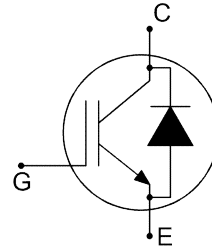
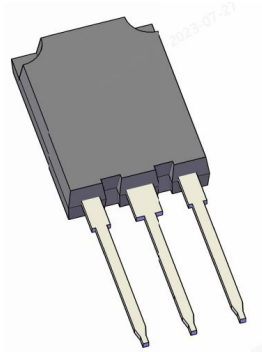


Q package: 750V 200A IGBT and emitter controlled diode



等效电路图
Equivalent Circuit Schematic

Features:

- 750V 200A, $V_{CE(sat)} = 1.35V @ 25^{\circ}C$
- Micro pattern trench/FS technology
- Low switching losses
- High SC capability
- High reliability
- High creepage distance

产品特性:

- 750V 200A, $V_{CE(sat)} = 1.35V @ 25^{\circ}C$
- 微沟槽/场终止技术
- 低开关损耗
- 高短路能力
- 高可靠性
- 高爬电距离

Typical Applications:

- Automotive Applications
- Motor Drives
- Inverters

典型应用:

- 汽车应用
- 电机驱动
- 逆变器

Product validation:

- Qualified for automotive applications
- Qualified according to AEC-Q101

产品验证:

- 车规产品
- 符合 AEC-Q101 标准

Package
Characteristic Values / 性能参数

min. typ. max.

Internal emitter inductance measured 5 mm from case 距离外壳 5mm 的内部发射器电感测量		L_E		13.0		nH
Storage temperature 存储温度		T_{stg}	-55		150	°C
Soldering temperature 焊接温度	Wave soldering 1.6mm from case for 10s				260	°C
Thermal resistance, junction-ambient 结-环境热阻		$R_{th(j-a)}$			40	K/W

IGBT, Inverter / IGBT, 逆变部分
Maximum Rated Values / 最大标称参数

Collector-emitter voltage 集电极-发射极电压		V_{CE}		750		V
Continuous DC collector current, limited by T_{vjmax} 集电极连续直流电流, 受 T_{vjmax} 限制	$T_C=25^\circ\text{C}$	I_C		200		A
	$T_C=100^\circ\text{C}$			200		A
Pulsed collector current, t_p limited by T_{vjmax} 脉冲集电极电流, t_p 受 T_{vjmax} 限制		I_{Cpulse}		400		A
Turn-off safe operating area 关断安全操作区域	$V_{CE} \leq 750\text{V}, t_p = 1\mu\text{s}, T_{vj} \leq 175^\circ\text{C}$			400		A
Gate-emitter voltage 栅极发射极电压		V_{GE}		± 20		V
Transient gate-emitter voltage 瞬态栅极发射极电压	$t_p < 0.1\mu\text{s}, D < 0.01$	V_{GE}		± 30		V
Short-circuit withstand time 短路耐受时间	$V_{CC} \leq 470\text{V}, V_{GE} = 15\text{V}$, Allowed number of short circuits < 1000, Time between short circuits $\geq 1.0\text{s}, T_{vj} = 25^\circ\text{C}$	t_{SC}		5		us
Power dissipation 功率损耗	$T_C=25^\circ\text{C}$	P_{tot}		2500		W
	$T_C=100^\circ\text{C}$			1200		

Characteristic Values / 性能参数

min. typ. max.

