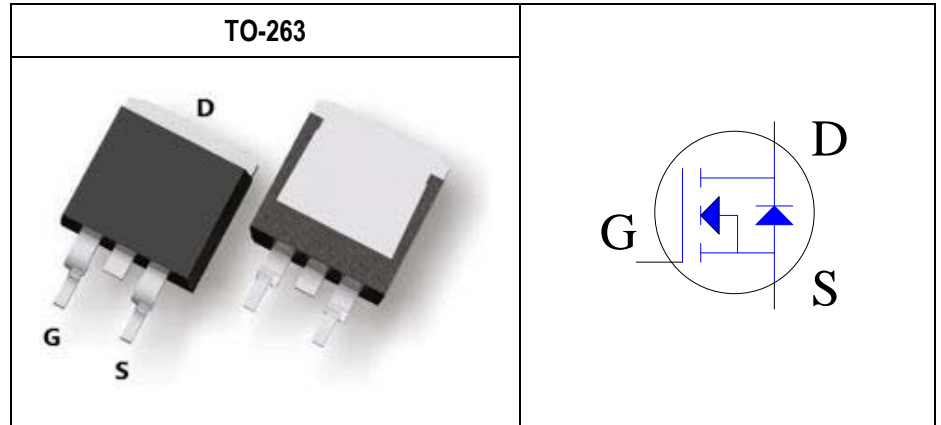


| Parameter | Value | Unit |
|------------------------------|-------|------------|
| V_{DSS} | 100 | V |
| $R_{DS(ON) max. V_{GS}=10V}$ | 5.2 | m Ω |
| I_D | 190 | A |
| $V_{GS(TH) Typ.}$ | 3.0 | V |
| $C_{iss} Typ.$ | 3762 | pF |
| $Q_{g10V} Typ.$ | 70.5 | nC |
| E_{AS} | 33.8 | mJ |



| Features | Application |
|--|---|
| <ul style="list-style-type: none"> Low On-Resistance $R_{DS(on)}$ Low Input Capacitance Low Gate Charge Fully Characterized Capacitance and Avalanche Pb-free lead plating; RoHS compliant | <ul style="list-style-type: none"> DC to DC converter LED Lighting Driver Load Switch Application Motor Driving Application Switch Mode Power Supply |

Ordering Information

| Ordering Code | RoHS Status | Package | Package Code | Packing | Quantity |
|---------------|--------------|---------|--------------|-------------|----------|
| DG100N15HG | Halogen-Free | TO-263 | G | Tape & Reel | 800 |

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|----------------|-------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous ^{Note 1} | I_D | $T_C=25^\circ\text{C}$ | 190 |
| | | $T_C=100^\circ\text{C}$ | 128 |
| Drain Current-Continuous ^{Note 2} | I_D | $T_A=25^\circ\text{C}$ | 23.5 |
| | | $T_A=70^\circ\text{C}$ | 18.8 |
| Drain Current-Pulsed ^{Note 3} | I_{DM} | 200 | A |
| Avalanche Current | I_{AR} | 26 | A |
| Single Pulse Avalanche Energy ^{Note 4} | E_{AS} | 33.8 | mJ |
| Maximum Power Dissipation | P_D | $T_C=25^\circ\text{C}$ | 320 |
| | | $T_C=100^\circ\text{C}$ | 128 |
| | | $T_A=25^\circ\text{C}$ | 4.86 |
| | | $T_A=70^\circ\text{C}$ | 3.11 |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

Thermal Resistance Ratings

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|-----------------|--------------|------|------|-------|--------------------|
| Thermal resistance, Junction-Case ^{Note 5} | $R_{\theta JC}$ | Steady State | - | - | 0.39 | $^\circ\text{C/W}$ |
| Thermal resistance, Junction-Ambient ^{Note 5} | $R_{\theta JA}$ | Steady State | - | - | 25.69 | $^\circ\text{C/W}$ |

Notes:

- Limited by silicon chip capability and $R_{\theta JC}$ junction-to-case thermal resistance.
- The maximum current rating is limited by package and $R_{\theta JA}$ junction-to-ambient thermal resistance.
- Must be ensure junction temperature does not exceed 150-degree C. (Pulse Width $\leq 100\mu\text{s}$, Duty $\leq 2\%$)
- Limited by T_{Jmax} , starting $T_J=25^\circ\text{C}$, $L=0.1\text{mH}$, $R_g=25\Omega$, $I_D=26\text{A}$, $V_{GS}=10\text{V}$.
- The value of thermal resistance is measured with the single device put on cooling plate under a still air environment temperature is 25 degree C based on JEDEC standard JESD51-14 and JESD51-2a. Thermal resistance obtained depends on the user's specific board design and given application.

