

$T_{jmax} = 175^{\circ}\text{C}$ Continuous Operation

- Low V_{CESAT} and Switching Losses
- Automotive Grade FS4 750 V Narrow Mesa IGBT
- Fast Recovery Diode Chip Technologies
- 4.2 kV Isolated DBC Substrate
- Easy to Integrate 6 pack Topology
- This Device is Pb Free and is RoHS Compliant

Typical Applications

- Hybrid and Electric Vehicle Traction Inverter Narrow Mesa IGBT

VE-Trac™ Direct Module NVH680S75L4SPB

MODULE CHARACTERISTICS (T_{vj} = 25°C, Unless Otherwise Specified)

| Symbol | Parameter | Rating | Unit |
|--------------------|---|------------|------|
| T _{vj} | Operating Junction Temperature | -40 to 175 | °C |
| T _{STG} | Storage Temperature | -40 to 125 | °C |
| V _{ISO} | Isolation Voltage (DC, 0 Hz, 1 s) | 4200 | V |
| L _{sCE} | Stray Inductance | 10 | nH |
| RCC'+EE' | Module Lead Resistance, Terminals – Chip | 0.75 | mΩ |
| G | Module Weight | 700 | g |
| CTI | Comparative Tracking Index | >200 | – |
| d _{creep} | Creepage: Terminal to Heatsink Terminal to Terminal | 9.0 9.0 | mm |
| d _{clear} | Clearance: Terminal to Heatsink Terminal to Terminal | 4.5 4.5 | mm |

| Symbol | Parameters | Conditions | Min | Typ | Max | Unit |
|------------|---|--|--------|--------|-----|------|
| Δp | Pressure Drop in Cooling Circuit | 10 L/min, 65°C, 50/50 EGW | – | 95 | – | mbar |
| P (Note 1) | Maximum Pressure in Cooling Loop (relative) | T _{Baseplate} < 40°C T _{Baseplate} > 40°C | – – | – – | 2.5 | |

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CHARACTERISTICS OF INVERSE DIODE (T_{vj} = 25°C, Unless Otherwise Specified)

| Symbol | Parameters | Conditions | Min | Typ | Max | Unit | |
|-----------------|----------------------------------|---|--|-----|------|------|----|
| V _F | Diode Forward Voltage (Terminal) | I _F = 500 A | T _{vj} = 25°C | – | 1.60 | 1.85 | V |
| | Diode Forward Voltage (Chip) | I _F = 500 A | T _{vj} = 25°C | – | 1.53 | 1.78 | |
| | | | T _{vj} = 150°C | – | 1.45 | – | |
| | | I _F = 680 A | T _{vj} = 25°C | – | 1.65 | – | |
| | | | T _{vj} = 150°C | – | 1.61 | – | |
| | | | T _{vj} = 175°C | – | 1.57 | – | |
| E _{rr} | Reverse Recovery Energy | I _F = 500 A, V _R = 400 V, V _{GE} = +15/-8 V, R _{g,on} = 4.7 Ω | di/dt = 3.5 A/nS, T _{vj} = 25°C | – | 3 | – | mJ |
| | | | di/dt = 3.0 A/nS, T _{vj} = 150°C | – | 8 | – | |
| | | | di/dt = 2.8 A/nS, T _{vj} = 175°C | – | 10 | – | |
| Q _{RR} | Recovered Charge | I _F = 500 A, V _R = 400 V, V _{GE} = -8 V, R _{g,on} = 4.7 Ω | di/dt = 3.5 A/nS, T _{vj} = 25°C | – | 11 | – | μC |
| | | | di/dt = 3.0 A/nS, T _{vj} = 150°C | – | 32 | – | |
| | | | di/dt = 2.8 A/nS, T _{vj} = 175°C | – | 38 | – | |
| I _{rr} | Peak Reverse Recovery Current | I _F = 500 A, V _R = 400 V, V _{GE} = -8 V, R _{g,on} = 4.7 Ω | di/dt = 3.5 A/nS, T _{vj} = 25°C | – | 141 | – | A |
| | | | di/dt = 3.0 A/nS, T _{vj} = 150°C | – | 247 | – | |
| | | | di/dt = 2.8 A/nS, T _{vj} = 175°C | – | 265 | – | |

NTC SENSOR CHARACTERISTICS (T_{vj} = 25°C, Unless Otherwise Specified)

| Symbol | Parameters | Conditions | Min | Typ | Max | Unit |
|--------------------------|-------------------------------|---|-----|------|-----|------|
| R ₂₅ (Note 3) | Rated Resistance | T _C = 25°C | – | 5147 | – | Ω |
| ΔR/R | Deviation of R ₁₀₅ | T _C = 105°C, R ₁₀₅ = 472 Ω | 5 | – | 5 | % |
| P ₂₅ | Power Dissipation | T _C = 25°C | – | – | 32 | mW |
| B _{25/55} | B-Value | R = R ₂₅ exp [B _{25/55} (1/T-1/298)] | – | 3340 | – | K |
| B _{25/85} | B-Value | R = R ₂₅ exp [B _{25/85} (1/T-1/298)] | – | 3360 | – | K |
| B _{25/105} | B-Value | R = R ₂₅ exp [B _{25/105} (1/T-1/298)] | – | 3364 | – | K |