Collector-emitter saturation voltage 集电极-发射极饱和压降	$I_C=200\text{A}, V_{GE}=15\text{V}$	$T_{vj}=25^\circ\text{C}$ $T_{vj}=175^\circ\text{C}$	V_{CEsat}		1.35 1.50		V
Gate-emitter threshold voltage 门极阈值电压	$V_{CE}=V_{GE}, I_C=4\text{mA}$	$T_{vj}=25^\circ\text{C}$	V_{GEth}	5.00	6.00	7.00	V
Zero gate-voltage collector current 零栅极电压集电极电流	$V_{CE}=750\text{V}, V_{GE}=0\text{V}$	$T_{vj}=25^\circ\text{C}$	I_{CES}			200	uA
		$T_{vj}=175^\circ\text{C}$			6000		
Gate-emitter leakage current 门极-发射极漏电流	$V_{CE}=0\text{V}, V_{GE}=20\text{V}$	$T_{vj}=25^\circ\text{C}$	I_{GES}			200	nA
Transconductance 跨导	$I_C=200\text{A}, V_{CE}=15\text{V}$		g_{fs}		/		S

Short-circuit collector current 短路集电极电流	$V_{CE} \leq 470V$, $V_{GE} = 15V$, $t_{sc} \leq 5\mu s$, Allowed number of short circuits < 1000, Time between short circuits $\geq 1.0s$, $T_{vj} = 25^\circ C$	I_{SC}	-	1030	-	A
Input capacitance 输入电容	$V_{CE} = 25V$, $V_{GE} = 0V$, $f = 100kHz$ $T_{vj} = 25^\circ C$	C_{ies}	-	29.2	-	nF
Output capacitance 输出电容	$V_{CE} = 25V$, $V_{GE} = 0V$, $f = 100kHz$ $T_{vj} = 25^\circ C$	C_{oes}	-	1.5	-	nF
Reverse transfer capacitance 反向传输电容	$V_{CE} = 25V$, $V_{GE} = 0V$, $f = 100kHz$ $T_{vj} = 25^\circ C$	C_{res}	-	0.11	-	nF
Gate charge 门极电荷	$V_{GE} = -8V \sim +15V$, $V_{CE} = 400V$	Q_G	-	1.1	-	μC
Turn-on delay time 开通延迟时间	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$ $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	t_{don}	-	69.6 173.0	-	ns
Rise time(inductive load) 上升时间(感性负载)	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$ $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	t_r	-	157 255	-	ns
Turn-off delay time 关断延迟时间	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$, $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	t_{doff}	-	497 632	-	ns
Fall time(inductive load) 下降时间(感性负载)	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$ $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	t_f	-	84 128	-	ns
Turn-on energy 开通损耗	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$ $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	E_{on}	-	23 38.6	-	mJ
Turn-off energy 关断损耗	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$ $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	E_{off}	-	11.4 16.2	-	mJ
Total switching energy 总开关损耗	$I_C = 200A$, $V_{CE} = 470V$ $V_{GE} = -8V/15V$ $T_{vj} = 25^\circ C$ $R_{Gon} = 5.0\Omega$, $R_{Goff} = 12.0\Omega$ $T_{vj} = 175^\circ C$ $L_\sigma = 50nH$, $C_\sigma = 30pF$	E_{ts}	-	34.4 54.8	-	mJ
IGBT Thermal resistance, junction to case IGBT 结-壳热阻		R_{thjc}	-	0.058	-	K/W
Operating junction Temperature 工作温度		T_{vj}	-40	-	175	$^\circ C$

