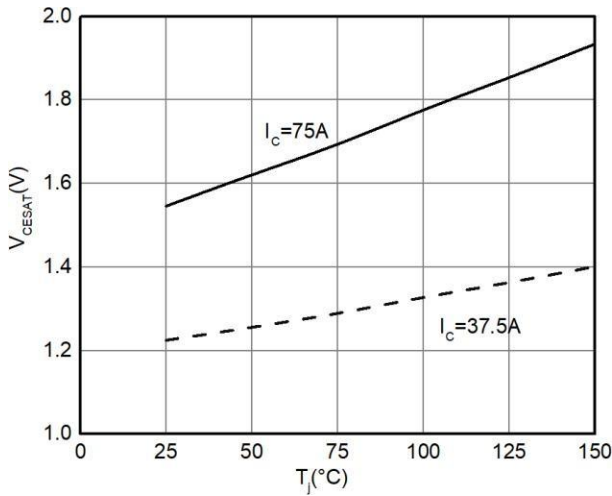
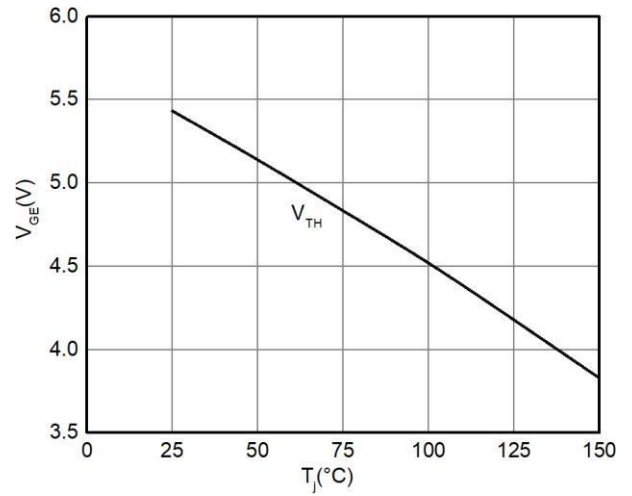


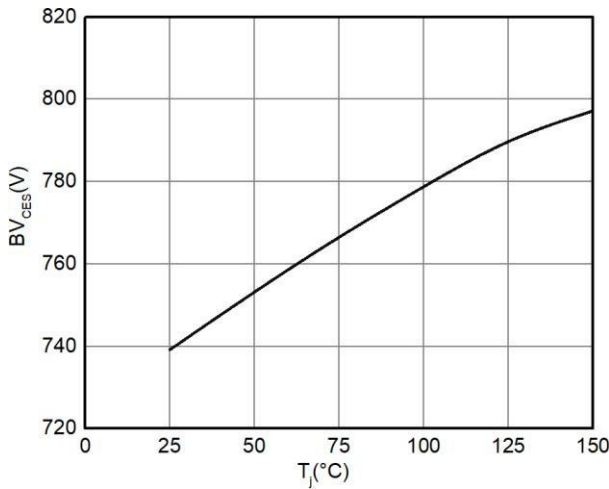
Figure 6. 典型栅极电荷/Typical gate charge



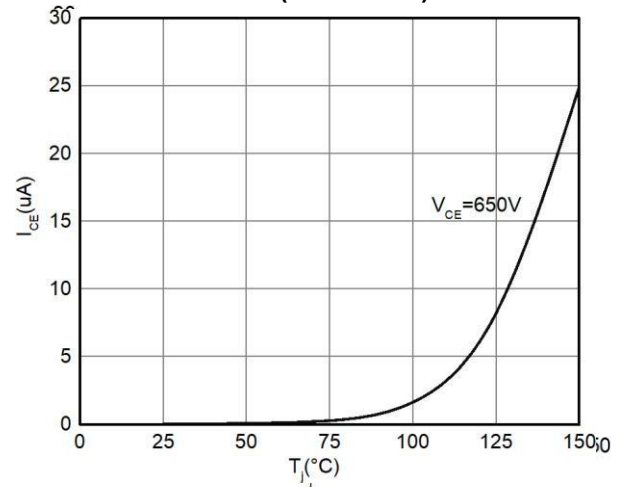
**Figure 7. V_{CESAT} 作为结温的函数曲线/
 V_{CESAT} as a function of junction temperature
($V_{GE}=15V$)**