Electrical Characteristics (T_J=25°C unless otherwise noted)

| STATIC CHARACTERISTICS | | | | | | |
|---------------------------------|----------------------|--|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _{DS} =-250μA | 100 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =80V, V _{GS} =0V | - | - | 1 | μA |
| | | V _{DS} =80V, V _{GS} =0V, T _J =125°C | - | - | 100 | μA |
| Gate-Body Leakage | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |

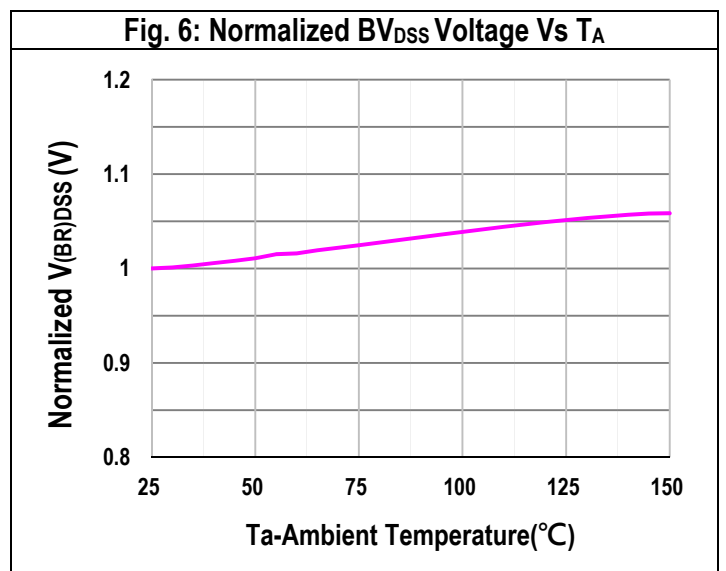
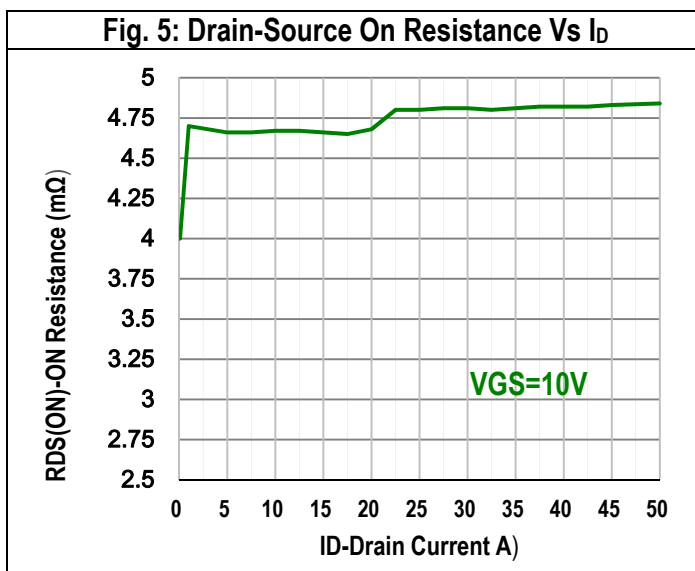
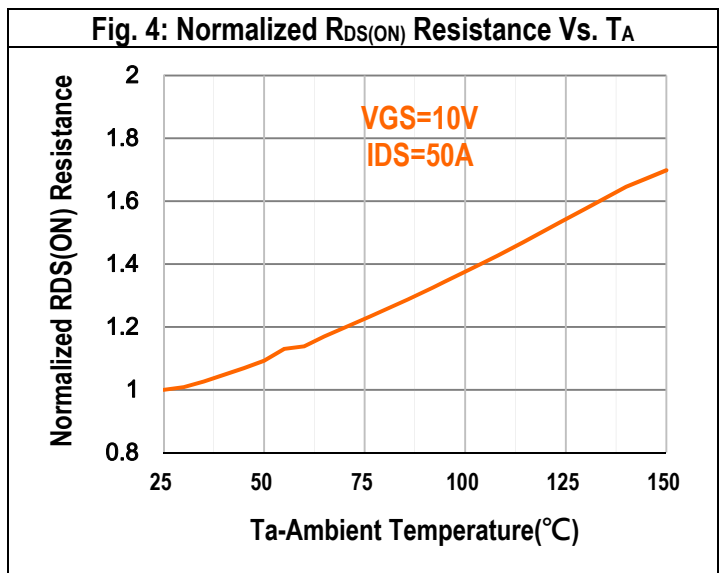
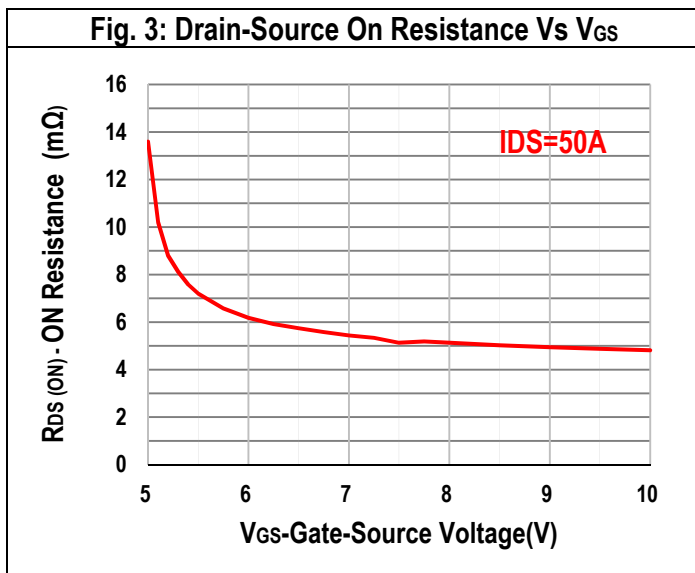
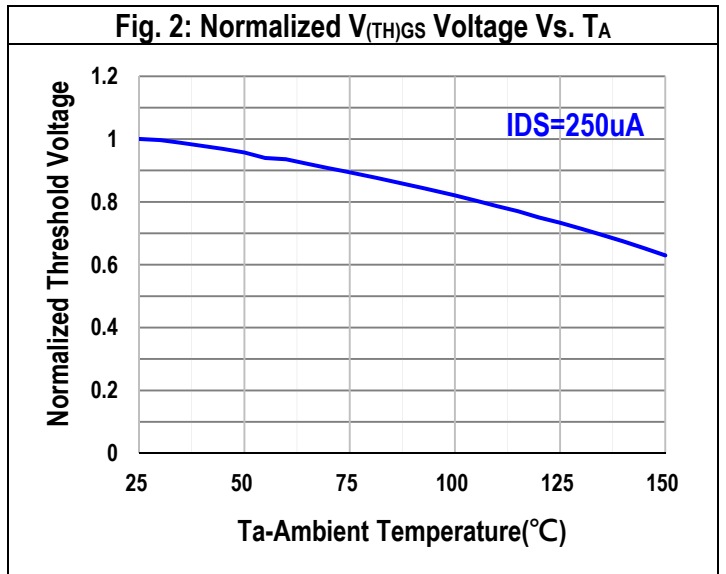
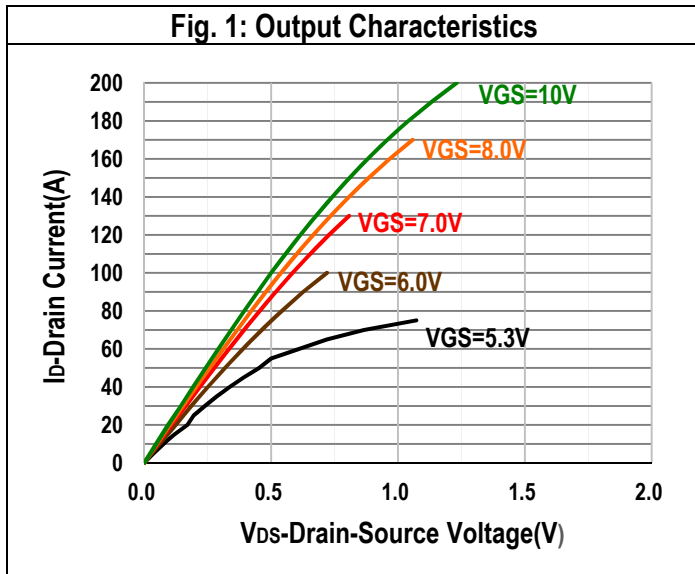
| STATIC CHARACTERISTICS | | | | | | |
|----------------------------------|---------------------|---|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} =V _{GS} , I _{DS} =250μA | 2.5 | 3.0 | 3.2 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _{DS} =50A | - | 4.5 | 5.2 | mΩ |
| Gate Resistance | R _g | V _{GS} =0V, V _{DS} =0V, f=1MHz | - | 1.1 | - | Ω |
| Forward Transconductance | g _{fs} | V _{DS} =5V, I _{DS} =20A | - | 30 | - | S |

