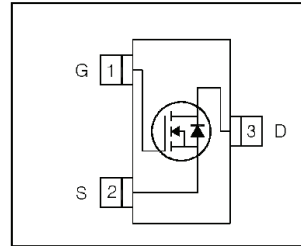


HEXFET® Power MOSFET

| | | |
|---|------------|-----------|
| V_{DSS} | 60 | V |
| V_{GS} | ±16 | V |
| $R_{DS(on) \max}$ (@ $V_{GS} = 10V$) | 92 | mΩ |
| $R_{DS(on) \max}$ (@ $V_{GS} = 4.5V$) | 116 | mΩ |



| | | |
|----------|----------|----------|
| G | D | S |
| Gate | Drain | Source |

Applications

- Load/System Switch

Features

| |
|--|
| Industry-Standard Pinout |
| Compatible with Existing Surface Mount Techniques |
| RoHS Compliant Containing no Lead, no Bromide and no Halogen |
| MSL1 |

Benefits

 results in
⇒

| |
|----------------------------|
| Multi-Vendor Compatibility |
| Easier Manufacturing |
| Environmentally Friendlier |
| Increased Reliability |

| Base part number | Package Type | Standard Pack | | Orderable Part Number |
|------------------|-------------------|---------------|----------|-----------------------|
| | | Form | Quantity | |
| IRLML0060TRPbF | Micro 3™ (SOT-23) | Tape and Reel | 3000 | IRLML0060TRPbF |

Absolute Maximum Ratings

| Symbol | Parameter | Max. | Units |
|--------------------------|---|--------------|-------|
| V_{DS} | Drain-to-Source Voltage | 60 | V |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 2.7 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 2.1 | |
| I_{DM} | Pulsed Drain Current | 11 | |
| $P_D @ T_A = 25^\circ C$ | Maximum Power Dissipation | 1.25 | W |
| $P_D @ T_A = 70^\circ C$ | Maximum Power Dissipation | 0.80 | |
| | Linear Derating Factor | 0.01 | mW/°C |
| V_{GS} | Gate-to-Source Voltage | ± 16 | |
| T_J T_{STG} | Operating Junction and Storage Temperature Range | -55 to + 150 | °C |


Thermal Resistance

| Symbol | Parameter | Typ. | Max. | Units |
|-----------------|--|------|------|-------|
| $R_{\theta JA}$ | Junction-to-Ambient ^③ | — | 100 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient (t < 10s) ^④ | — | 99 | |