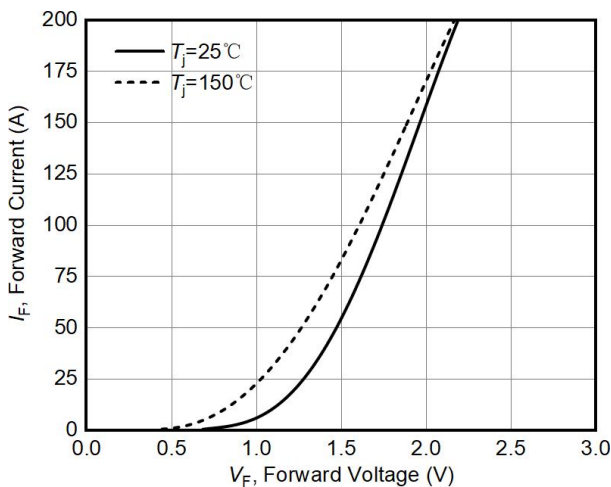
**Figure 8. V_{TH} 与结温的关系曲线/
 V_{TH} as a function of junction temperature
($I_{CE}=250\mu A$)**



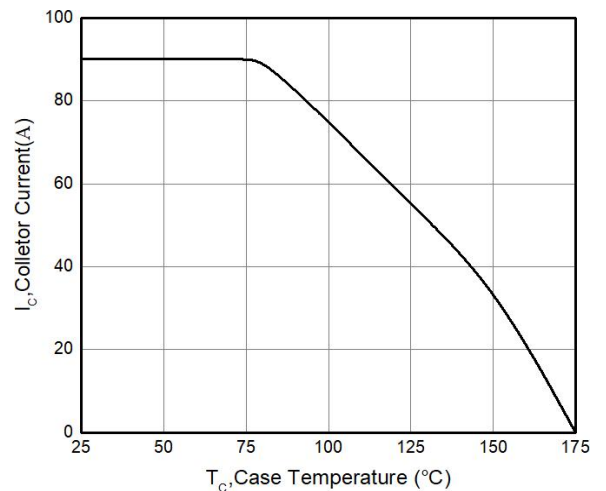
**Figure 9. BV 作为结温的函数曲线/
BV as a function of junction temperature
($I_{CE}=250\mu A$)**



**Figure 10. I_{CES} 漏电流与结温的关系曲线/
 I_{CES} leakage current as a function of junction
temperature**



**Figure 11. 典型二极管正向电流与正向电压的函数关系/
Typical diode forward current as a function
of forward voltage**



**Figure 12. 集电极电流与外壳温度的关系
/Collector current as a function of case
temperature ($V_{GE} \geq 15V, T_j \leq 175^\circ C$)**

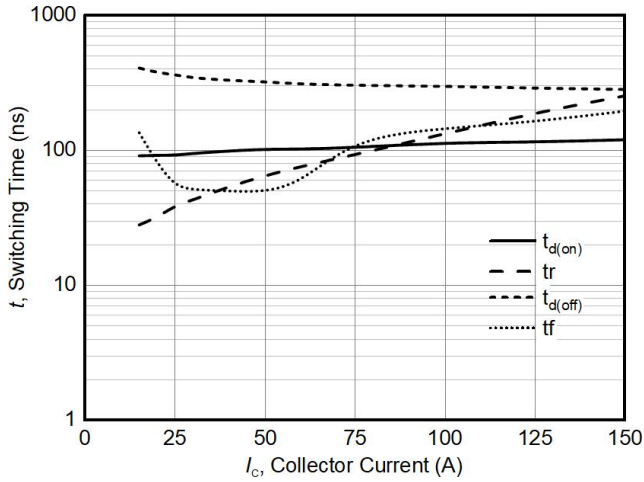


Figure 13. 典型开关时间与集电极电流的关系/Typical switching times as a function of collector current
 $(T_j=150\text{ }^\circ\text{C}, V_{CE}=400\text{V}, R_{G(on)}=R_{G(off)}=10\Omega)$