| DYNAMIC CHARACTERISTICS | | | | | | |
|------------------------------|---------------------|--|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Input Capacitance | C _{iss} | V _{DD} =100V, V _{DS} =50V, V _{GS} =0V, f=1MHz | - | 3762 | - | pF |
| Output Capacitance | C _{oss} | V _{DD} =100V, V _{DS} =50V, V _{GS} =0V, f=1MHz | - | 566 | - | pF |
| Reverse Transfer Capacitance | C _{rss} | V _{DD} =100V, V _{DS} =50V, V _{GS} =0V, f=1MHz | - | 12.1 | - | pF |
| Turn-On Delay Time | T _{d(on)} | V _{DS} =50V, V _{GS} =10V, I _{DS} =50A, R _{GEN} =3Ω | - | 19.6 | - | nS |
| Rise Time | T _r | V _{DS} =50V, V _{GS} =10V, I _{DS} =50A, R _{GEN} =3Ω | - | 60.1 | - | nS |
| Turn-Off Delay Time | T _{d(off)} | V _{DS} =50V, V _{GS} =10V, I _{DS} =50A, R _{GEN} =3Ω | - | 44 | - | nS |
| Fall Time | T _f | V _{DS} =50V, V _{GS} =10V, I _{DS} =50A, R _{GEN} =3Ω | - | 55.6 | - | nS |

