

F540ZL-VB TO262 Datasheet

N-Channel 100-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

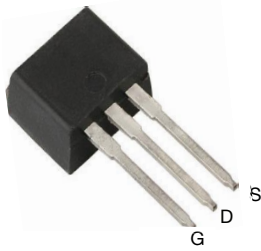
| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
|--------------|---------------------------|-----------|
| 100 | 0.0085 at $V_{GS} = 10$ V | 100 |
| | 0.010 at $V_{GS} = 6$ V | 85 |

FEATURES

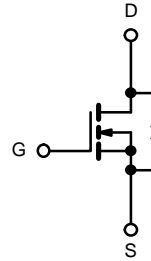
- TrenchFET® Power MOSFET
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC


RoHS
 COMPLIANT

TO-262



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

| Parameter | | Symbol | Limit | Unit |
|--|--|-----------------------------------|------------------|------|
| Drain-Source Voltage | | V _{DS} | 100 | V |
| Gate-Source Voltage | | V _{GS} | ± 20 | |
| Continuous Drain Current (T _J = 150 °C) | T _C = 25 °C | I _D | 100 | A |
| | T _C = 125 °C | | 75 ^a | |
| Pulsed Drain Current | | I _{DM} | 300 | |
| Avalanche Current | L = 0.1 mH | I _{AS} | 75 | |
| Single Pulse Avalanche Energy ^b | | E _{AS} | 280 | mJ |
| Maximum Power Dissipation ^b | T _C = 25 °C (TO-220AB and TO-263) | P _D | 250 ^c | W |
| | T _A = 25 °C (TO-263) ^d | | 3.75 | |
| Operating Junction and Storage Temperature Range | | T _J , T _{stg} | - 55 to 175 | °C |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Limit | Unit |
|---------------------|------------|-------|------|
| Junction-to-Ambient | R_{thJA} | 40 | °C/W |
| | | 62.5 | |
| Junction-to-Case | R_{thJC} | 0.6 | |

Notes:

- a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
 b. Guaranteed by design, not subject to production testing.
 c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

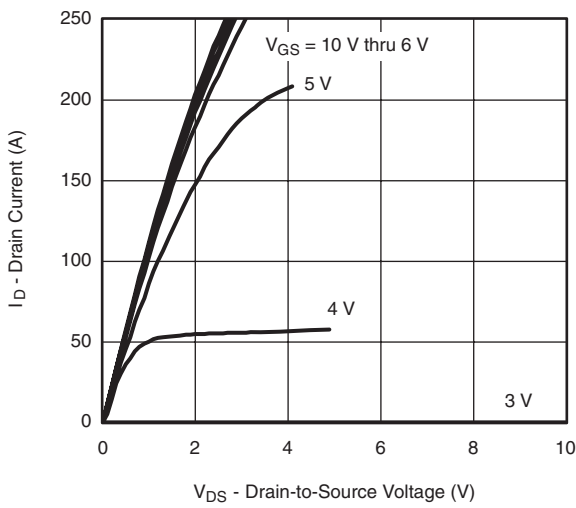
| SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted | | | | | | |
|--|---------------|--|------|--------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 100 | | | V |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 1 | | 3 | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^{\circ}\text{C}$ | | | 50 | |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^{\circ}\text{C}$ | | | 250 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} = \geq 5\text{ V}, V_{GS} = 10\text{ V}$ | 120 | | | A |
| Drain-Source On-State Resistance ^a | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 30\text{ A}$ | | 0.0085 | | Ω |
| | | $V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$ | | 0.010 | | |
| | | $V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 125\text{ }^{\circ}\text{C}$ | | 0.017 | | |
| | | $V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$ | | 0.022 | | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = 15\text{ V}, I_D = 30\text{ A}$ | 25 | | | S |
| Dynamic ^b | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 6550 | | pF |
| Output Capacitance | C_{oss} | | | 665 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 265 | | |
| Total Gate Charge ^c | Q_g | $V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 85\text{ A}$ | | 105 | 160 | nC |
| Gate-Source Charge ^c | Q_{gs} | | | 17 | | |
| Gate-Drain Charge ^c | Q_{gd} | | | 23 | | |
| Turn-On Delay Time ^c | $t_{d(on)}$ | $V_{DD} = 50\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong 85\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$ | | 12 | 25 | ns |
| Rise Time ^c | t_r | | | 90 | 135 | |
| Turn-Off DelayTime ^c | $t_{d(off)}$ | | | 55 | 85 | |
| Fall Time ^c | t_f | | | 130 | 195 | |
| Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^{\circ}\text{C}$ ^b | | | | | | |
| Continuous Current | I_S | | | | 85 | A |
| Pulsed Current | I_{SM} | | | | 240 | |
| Forward Voltage ^a | V_{SD} | $I_F = 85\text{ A}, V_{GS} = 0\text{ V}$ | | 1.0 | 1.5 | V |
| Reverse Recovery Time | t_{rr} | $I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ | | 85 | 140 | ns |
| Peak Reverse Recovery Current | $I_{RM(REC)}$ | | | 4.5 | 7 | A |
| Reverse Recovery Charge | Q_{rr} | | | 0.17 | 0.35 | μC |