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

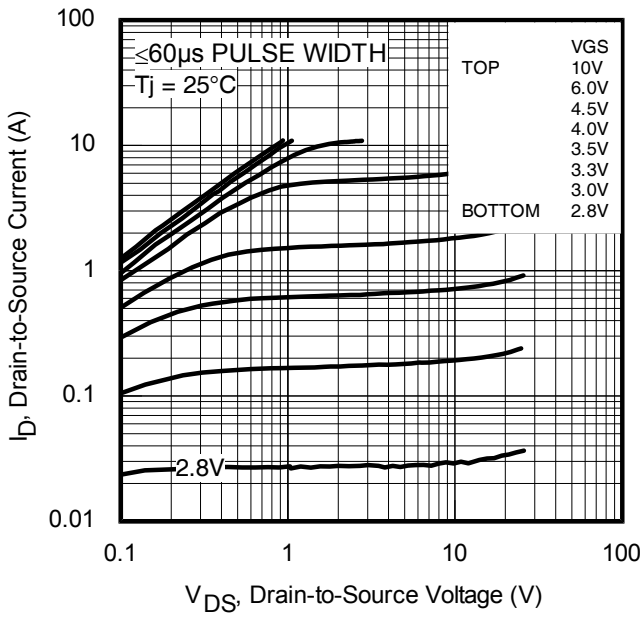
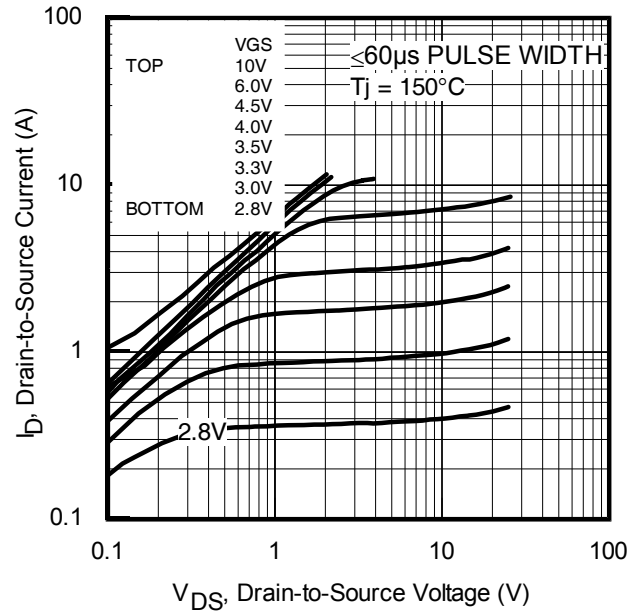
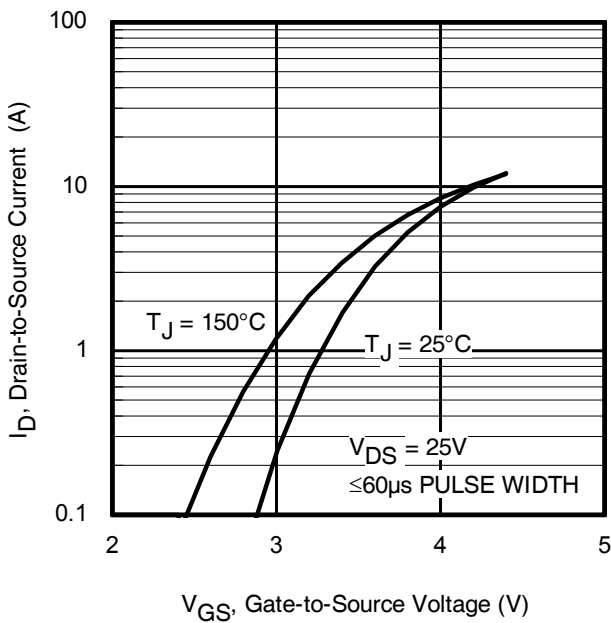
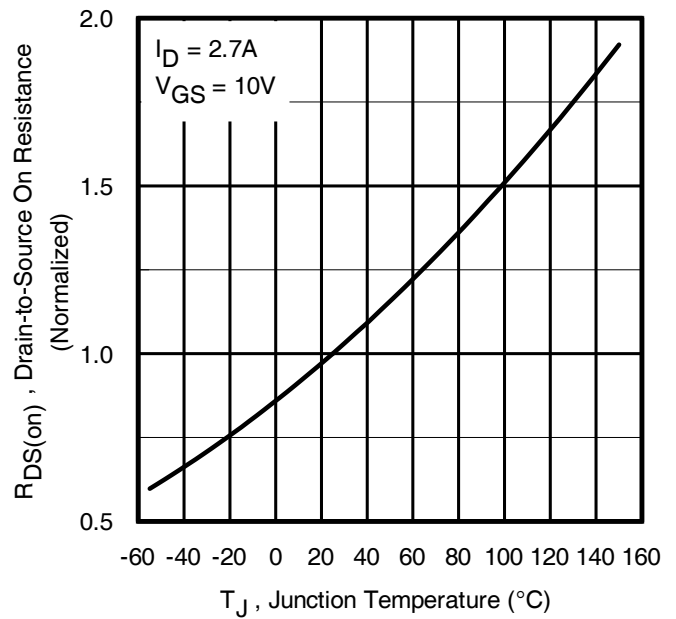
| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|--|--------------------------------------|------|------|------|-------|---|
| V _{(BR)DSS} | Drain-to-Source Breakdown Voltage | 60 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| ΔV _{(BR)DSS} /ΔT _J | Breakdown Voltage Temp. Coefficient | — | 0.06 | — | V/°C | Reference to 25°C, I _D = 1mA |
| R _{DS(on)} | Static Drain-to-Source On-Resistance | — | 98 | 116 | mΩ | V _{GS} = 4.5V, I _D = 2.2A |
| | | — | 78 | 92 | | V _{GS} = 10V, I _D = 2.7A |
| V _{GS(th)} | Gate Threshold Voltage | 1.0 | — | 2.5 | V | V _{DS} = V _{GS} , I _D = 25μA |
| I _{DSS} | Drain-to-Source Leakage Current | — | — | 20 | μA | V _{DS} = 60V, V _{GS} = 0V |
| | | — | — | 250 | | V _{DS} = 60V, V _{GS} = 0V, T _J = 125°C |
| I _{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | V _{GS} = 16V |
| | Gate-to-Source Reverse Leakage | — | — | -100 | | V _{GS} = -16V |
| R _G | Internal Gate Resistance | — | 1.6 | — | Ω | |
| g _{fs} | Forward Trans conductance | 7.6 | — | — | S | V _{DS} = 25V, I _D = 2.7A |
| Q _g | Total Gate Charge | — | 2.5 | — | nC | I _D = 2.7A |
| Q _{gs} | Gate-to-Source Charge | — | 0.7 | — | | V _{DS} = 30V |
| Q _{gd} | Gate-to-Drain ('Miller') Charge | — | 1.3 | — | | V _{GS} = 4.5V ② |
| t _{d(on)} | Turn-On Delay Time | — | 5.4 | — | ns | V _{DD} = 30V ② |
| t _r | Rise Time | — | 6.3 | — | | I _D = 1.0A |
| t _{d(off)} | Turn-Off Delay Time | — | 6.8 | — | | R _G = 6.8Ω |
| t _f | Fall Time | — | 4.2 | — | | V _{GS} = 4.5V |
| C _{iss} | Input Capacitance | — | 290 | — | pF | V _{GS} = 0V |
| C _{oss} | Output Capacitance | — | 37 | — | | V _{DS} = 25V |
| C _{rss} | Reverse Transfer Capacitance | — | 21 | — | | f = 1.0MHz |

Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|--|------|------|------|-------|--|
| I _S | Continuous Source Current (Body Diode) | — | — | 1.6 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I _{SM} | Pulsed Source Current (Body Diode) ① | — | — | 11 | | |
| V _{SD} | Diode Forward Voltage | — | — | 1.3 | V | T _J = 25°C, I _S = 2.7A, V _{GS} = 0V ② |
| t _{rr} | Reverse Recovery Time | — | 14 | 21 | ns | T _J = 25°C, V _R = 30V, I _F = 1.6A |
| Q _{rr} | Reverse Recovery Charge | — | 13 | 20 | nC | di/dt = 100A/μs ② |

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ③ Surface mounted on 1 in square Cu board
- ④ Refer to application note #AN-994.


Fig. 1 Typical Output Characteristics

Fig. 2 Typical Output Characteristics

Fig. 3 Typical Transfer Characteristics

Fig. 4 Normalized On-Resistance vs. Temperature

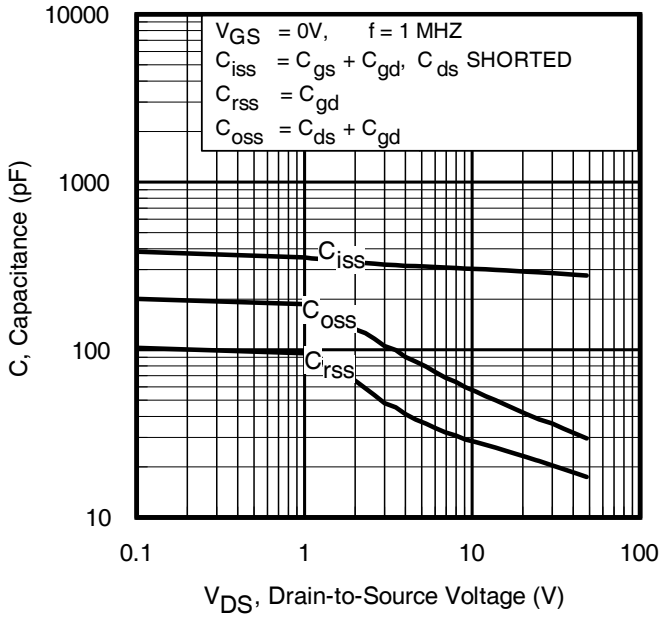


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

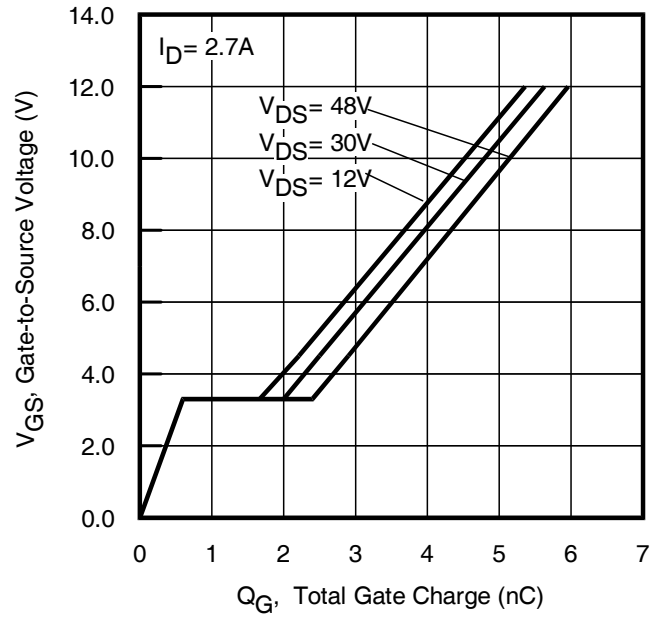


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

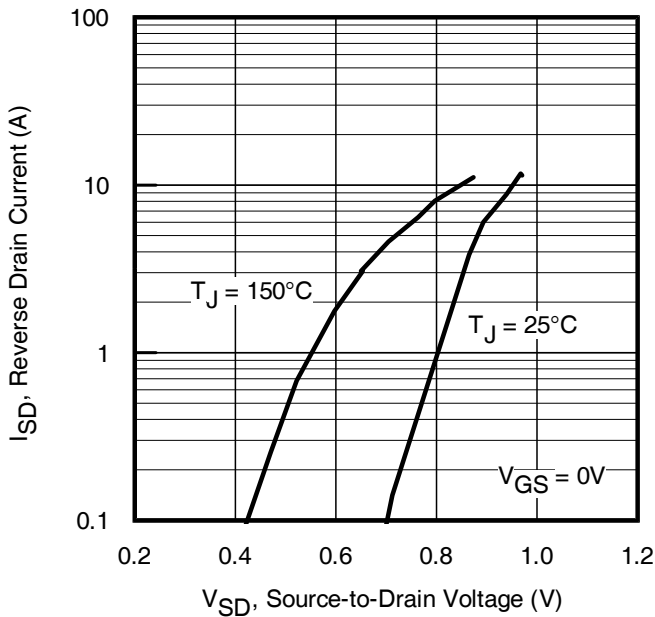