| GATE CHARGE CHARACTERISTICS | | | | | | |
|--|----------------------|--|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Gate to Source Gate Charge | Q _{gs} | V _{DD} =50V, I _D =50A, V _{GS} =0 to 10V | - | 20.4 | - | nC |
| Gate charge at threshold | Q _{g(th)} | V _{DD} =50V, I _D =50A, V _{GS} =0 to 10V | - | 11.2 | - | nC |
| Gate to Drain Charge | Q _{gd} | V _{DD} =50V, I _D =50A, V _{GS} =0 to 10V | - | 22.4 | - | nC |
| Switching charge | Q _{sw} | V _{DD} =50V, I _D =50A, V _{GS} =0 to 10V | - | 31.6 | - | nC |
| Gate charge total | Q _{g 10V} | V _{DD} =50V, I _D =50A, V _{GS} =0 to 10V | - | 70.5 | - | nC |
| Gate plateau voltage | V _{plateau} | V _{DD} =50V, I _D =50A, V _{GS} =0 to 10V | - | 5.2 | - | V |
| Gate charge total, sync. FET (Q _g - Q _{gd}) | Q _{g(sync)} | V _{DS} =0.1V, V _{GS} =0 to 10V | - | 48.1 | - | nC |

| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS | | | | | | |
|--|-----------------|--|------|-------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Body Diode continuous forward current | I _S | T _C =25°C | - | - | 190 | A |
| Body Diode pulse current | I _{SM} | T _C =25°C | - | - | 200 | A |
| Body Diode Forward Voltage | V _{SD} | V _{GS} =0V, I _S =50A | - | 0.92 | 1.0 | V |
| Body Diode Reverse Recovery Time | t _{rr} | V _{DD} =50V, I _F =50A, di/dt=200A/μs | - | 44.4 | - | nS |
| Body Diode Reverse Recovery Charge | Q _{rr} | V _{DD} =50V, I _F =50A, di/dt=200A/μs | - | 108.6 | - | nC |
| Body Diode Reverse Recovery Current | I _{rm} | V _{DD} =50V, I _F =50A, di/dt=200A/μs | - | 4.3 | - | A |

