

J606-Z-VB Datasheet

P-Channel 60 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) ^c |
|--------------|-----------------------------|------------------------|
| - 60 | 0.0074 at $V_{GS} = -10$ V | - 90 |
| | 0.0094 at $V_{GS} = -4.5$ V | - 90 |

FEATURES

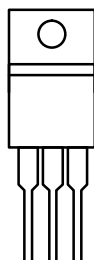
- Trench Power MOSFET
- Compliant to RoHS Directive 2002/95/EC


RoHS
 COMPLIANT

APPLICATIONS

- DC/DC Primary Switch

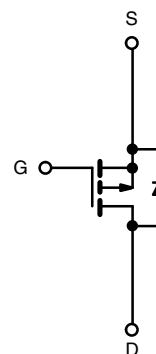
TO-220AB



G D S

Top View

Drain connected to Tab



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|---|-------------------------|-----------------------------------|------------------|------|
| Drain-Source Voltage | | V _{DS} | - 60 | V |
| Gate-Source Voltage | | V _{GS} | ± 20 | |
| Continuous Drain Current (T _J = 175 °C) ^c | T _C = 25 °C | I _D | - 90 | A |
| | T _C = 125 °C | | - 67 | |
| Pulsed Drain Current | | I _{DM} | - 200 | |
| Avalanche Current | L = 0.1 mH | I _{AS} | - 65 | |
| Single Pulse Avalanche Energy ^a | | E _{AS} | 211 | mJ |
| Power Dissipation | T _C = 25 °C | P _D | 250 ^b | W |
| | T _A = 25 °C | | 2.4 | |
| Operating Junction and Storage Temperature Range | | T _J , T _{stg} | - 55 to 175 | °C |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Limit | Unit |
|------------------------------|------------|-------|------|
| Junction-to-Ambient Free Air | R_{thJA} | 62 | °C/W |
| Junction-to-Case | R_{thJC} | 0.6 | |

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. Limited by package.

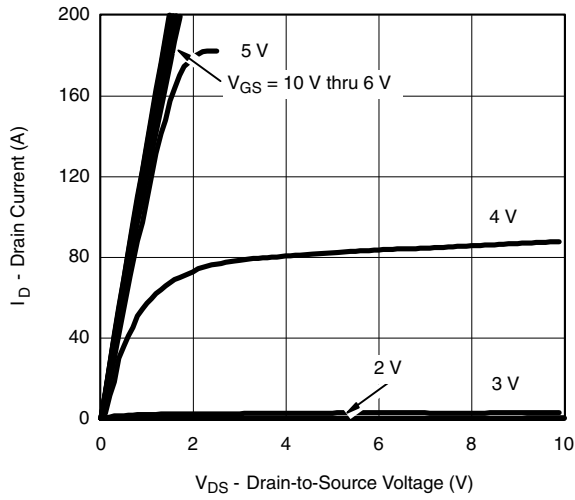
| SPECIFICATIONS (T _J = 25 °C, unless otherwise noted) | | | | | | |
|--|----------------------|---|-------|--------|-------|------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{DS} | V _{GS} = 0 V, I _D = - 250 μA | - 60 | | | V |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = - 250 μA | - 1 | | - 3 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = - 60 V, V _{GS} = 0 V | | | - 1 | μA |
| | | V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 125 °C | | | - 50 | |
| | | V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 175 °C | | | - 250 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = - 5 V, V _{GS} = - 10 V | - 120 | | | A |
| Drain-Source On-State Resistance ^a | R _{DS(on)} | V _{GS} = - 10 V, I _D = - 30 A | | 0.0074 | | Ω |
| | | V _{GS} = - 10 V, I _D = - 30 A, T _J = 125 °C | | 0.0150 | | |
| | | V _{GS} = - 10 V, I _D = - 30 A, T _J = 175 °C | | 0.0190 | | |
| | | V _{GS} = - 4.5 V, I _D = - 20 A | | 0.0094 | | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = - 15 V, I _D = - 30 A | 20 | | | S |
| Dynamic ^b | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = - 25 V, f = 1 MHz | | 9200 | | pF |
| Output Capacitance | C _{oss} | | | 975 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 760 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = - 30 V, V _{GS} = - 10 V, I _D = - 90 A | | 160 | 240 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 40 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 36 | | |
| Gate Resistance | R _g | f = 1.0 MHz | | 3 | | Ω |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = - 30 V, R _L = 0.33 Ω I _D ≅ - 90 A, V _{GEN} = - 10 V, R _g = 2.5 Ω | | 20 | 30 | ns |
| Rise Time ^c | t _r | | | 190 | 285 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 140 | 210 | |
| Fall Time ^c | t _f | | | 300 | 450 | |
| Source-Drain Diode Ratings and Characteristics (T _C = 25 °C) ^b | | | | | | |
| Continuous Current | I _S | | | | - 90 | A |
| Pulsed Current | I _{SM} | | | | - 200 | |
| Forward Voltage ^a | V _{SD} | I _F = - 50 A, V _{GS} = 0 V | | - 1.0 | - 1.5 | V |
| Reverse Recovery Time | t _{rr} | I _F = - 50 A, dI/dt = 100 A/μs | | 60 | 90 | ns |
| Peak Reverse Recovery Current | I _{RM(REC)} | | | - 3 | - 4.5 | A |
| Reverse Recovery Charge | Q _{rr} | | | | 0.09 | 0.2 |