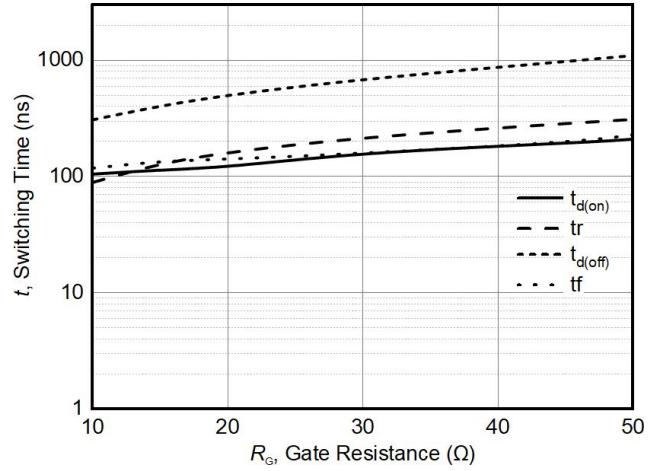


Figure 14. 典型开关时间与栅极电阻的关系/Typical switching times as a function of gate resistance
 $(T_j=150\text{ }^\circ\text{C}, V_{CE}=400\text{V}, I_C=75\text{A})$

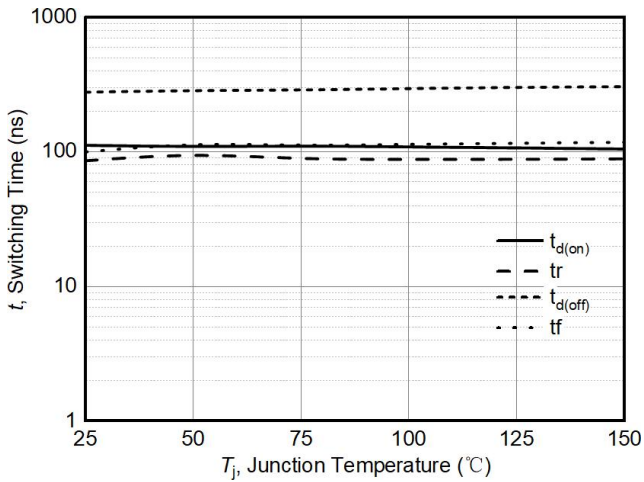


Figure 15. 典型开关时间与结温的关系/Typical switching times as a function of junction temperature
 $(V_{CE}=400\text{V}, I_C=75\text{A}, R_{G(on)}=R_{G(off)}=10\Omega)$

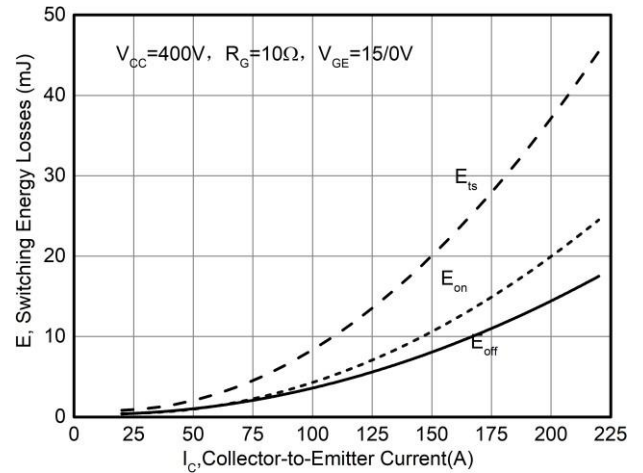


Figure 16. E_{on}, E_{off} 作为 I_c 的函数曲线
 $/E_{on}, E_{off}$ as a function of $I_c(T_j=25\text{ }^\circ\text{C})$

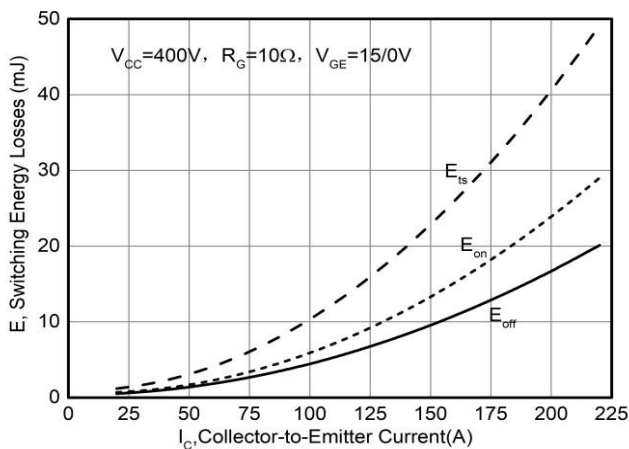


Figure 17. E_{on}, E_{off} 作为 I_c 的函数曲线
 $/E_{on}, E_{off}$ as a function of $I_c(T_j=150\text{ }^\circ\text{C})$