3. Measured value at terminals.

THERMAL CHARACTERISTICS

| Symbol | Parameter | Min | Typ | Max | Unit |
|--------------------------|--|-----|-----|-----|------|
| IGBT.R _{th,J-F} | R _{th} , Junction to Fluid, 10Tj6.5 0 0 6.5 132.831555 Tc(1/298))TjET226.998 291509 T59.754 29181 Tc0 Tw(25)Tj1.1164 .J6.56g(, Junction | | | | |

TYPICAL CHARACTERISTICS

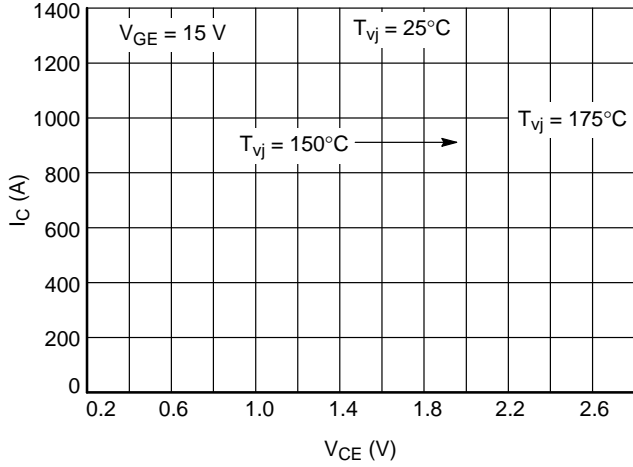


Figure 2. IGBT Output Characteristic

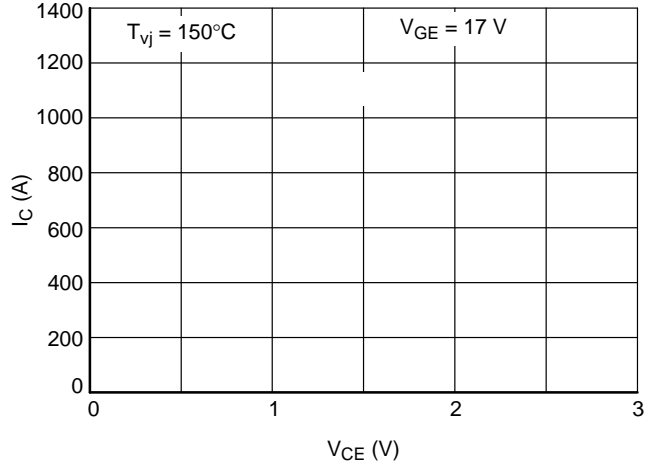


Figure 3. IGBT Output Characteristic

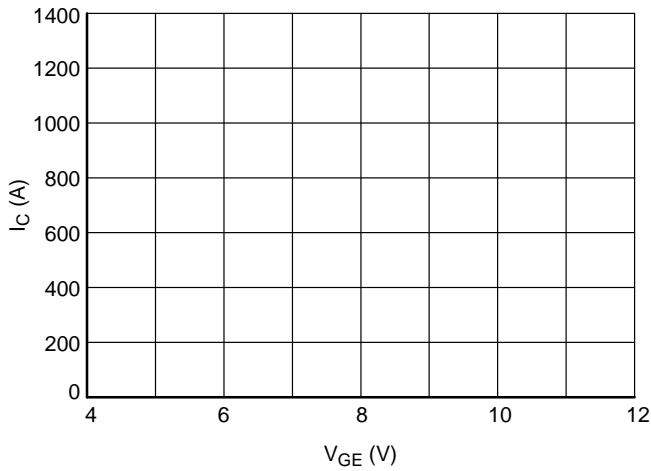


Figure 4. IGBT Transfer Characteristic

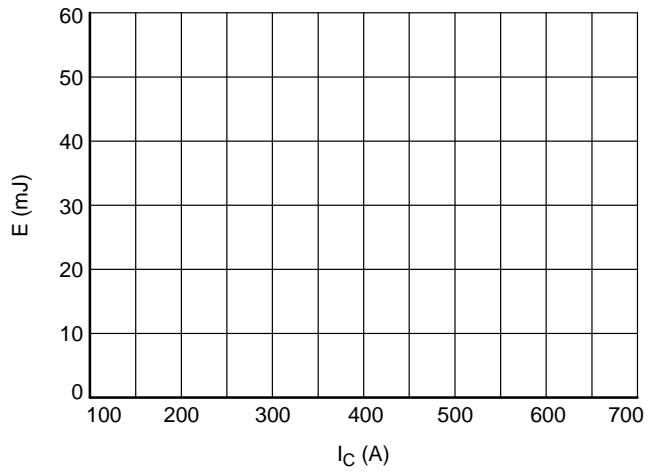


Figure 5. IGBT Turn-on Losses vs. I_C

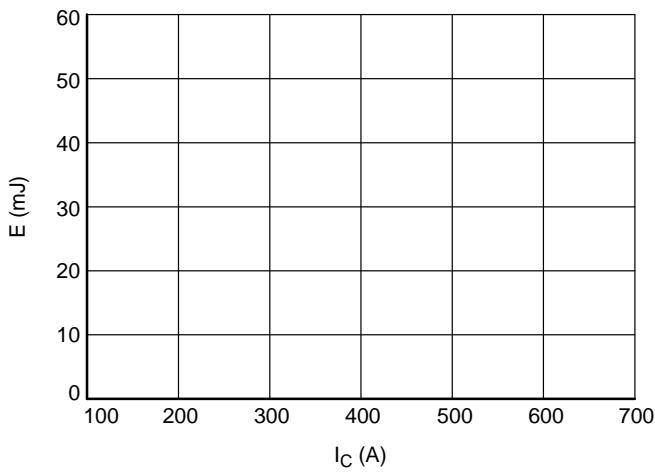