Notes:

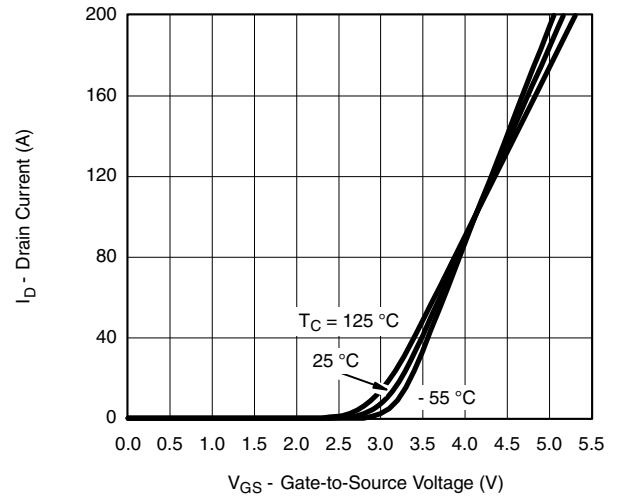
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.
 c. Independent of operating temperature.

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.

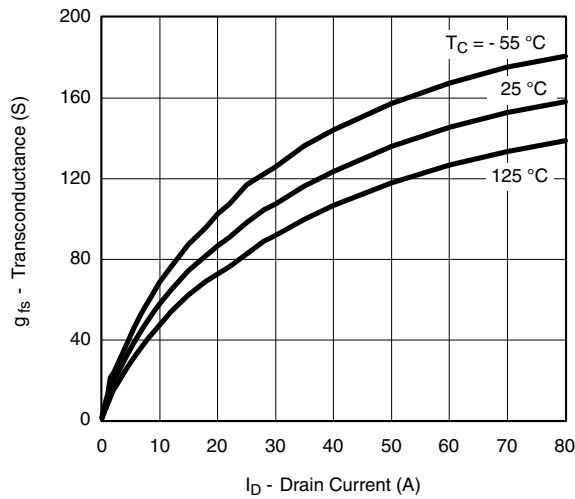
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