Typical Operating Characteristics



Typical Operating Characteristics

Fig. 7: Typical Capacitance Variation Vs V_{DS}

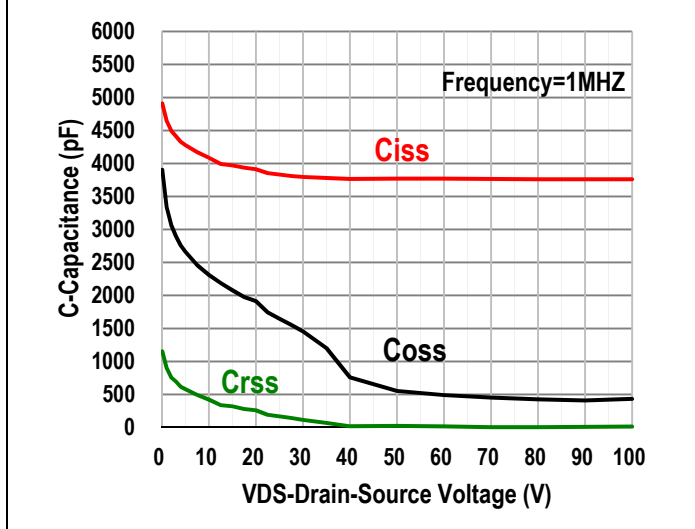


Fig. 8: Gate Charge Vs V_{GS}

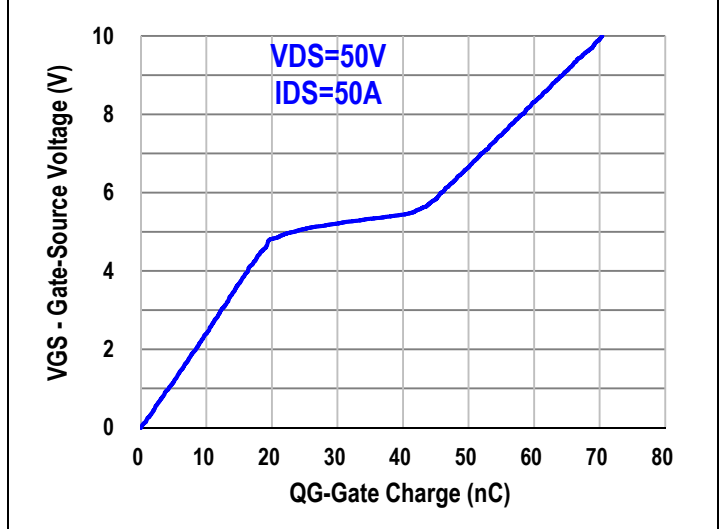


Fig. 9: Power Dissipation Vs. T_c

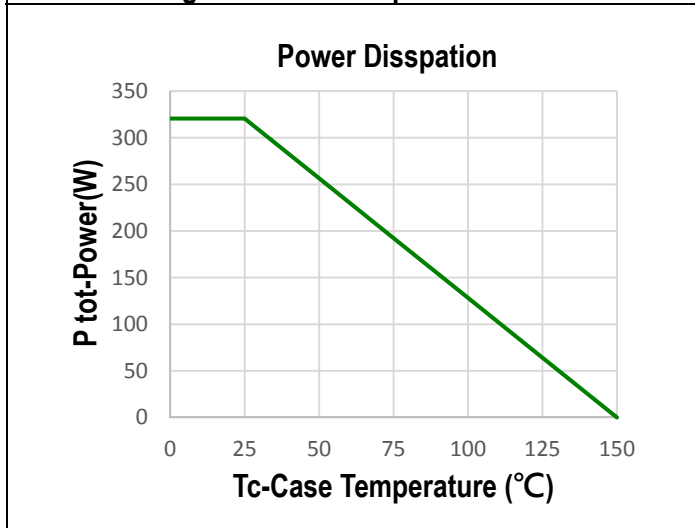


Fig. 10: Drain Current Vs. T_c

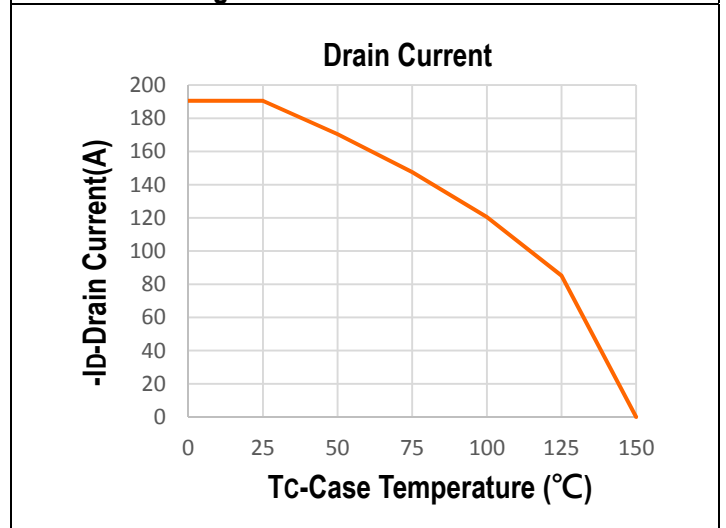


Fig. 11: Body Diode Forward Voltage Vs. I_s

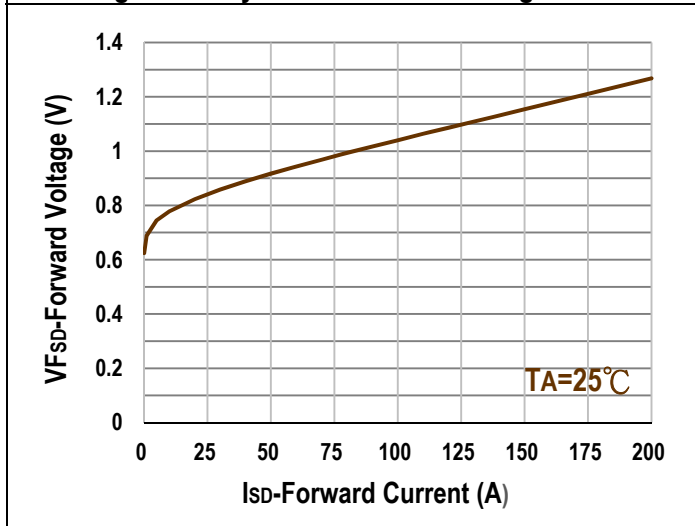
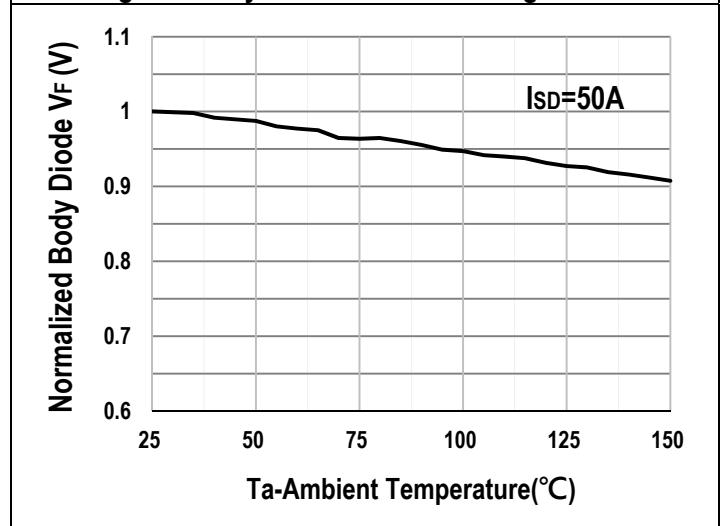