Figure 6. IGBT Turn-off Losses vs. I_C

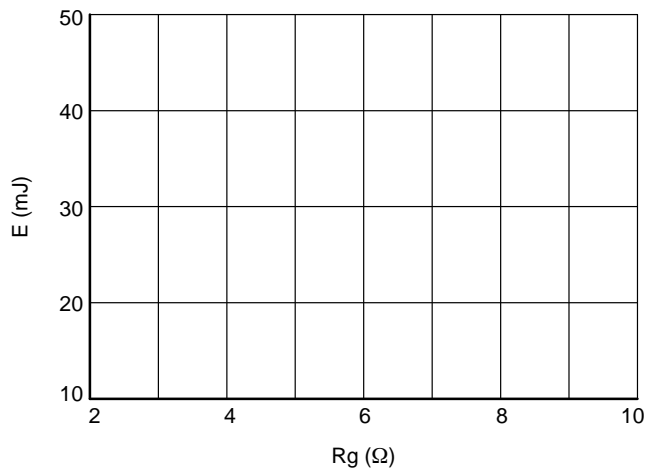


Figure 7. E_{on} vs. R_g

VE-Trac™ Direct Module NVH680S75L4SPB

TYPICAL CHARACTERISTICS

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TYPICAL CHARACTERISTICS

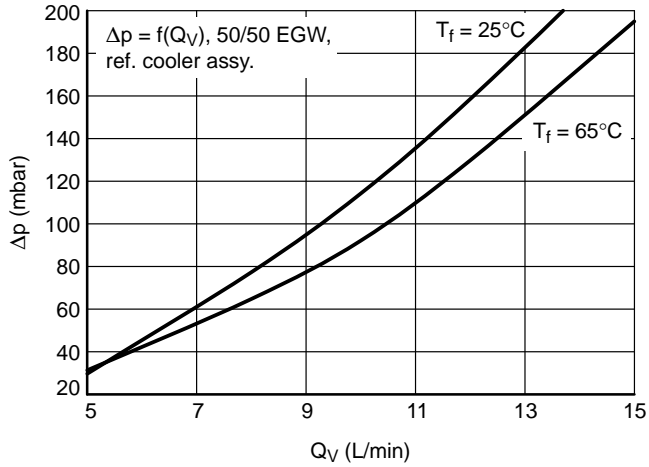


Figure 20. Pressure Drop In Cooling Circuit

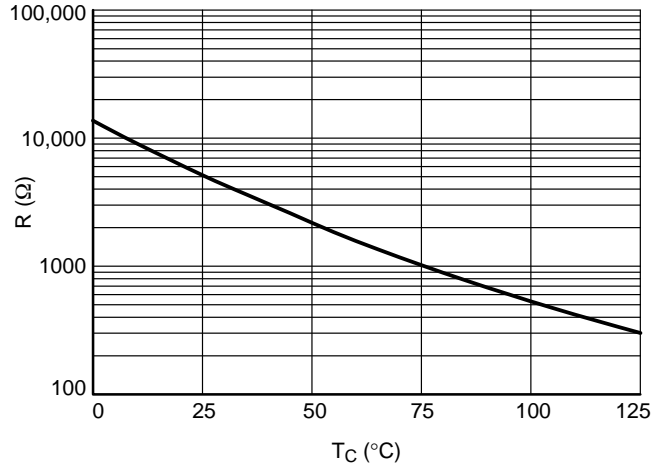


Figure 21. NTC Thermistor – Temperature Characteristic (Typical)

VE-Trac™ Direct Module NVH680S75L4SPB

PACKAGE DIMENSIONS

SSDC33, 154.50x92.0 (SPB)

CASE 183AB


ISSUE A

VE-Trac™ Direct Module NVH680S75L4SPB

PACKAGE DIMENSIONS

SSDC33, 154.50x92.0 (SPB)
CASE 183AB
ISSUE A

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