Fig 7 Typical Source-to-Drain Diode Forward Voltage

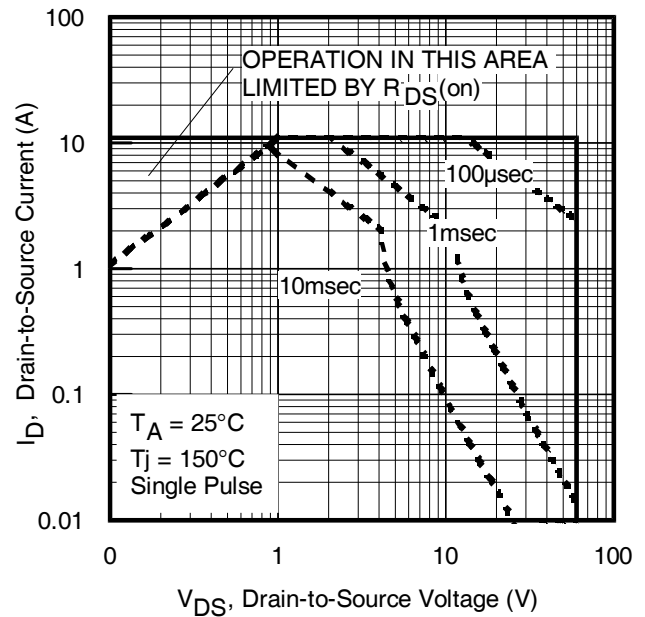


Fig 8. Maximum Safe Operating Area

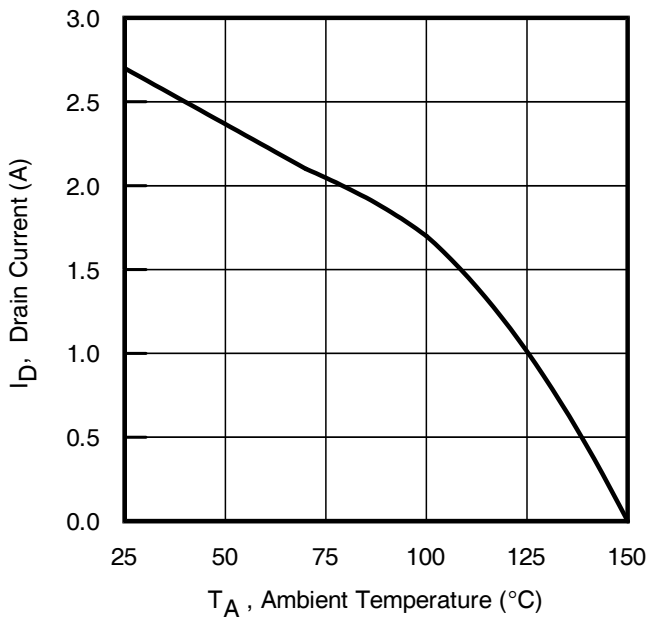


Fig 9. Maximum Drain Current vs. Case Temperature

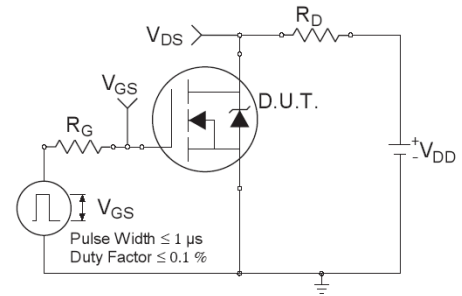


Fig 10a. Switching Time Test Circuit

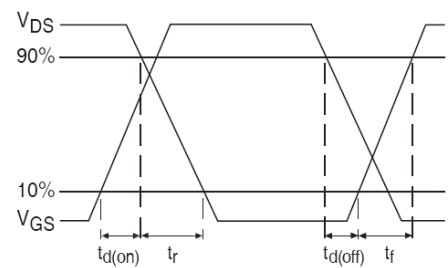


Fig 10b. Switching Time Waveforms

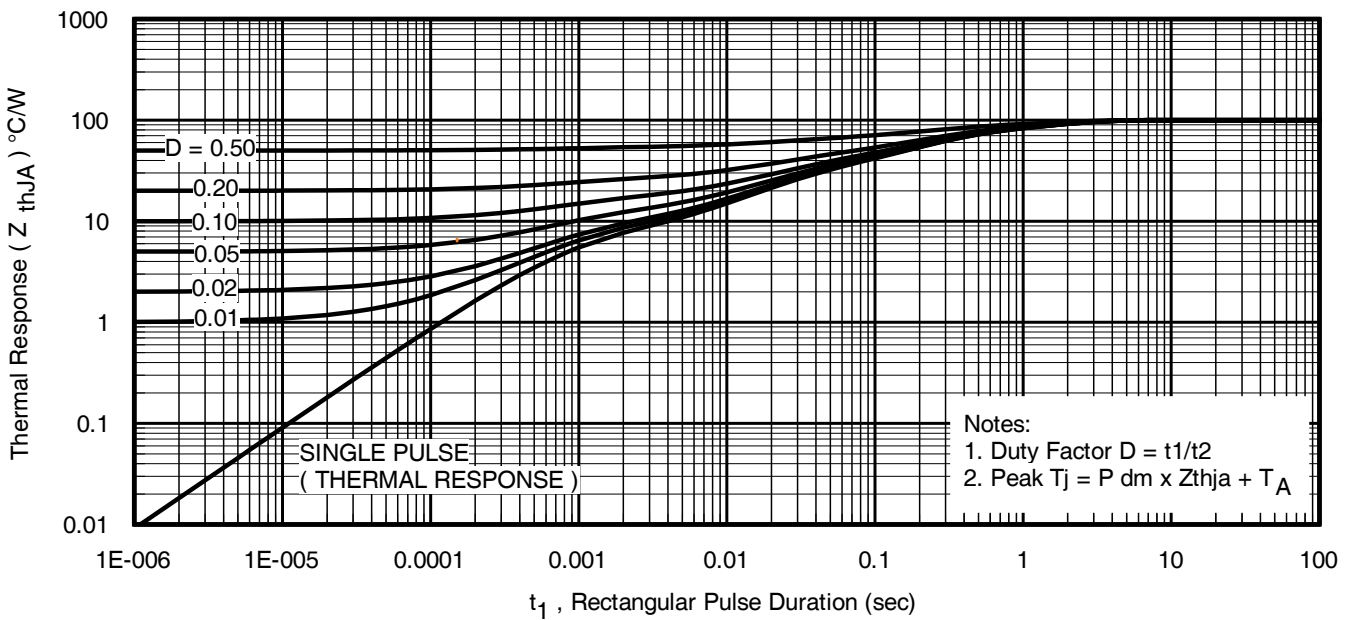


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

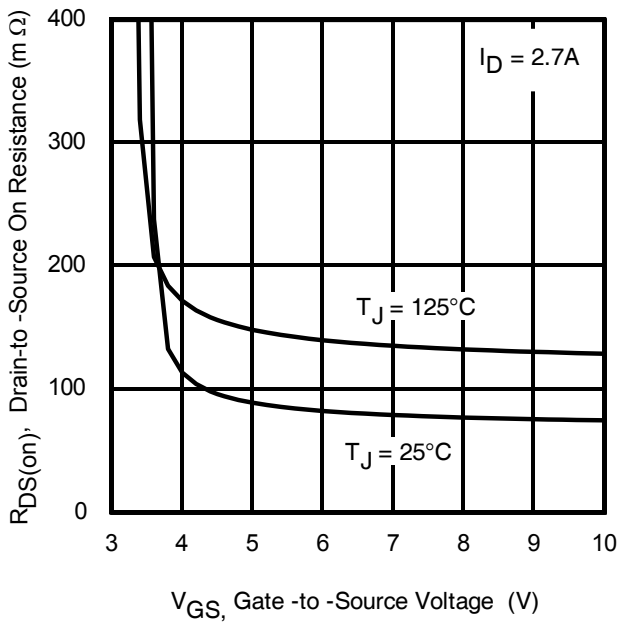