Notes:

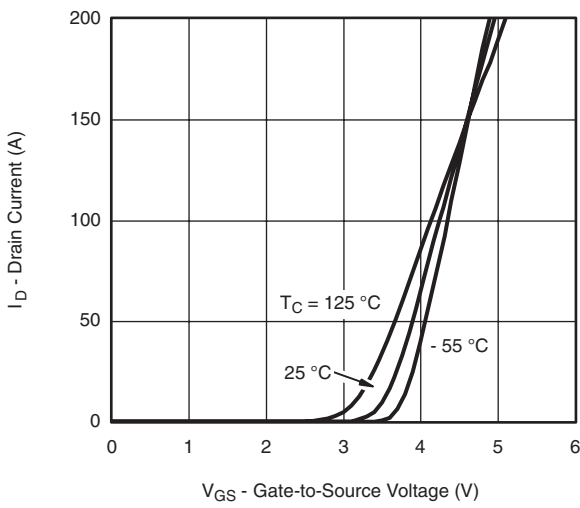
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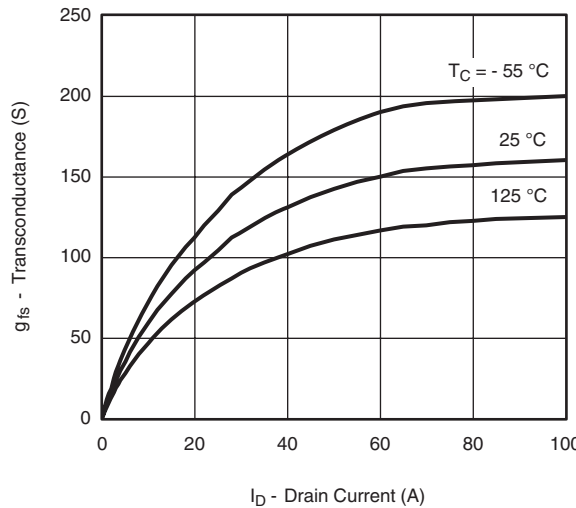
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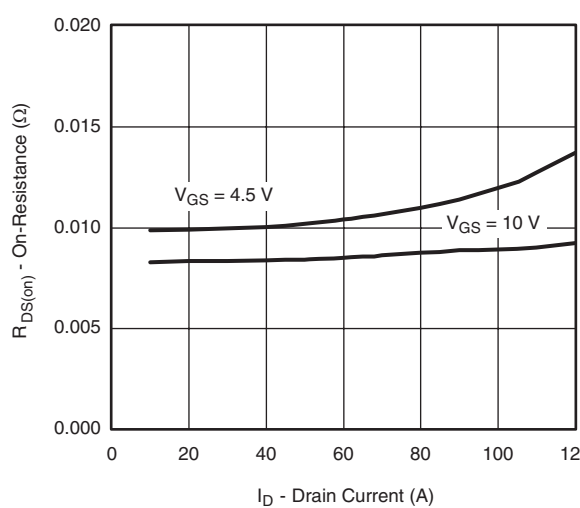
Output Characteristics