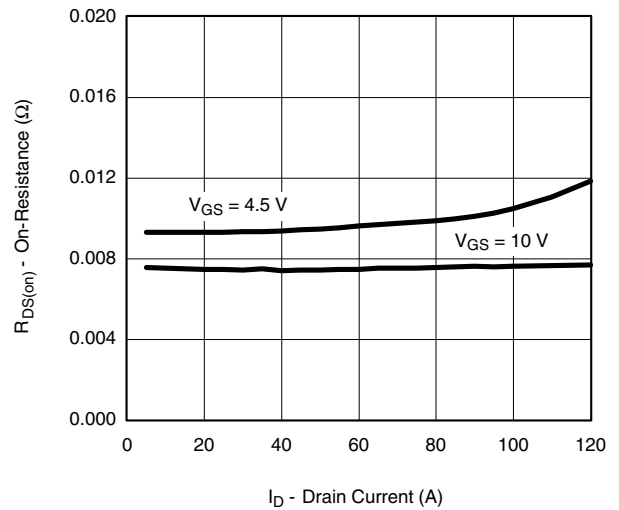
Output Characteristics



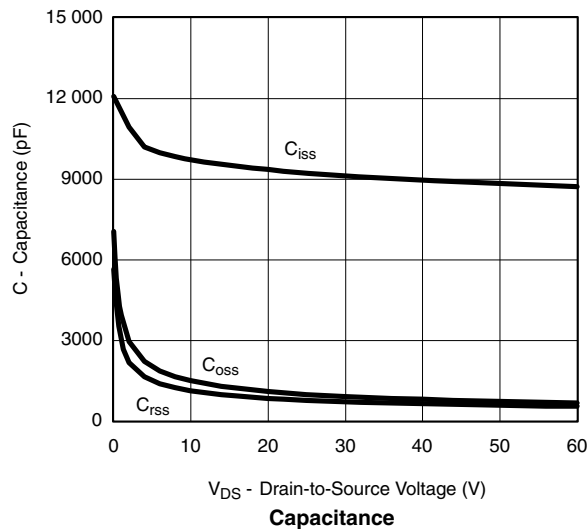
Transfer Characteristics



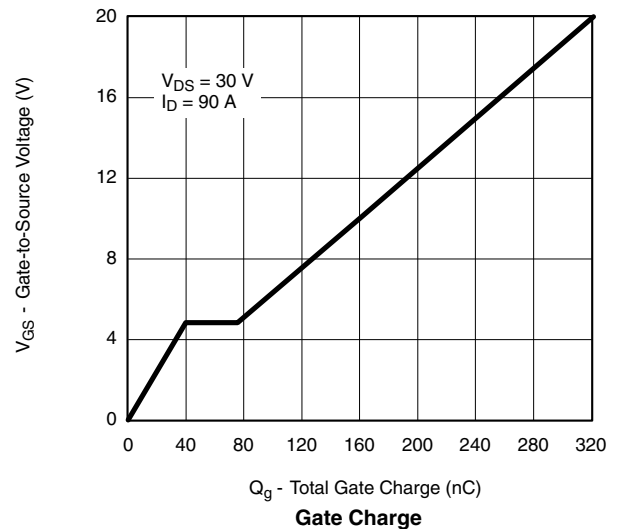
Transconductance



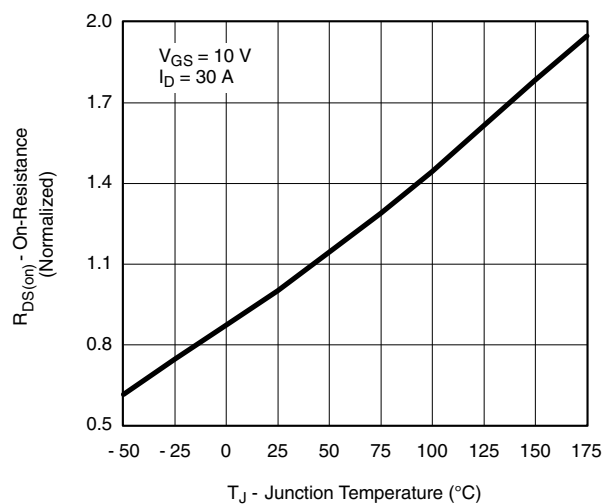