Diode, Inverter / 二极管, 逆变部分

Maximum Rated Values / 最大标称参数

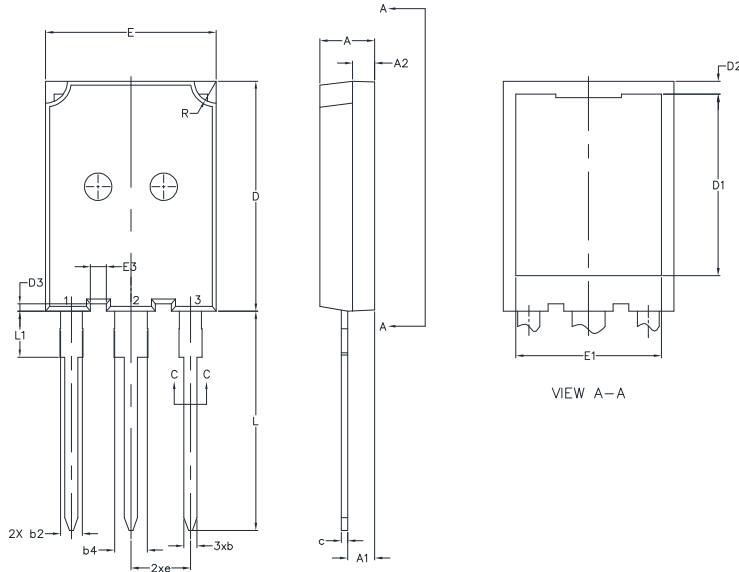
Diode forward current, limited by T_{vjmax} 二极管正向电流, 受 T_{vjmax} 限制	$T_C = 25^\circ C$	I_F	200	A
	$T_C = 100^\circ C$		200	
Diode pulsed current, limited by T_{vjmax} 二极管脉冲电流, 受 T_{vjmax} 限制		I_{Fpulse}	400	A
Power dissipation 功率耗散	$T_C = 25^\circ C$	P_{tot}	650	W
	$T_C = 100^\circ C$		320	

Characteristic Values / 性能参数

		min.	typ.	max.		
Diode Forward voltage ¹⁾ 二极管正向电压	$I_F=200A, V_{GE}=0V$ $T_{vj}=25^{\circ}C$ $T_{vj}=175^{\circ}C$	V_F		1.74 1.67	1.9	V
Diode Recovery charge 二极管反向恢复电荷	$I_F=200A, V_R < 470V, R_{Gon}=5 \Omega$ $-di_F/dt=992 A/\mu s(T_{vj}=25^{\circ}C)$ $-di_F/dt=794 A/\mu s(T_{vj}=175^{\circ}C)$	Q_R	-	4.5 11.6	-	μC
Diode peak reverse recovery current 二极管反向恢复峰值电流	$I_F=200A, V_R < 470V, R_{Gon}=5 \Omega$ $-di_F/dt=992 A/\mu s(T_{vj}=25^{\circ}C)$ $-di_F/dt=794 A/\mu s(T_{vj}=175^{\circ}C)$	I_{rrm}	-	28 42	-	A
Reverse recovery energy 反向恢复损耗	$V_R < 470V, V_{GE} = -8V/15V, R_{Gon}=5.0\Omega$ $L_{\sigma}=40nH, C_{\sigma}=30pF,$ $-di_F/dt=992 A/\mu s(T_{vj}=25^{\circ}C)$ $-di_F/dt=794 A/\mu s(T_{vj}=175^{\circ}C)$	E_{rec}	-	1.2 2.8	-	mJ
Diode thermal resistance, junction to case 二极管结-壳热阻		R_{thjc}	-	0.23	-	K/W
Operating junction Temperature 工作温度		T_{vj}	-40	-	175	$^{\circ}C$

Package Dimension / 封装尺寸

Dimensions in Millimeters / 毫米为单位



DIMENSIONS	DIMENSIONS			
	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A	4.90	5.10	0.193	0.201
A1	2.31	2.51	0.091	0.099
A2	1.90	2.10	0.075	0.083
b	1.16	1.26	0.046	0.050
b2	1.96	2.06	0.077	0.081
b4	2.96	3.06	0.117	0.120
c	0.59	0.66	0.023	0.026
D	20.90	21.10	0.823	0.831
D1	16.25	16.85	0.640	0.663
D2	1.05	1.35	0.041	0.053
D3	0.58	0.78	0.023	0.031
E	15.75	15.90	0.620	0.626
E1	13.26	—	0.552	—
E3	1.35	1.55	0.053	0.061
e	5.44BSC		0.214BSC	
L	19.80	20.10	0.780	0.791
L1	—	4.30	—	0.169
R	1.90	2.10	0.075	0.083