Fig. 12: Body Diode Forward Voltage Vs. T_A



Typical Operating Characteristics

Fig. 13: Safe Operation Area

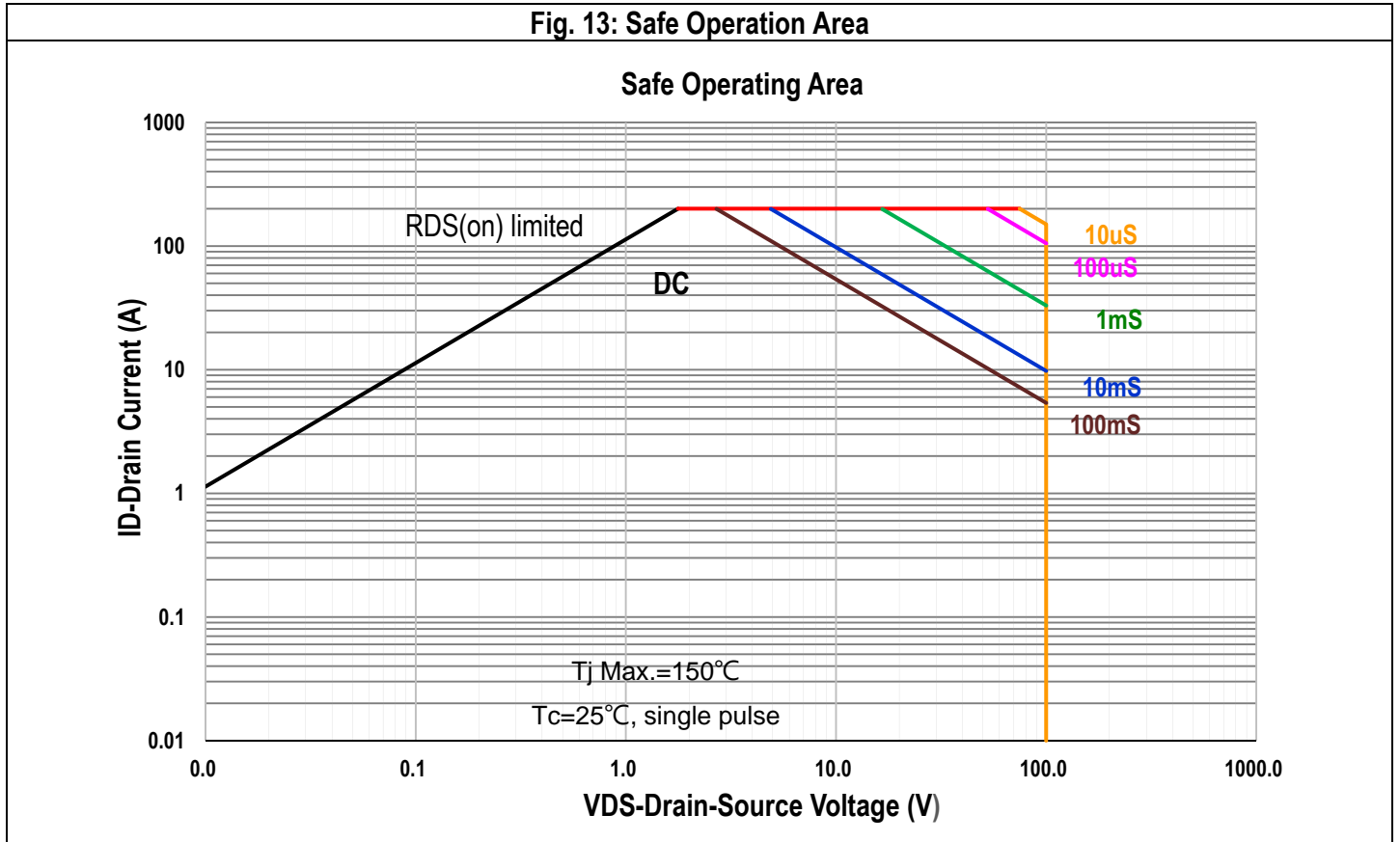
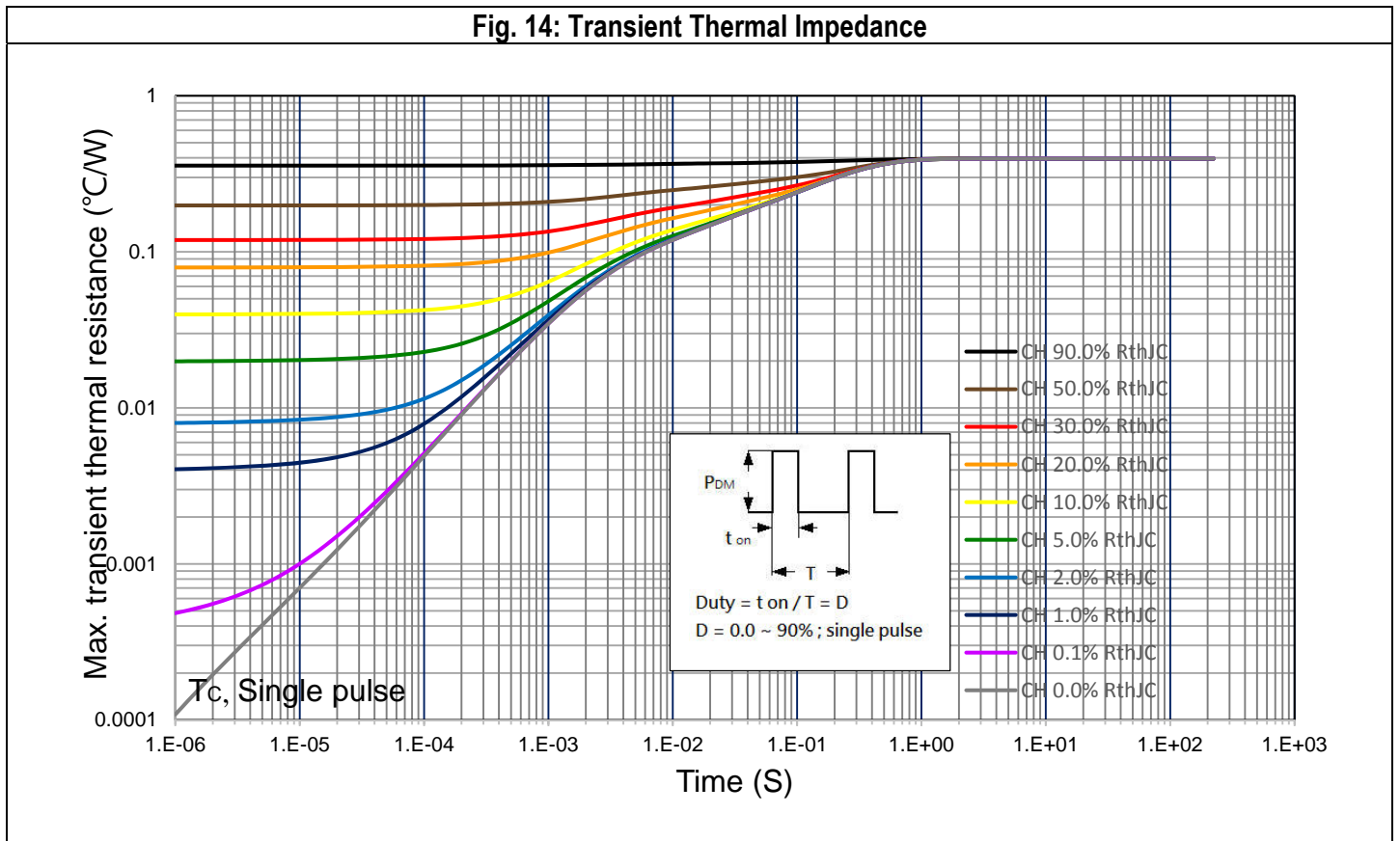
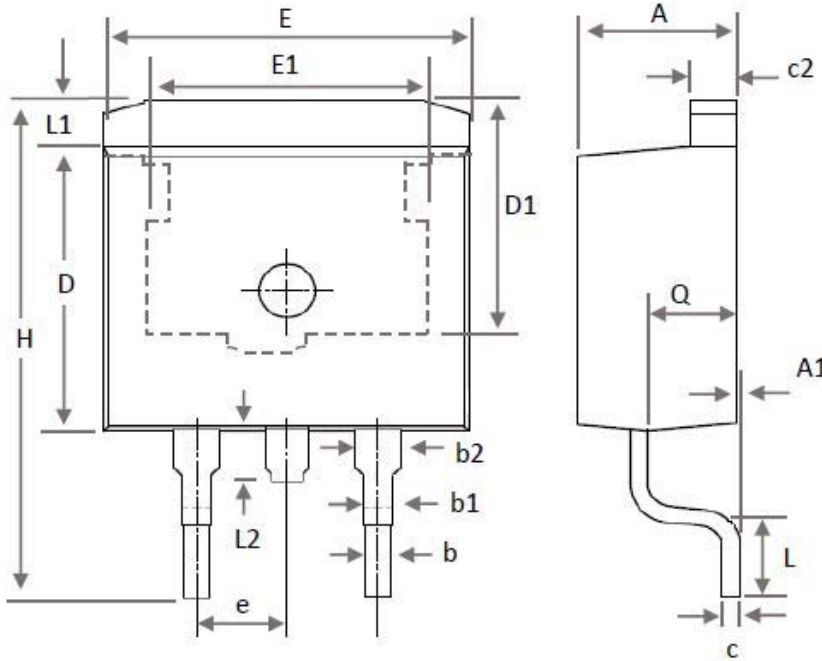