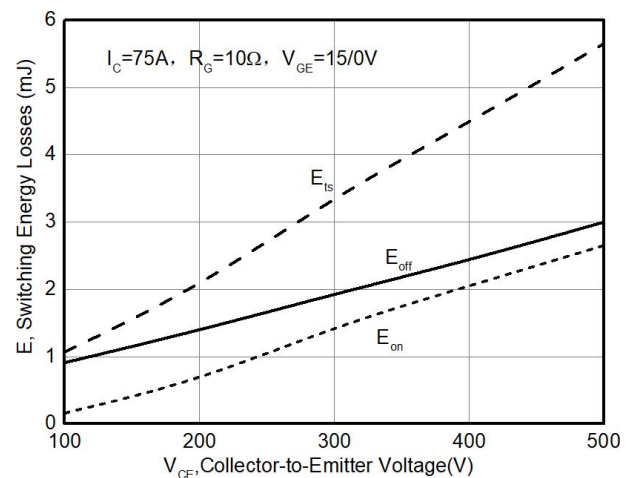


Figure 18. E_{on}, E_{off} 作为 V_{CE} 的函数曲线
 $/E_{on}, E_{off}$ as a function of $V_{CE}(T_j=25\text{ }^\circ\text{C})$

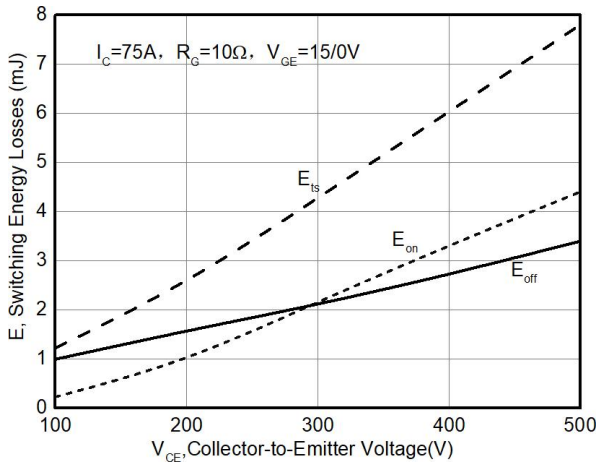


Figure 19. E_{on}, E_{off} 作为 V_{CE} 的函数曲线 / E_{on}, E_{off} as a function of V_{CE} ($T_j=150^\circ\text{C}$)