Fig 12. Typical On-Resistance Vs. Gate Voltage

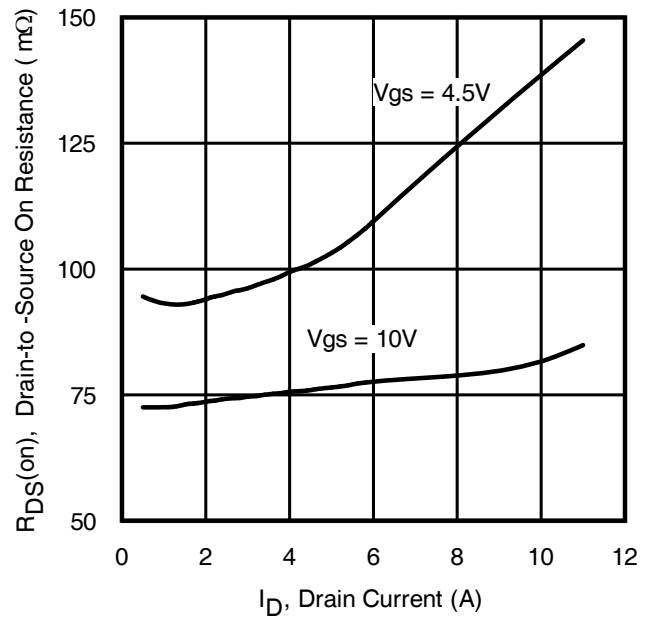


Fig 13. Typical On-Resistance Vs. Drain Current

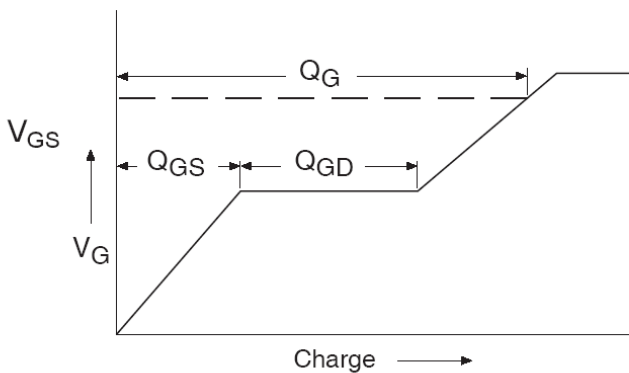


Fig 14a. Basic Gate Charge Waveform

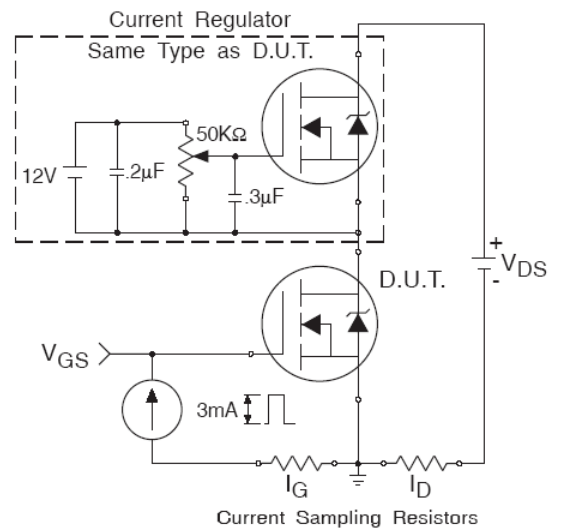


Fig 14b. Gate Charge Test Circuit

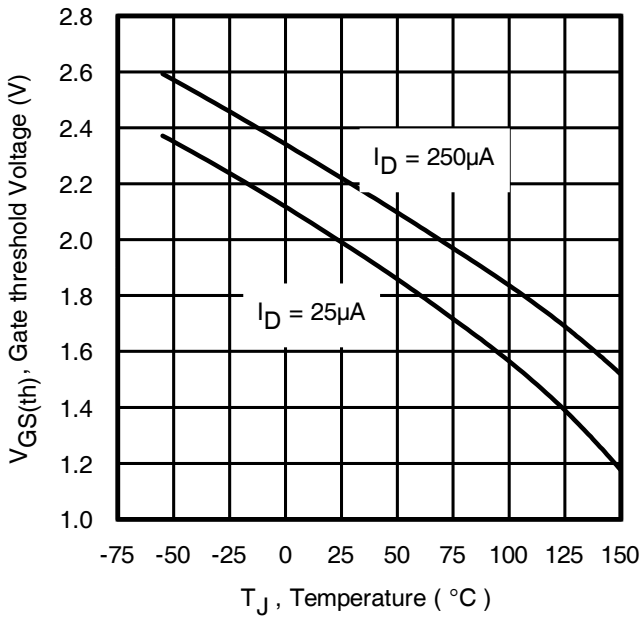


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

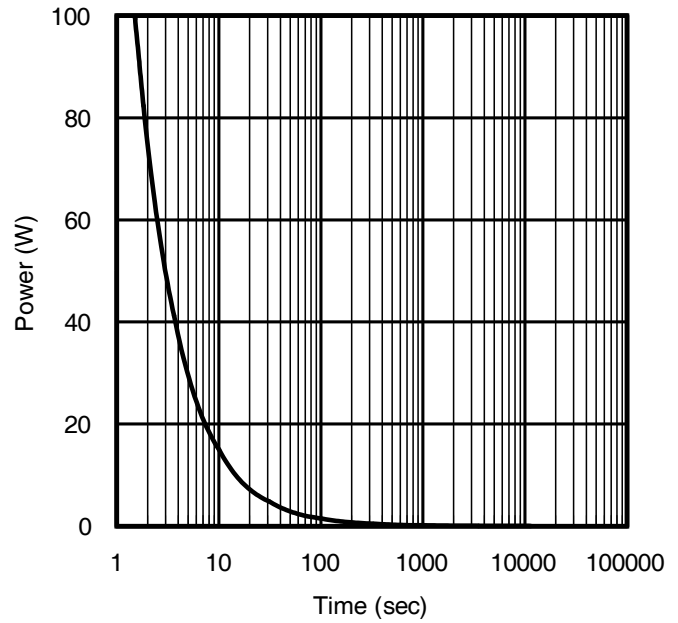
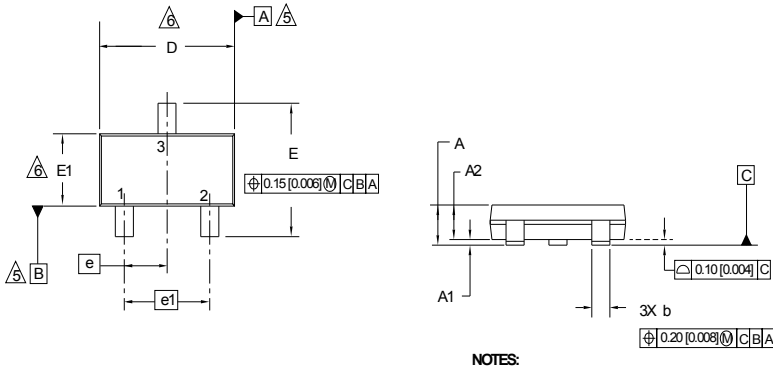
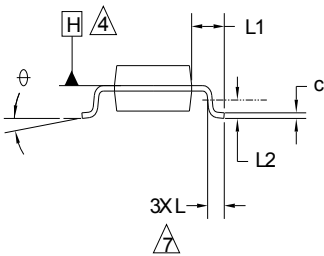
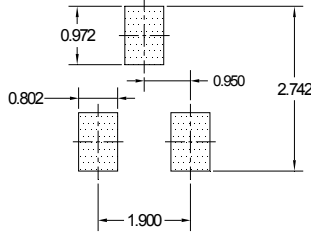