Fig. 14: Transient Thermal Impedance

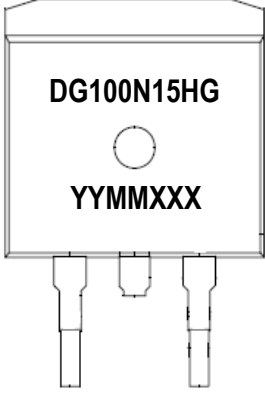


Package of Dimension



| Symbol | Min | Nor | Max |
|--------|-----------|-------|-------|
| A | 4.24 | 4.44 | 4.64 |
| A1 | 0.00 | 0.10 | 0.25 |
| b | 0.66 | 0.76 | 0.96 |
| b1 | 0.76 | 0.86 | 1.06 |
| b2 | 1.14 | 1.27 | 1.47 |
| c | 0.40 | 0.50 | 0.60 |
| c2 | 1.15 | 1.30 | 1.45 |
| D | 8.38 | 8.60 | 8.90 |
| D1 | 6.86 | 7.16 | - |
| E | 9.90 | 10.20 | 10.50 |
| E1 | 7.80 Ref. | | |
| e | 2.54 BSC | | |
| H | 14.61 | 15.00 | 15.88 |
| L | 1.78 | 2.20 | 2.79 |
| L1 | 1.40 REF. | | |
| L2 | 1.50 REF. | | |
| Q | - | 2.49 | 2.70 |