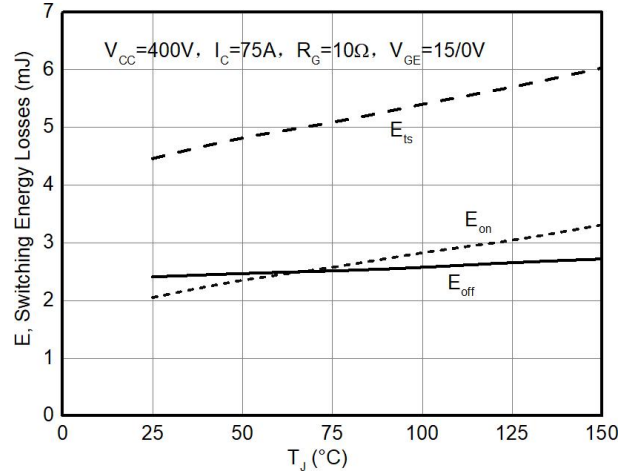


Figure 20. E_{on}, E_{off} 作为 T_j 的函数曲线 / E_{on}, E_{off} as a function of T_j

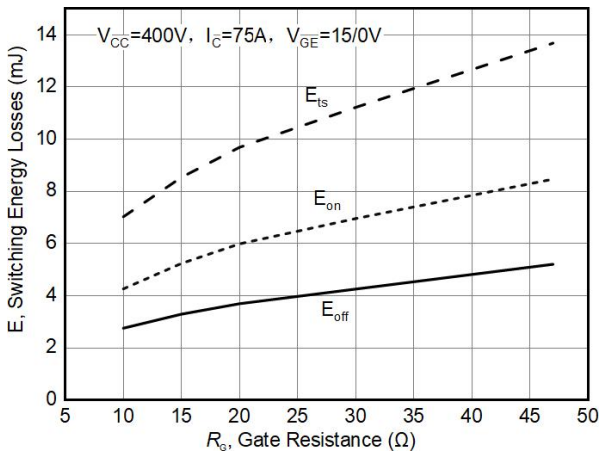


Figure 21. E_{on}, E_{off} 作为栅极电阻的函数 / E_{on}, E_{off} as a function of gate resistance ($T_j=150^\circ\text{C}$)

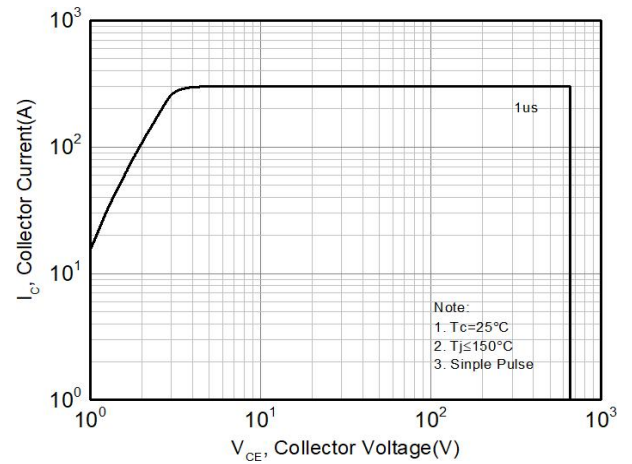
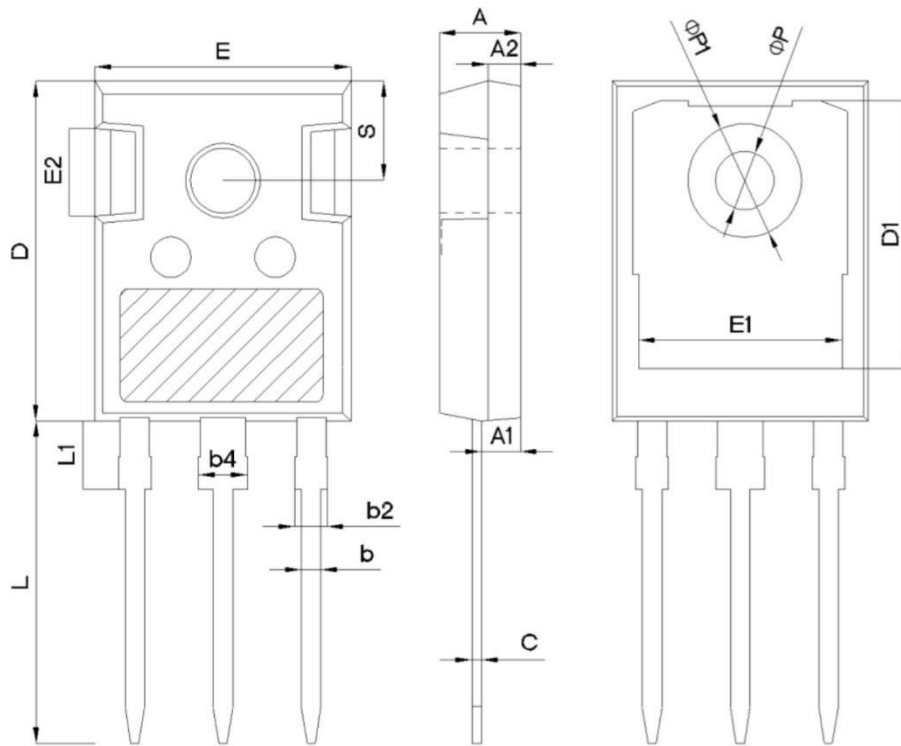


Figure 22. 正向偏置安全工作区/FBSOA

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
b2	1.91	2.01	2.21
b4	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	2022-03
2.0	Update the English and Chinese versions	2023-04

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