**IGBT**

# HSG40N65LJ

**Features/特性**

* 650V，40A
* VCE(sat)(typ.)=1.8V @VGE=15V,IC=40A
* 具有正温度系数的VCE(sat)

VCE(sat) with positive temperature coefficient

* 包括快速软恢复反并联前馈

Including fast & soft recovery anti-parallel FWD

* 快开关速度

High speed switching

**Applications/应用**

* 不间断电源

Uninterruptible power supply

* 电机驱动逆变器

Inverter for motor drive

* 交、直流伺服驱动放大器

AC and DC servo drive amplifier

**Equivalent Circuit Schematic/等效电路图**

**IGBT-Absolute Maximum Ratings (@ TC = 25°C unless otherwise specified)**

# HSG40N65LJ



|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Parameter** | **Value** | **Units** |
| VCES | Collector-Emitter Voltage集电极-发射极电压 | 650 | V |
| VGES | Gate-Emitter Peak Voltage栅极-发射极峰值电压 | ±30 | V |
| IC | DC collector current, limited by Tvjmax集电极直流电流受最大结温限制 | TC = 100°C | 40 |  |
| ICM | Pulsed collector current, tp limited by Tvjmax集电极脉冲电流脉宽受最大结温限制 | 120 | A |
| Ptot | Maximum Power Dissipation最大耗散功率 | TC = 25°C | 246 | W |
| TC = 100°C | 123 | W |
| TJ | Operating Junction Temperature工作结温 | -45 to 175 | ℃ |
| TSTG | Storage Temperature Range储存温度 | -55 to 150 | ℃ |

**IGBT Characteristics (@ TC = 25°C unless otherwise specified)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Symbol** | **Parameter** | **Conditions** | **Min.** | **Typ.** | **Max.** | **Unit** |
| VCE sat | Collector to Emitter Saturation Voltage集电极-发射极饱和电压 | IC = 40 A, VGE = 15 V |  | 1.8 | 2.4 | V |
| VGE th | Gate-Emitter Threshold Voltage栅极阈值电压 | IC = 250 uA, VCE = VGE | 4.5 |  | 6.3 | V |
| ICES | Collector-Emitter Cut-off Current集电极-发射机截止电流 | VCE = 650 V, VGE = 0 V |  |  | 100.0 | uA |
| IGES | Gate-emitter Leakage Current栅极-发射极漏电流 | VCE = 0 V, VGE = ±30 V |  |  | ±100 | nA |
| QG | Gate Charge栅极电荷 | VCC=480V,IC=40A VGE=15V |  | 82 |  | nC |
| QGE | Gate-Emitter Charge栅极-发射极电荷 |  | 14 |  | nC |
| QGC | Gate-Collector Charge栅极-集电极电荷 |  | 45 |  | nC |
| Cies | Input Capacitance输入电容 | VCE=25V,f=1MHz, VGE=0V |  | 2020 |  | nF |
| Coies | Output Capacitance输出电容 |  | 101 |  | nF |
| Cres | Reverse Transfer Capacitance反向传输电容 |  | 36 |  | nF |
| tdon | Turn-on Delay Time开通延迟时间 | VCE=400V,IC=40A, RG=15Ω,VGE=15V |  | 36 |  | nS |
| tr | Rise Time上升时间 |  | 66 |  | nS |
| tdoff | Turn-off Delay Time关断延迟时间 |  | 137 |  | nS |
| tf | Fall Time下降时间 |  | 35 |  | nS |
| Eon | Turn-On Switching Loss Per Pulse开通损耗能量 |  | 1.4 |  | mJ |
| Eoff | Turn-off Energy Loss Per Pulse关断损耗能量 |  | 0.5 |  | mJ |

**Diode-Absolute Maximum Ratings (@ TC = 25°C unless otherwise specified)**

# HSG40N65LJ



|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Parameter** | **Value** | **Units** |
| VRRM | Repetitive Peak Reverse Voltage反向重复峰值电压 | 650 | V |
| IF | Diode Continuous Forward Current连续正向直流电流 | TC = 100°C | 40 |  |
| IFM | Diode maximum current, tp limited by Tvjmax二极管最大电流，脉宽受最大结温限制 | 120 | A |

**Diode Characteristics (@ TC = 25°C unless otherwise specified)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Symbol** | **Parameter** | **Conditions** | **Min.** | **Typ.** | **Max.** | **Unit** |
| VF | Diode Forward Voltage正向电压 | IF = 40 A |  | 1.5 |  | V |
| Qrr | Recovered Charge恢复电荷 | IF = 40A, VCE = 400 V, RG=30Ω |  | 1106 |  | nC |
| Irr | Peak Reverse Recovery Current反向恢复峰值电流 |  | 18 |  | A |
| trr | Reverse Recovery Time反向恢复时间 |  | 180 |  | nS |

**Thermal Characteristics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Symbol** | **Parameter** | **Min.** | **Typ.** | **Max.** | **Unit** |
| RthJC | Thermal resistance, junction to case for IGBT IGBT 结-外壳热阻 |  |  | 0.6 | ℃/W |
| RthJC | Thermal resistance, junction to case for Diode二极管 结-外壳热阻 |  |  | 1.2 | ℃/W |
| RthJA | Thermal resistance, junction to Ambient结-环境热阻 |  |  | 40 | ℃/W |

# HSG40N65LJ

输🎧特性IGBT

Typical output characteristic IGBT IC = f(VCE)

Tvj = 25 °C

IC(A)

IC(A)

传输特性IGBT

Typical transfer characteristic IGBT IC = f(VGE)

Tvj = 25 °C

VCE(V)

VGE(V)

开关损耗IGBT

output characteristic IGBT Eon = f(RG) ,Eoff = f(RG) VGE=15V,IC=40A,VCE=400V

电容

capacitance as a function of collector-emitter voltage IGBT

C = f(VCE) ,f = 1MHz, VGE = 0 V Tvj = 25 °C

RG(Ω) VCE(V)

E(mJ)

C(pF)

# HSG40N65LJ

正向偏压二极管

Diode forward voltage as a function of junction temperature

VF=f(TC)

PD(W)

功耗

Power dissipation as a function of case temperture PD=f(TC)

## TC(℃) TC(℃)

VF(V)

开关损耗二极管 Switching losses Diode Err = f(di/dt)

Err(uJ)

VGE=15V,IC=40A,VCE=400V

di/dt(A/us)

瞬态热阻抗

normalized transient thermal impedance,iunction to case ZthJC=f(t)

Normalized Thermal Impedance, ZθJC

t, Pulse Width (s)

# HSG40N65LJ

**封装尺寸/package outlines**