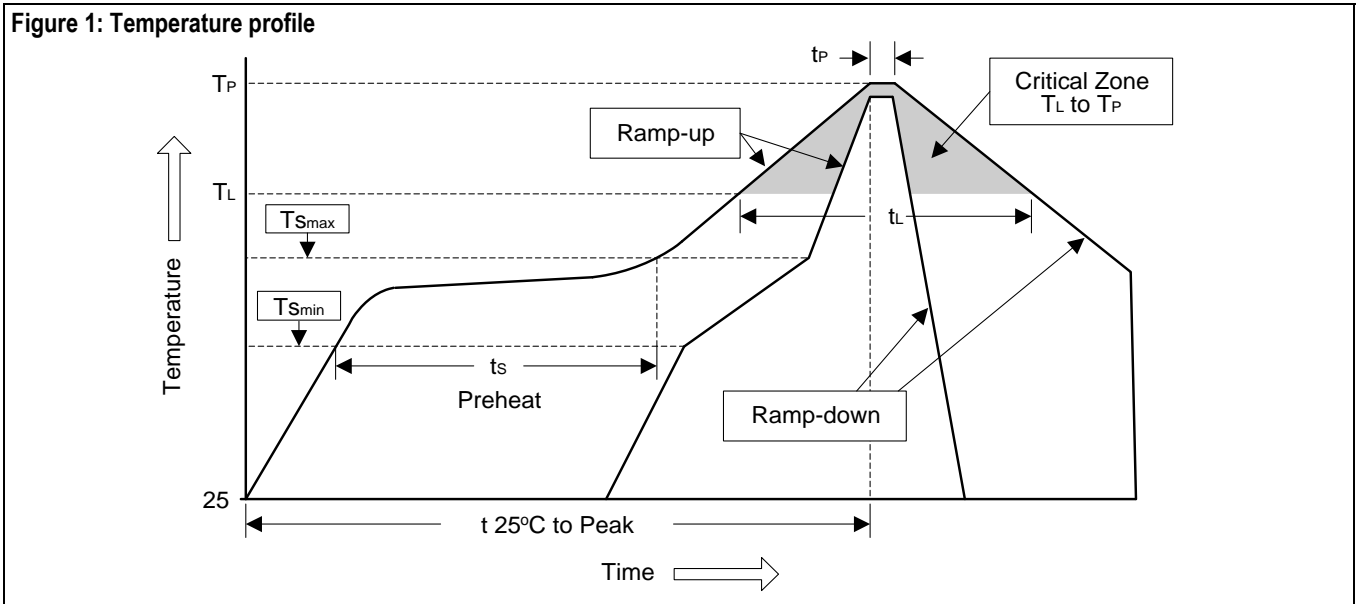
Marking Information

| TO-263 (G) | Marking Rule |
|--|---|
| <p>Laser Marking</p>  | <p><u>Line 1</u> : Device DG100N15HG</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p> |

Appendix-A

Soldering Methods for Silicongear's Products (Just for SMD type of device)

- Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
- Reflow soldering of surface-mount devices



| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|-------------------------|------------------|
| Average ramp-up rate (T _L to T _P) | <3°C/sec | <3°C/sec |
| Preheat | | |
| - Temperature Min (T _{smin}) | 100°C | 150°C |
| - Temperature Max (T _{smax}) | 150°C | 200°C |
| - Time (min to max) (ts) | 60 to 120 sec | 60 to 180 sec |
| T _{smax} to T _L | | |
| - Ramp-up Rate | <3°C/sec | <3°C/sec |
| Time maintained above: | | |
| - Temperature (T _L) | 183°C | 217°C |
| - Time (t _L) | 60 to 150 sec | 60 to 150 sec |
| Peak Temperature (T _P) | 240°C +0/-5°C | 260°C +0/-5°C |
| Time within 5°C of actual Peak Temperature (t _P) | 10 to 30 sec | 20 to 40 sec |
| Ramp-down Rate | <6°C/sec | <6°C/sec |
| Time 25°C to Peak Temperature | <6 minutes | <8 minutes |

3. Flow (wave) soldering (solder dipping)

| Products | Peak Temperature | Dipping Time |
|------------------|------------------|--------------|
| Pb devices. | 245°C ±5°C | 5sec ±1sec |
| Pb-Free devices. | 260°C +0/-5°C | 5sec ±1sec |

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