Fig 16. Typical Power Vs. Time

Micro3™ (SOT-23) Package Outline (Dimensions are shown in millimeters (inches))

NOTES:

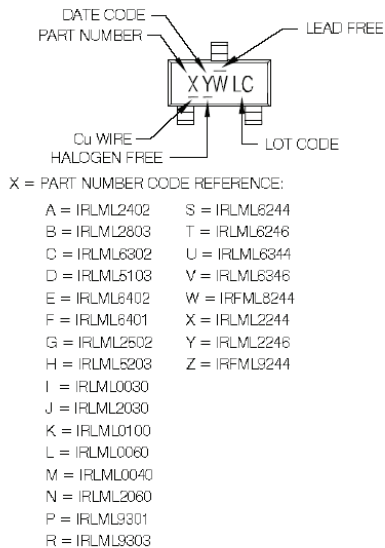
| SYMBOL | MILLIMETERS | | INCHES | |
|--------|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.89 | 1.12 | 0.035 | 0.044 |
| A1 | 0.01 | 0.10 | 0.0004 | 0.004 |
| A2 | 0.88 | 1.02 | 0.035 | 0.040 |
| b | 0.30 | 0.50 | 0.012 | 0.020 |
| c | 0.08 | 0.20 | 0.003 | 0.008 |
| D | 2.80 | 3.04 | 0.110 | 0.120 |
| E | 2.10 | 2.64 | 0.083 | 0.104 |
| E1 | 1.20 | 1.40 | 0.047 | 0.055 |
| e | 0.95 | BSC | 0.037 | BSC |
| e1 | 1.90 | BSC | 0.075 | BSC |
| L | 0.40 | 0.60 | 0.016 | 0.024 |
| L1 | 0.54 | REF | 0.021 | REF |
| L2 | 0.25 | BSC | 0.010 | BSC |
| ⌀ | 0 | 8 | 0 | 8 |


Recommended Footprint

NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. CONTROLLING DIMENSION: MILLIMETER
4. DATUM PLANE H IS LOCATED AT THE MOLD PARTING LINE
5. DATUM A AND B TO BE DETERMINED AT DATUM PLANE H
6. DIMENSIONS D AND E1 ARE MEASURED AT DATUM PLANE H. DIMENSIONS DOES NOT INCLUDE MOLD PROTRUSIONS OR INTERLEAD FLASH. MOLD PROTRUSIONS OR INTERLEAD FLASH SHALL NOT EXCEED 0.25 MM (0.010 INCH) PER SIDE
7. DIMENSION L IS THE LEAD LENGTH FOR SOLDERING TO A SUBSTRATE
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-236 AB

Micro3™ (SOT-23/TO-236AB) Part Marking Information

Notes: This part marking information applies to devices produced after 02/26/2001



Note: A line above the work week (as shown here) indicates Lead - Free.