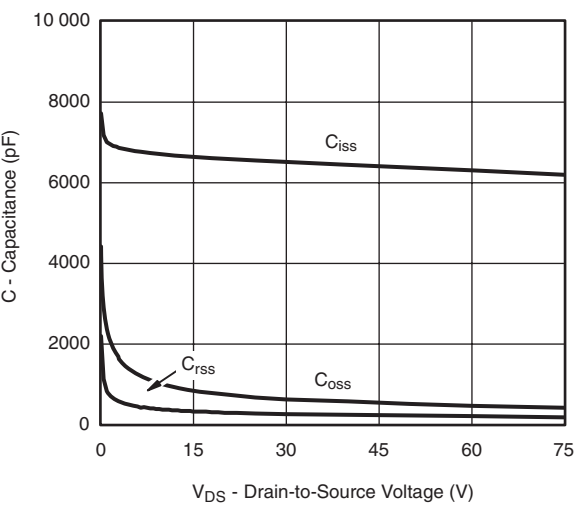
Transfer Characteristics



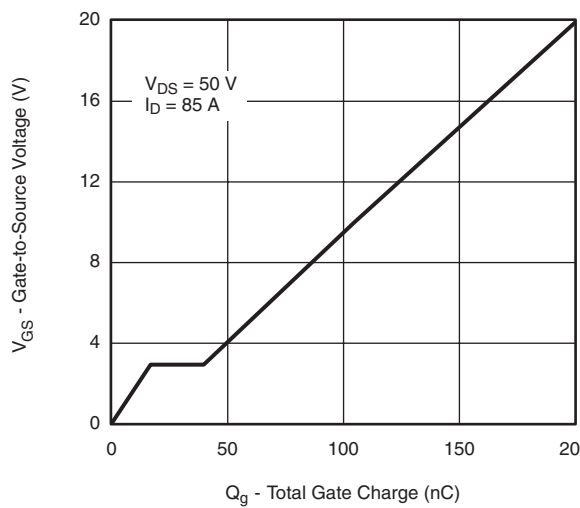
Transconductance



On-Resistance vs. Drain Current



Capacitance



Gate Charge

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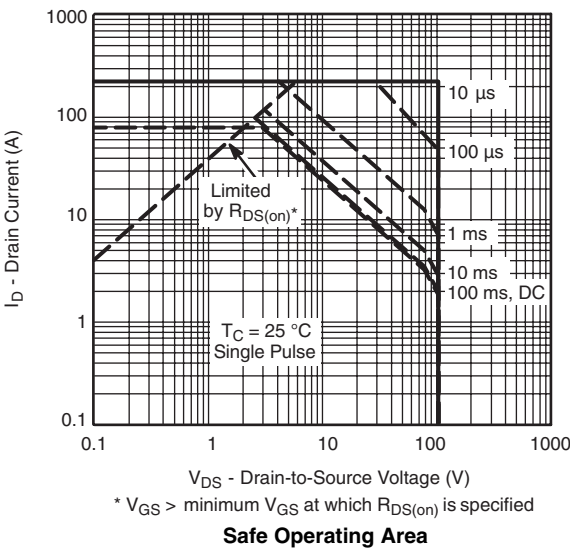
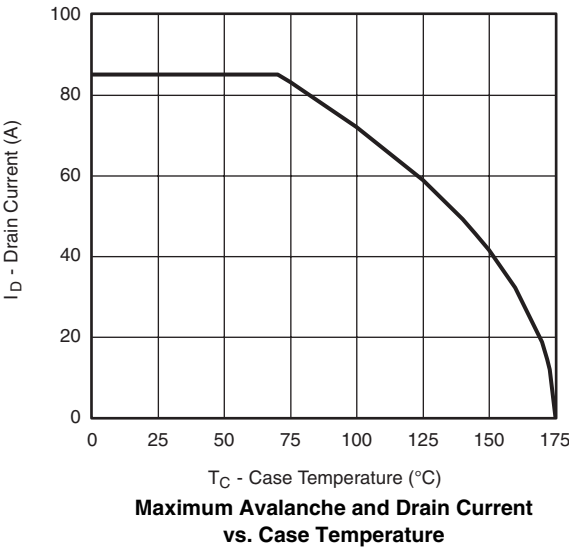
On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage

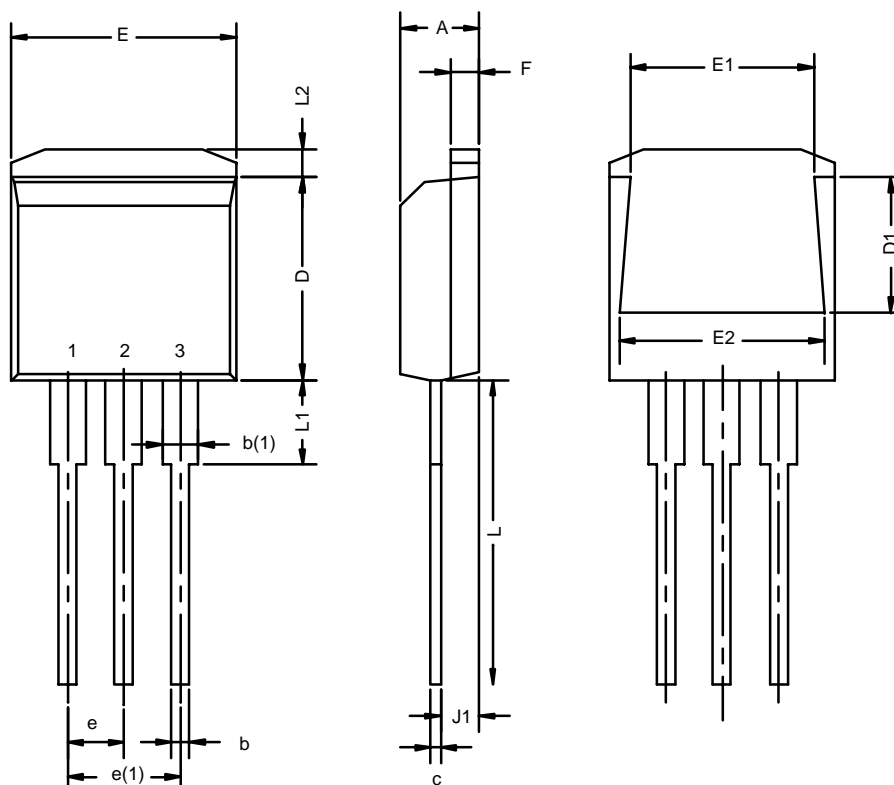
Avalanche Current vs. Time

 T_J - Drain-Source Breakdown vs. Junction-Temperature

THERMAL RATINGS



TO-262: 3-LEAD



| Dim | MILLIMETERS* | | INCHES | |
|---|--------------|-------|--------|-------|
| | Min | Max | Min | Max |
| A | 4.32 | 4.70 | 0.170 | 0.185 |
| b | 0.64 | 1.00 | 0.025 | 0.039 |
| b(1) | 1.14 | 1.40 | 0.045 | 0.055 |
| c | 0.36 | 0.50 | 0.014 | 0.020 |
| D | 8.64 | 9.65 | 0.340 | 0.380 |
| D1 | 5.59 | 6.10 | 0.220 | 0.240 |
| e | 2.41 | 2.67 | 0.095 | 0.105 |
| e(1) | 4.95 | 5.33 | 0.195 | 0.210 |
| E | 10.03 | 10.41 | 0.395 | 0.410 |
| E1 | 7.87 | 8.64 | 0.310 | 0.340 |
| E2 | 9.02 | 9.53 | 0.355 | 0.375 |
| F | 1.14 | 1.40 | 0.045 | 0.055 |
| J1 | 2.41 | 2.79 | 0.095 | 0.110 |
| L | 13.08 | 14.22 | 0.515 | 0.560 |
| L1 | - | 3.81 | - | 0.150 |
| L2 | 1.02 | 1.40 | 0.040 | 0.055 |
| ECN: T-02234—Rev. C, 14-Oct-02 DWG: 5855 | | | | |

*Use millimeters as the primary measurement

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