DATE CODE MARKING INSTRUCTIONS

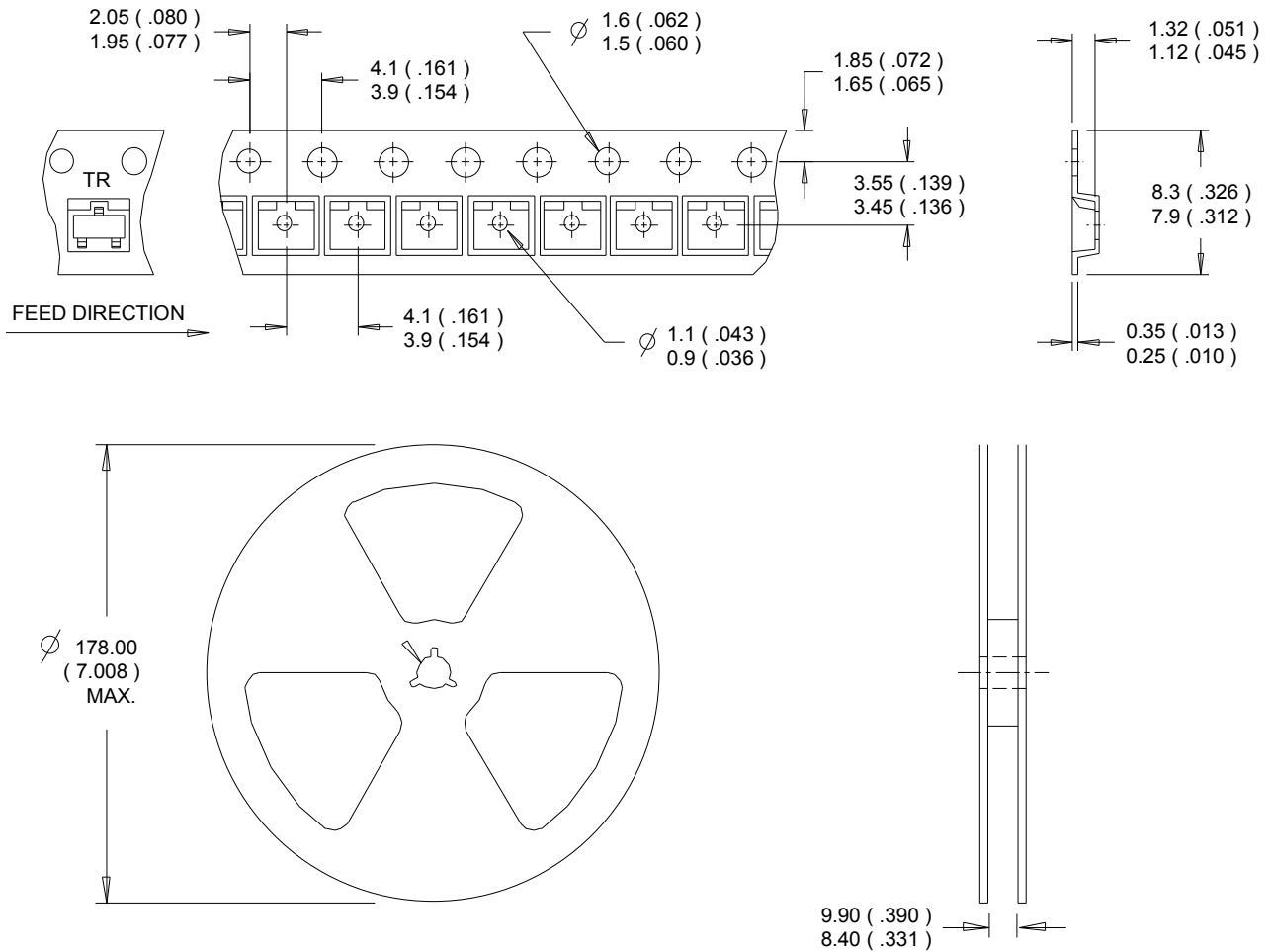
WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR

| YEAR | Y | WORK WEEK | W | |
|------|------|-----------|----|---|
| 2011 | 2001 | 1 | 01 | A |
| 2012 | 2002 | 2 | 02 | B |
| 2013 | 2003 | 3 | 03 | C |
| 2014 | 2004 | 4 | 04 | D |
| 2015 | 2005 | 5 | | |
| 2016 | 2006 | 6 | | |
| 2017 | 2007 | 7 | | |
| 2018 | 2008 | 8 | | |
| 2019 | 2009 | 9 | | |
| 2020 | 2010 | 0 | 24 | X |
| | | | 25 | Y |
| | | | 26 | Z |

WW = (27-52) IF PRECEDED BY A LETTER

| YEAR | Y | WORK WEEK | W | |
|------|------|-----------|----|---|
| 2011 | 2001 | A | 27 | A |
| 2012 | 2002 | B | 28 | B |
| 2013 | 2003 | C | 29 | C |
| 2014 | 2004 | D | 30 | D |
| 2015 | 2005 | E | | |
| 2016 | 2006 | F | | |
| 2017 | 2007 | G | | |
| 2018 | 2008 | H | | |
| 2019 | 2009 | J | | |
| 2020 | 2010 | K | 50 | X |
| | | | 51 | Y |
| | | | 52 | Z |

 Note: For the most current drawing please refer to Infineon's web site www.infineon.com

Micro3™ Tape & Reel Information (Dimensions are shown in millimeters (inches))


- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
 2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Note: For the most current drawing please refer to Infineon's web site www.infineon.com

Qualification Information

| | | |
|-----------------------------------|-----------------------------------|----------------------------------|
| Qualification Level | Consumer (per JEDEC JESD47F) † | |
| Moisture Sensitivity Level | Micro3™ (SOT-23) | MSL1 (per JEDEC J-STD-020D) † |
| RoHS Compliant | Yes | |

† Applicable version of JEDEC standard at the time of product release.

Revision History

| Date | Comments |
|----------|--|
| 12/20/16 | <ul style="list-style-type: none"> Changed datasheet with Infineon logo - all pages. Removed typo "Industrial" on Feature and Benefits Table on page 1. Corrected typo for Igss test condition from "V_{GS} = 20V" to "V_{GS} = 16V" on page 2. |

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