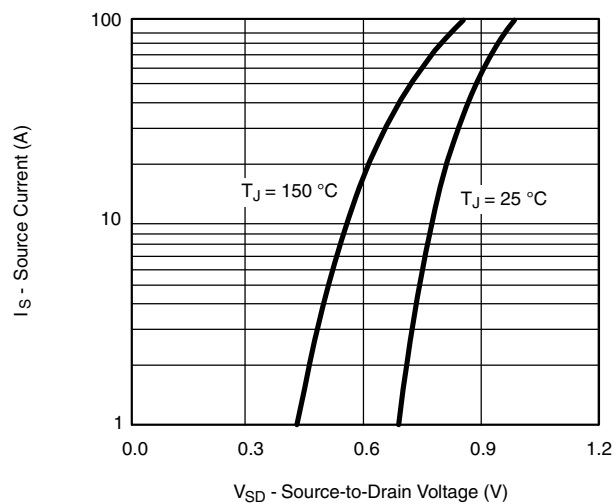
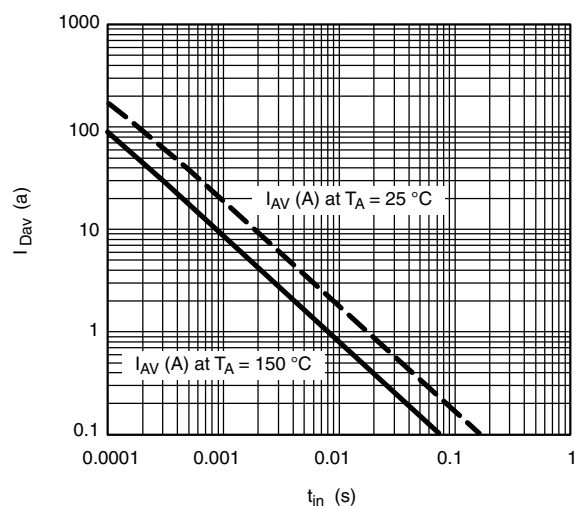
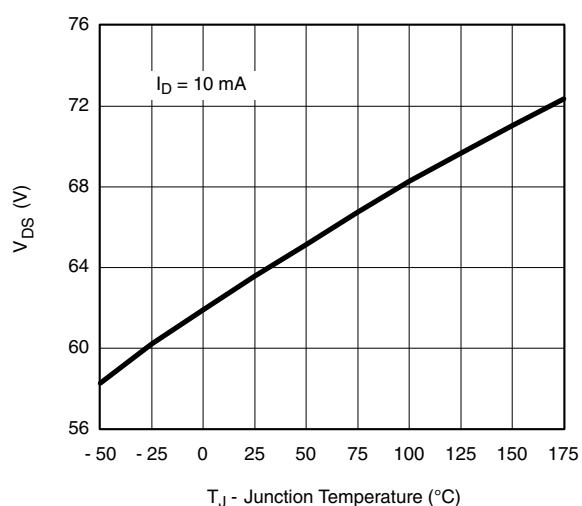
On-Resistance vs. Drain Current



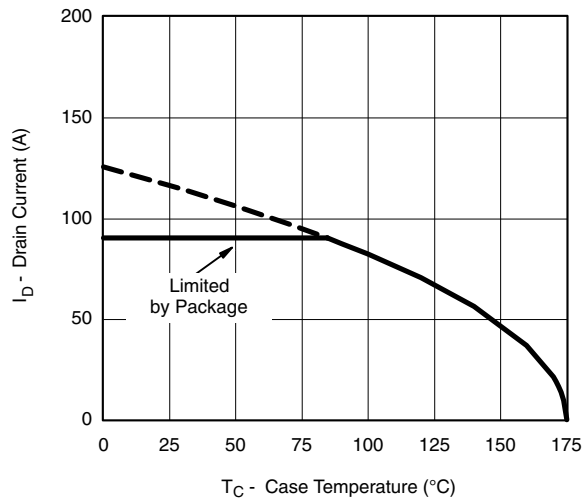
Capacitance



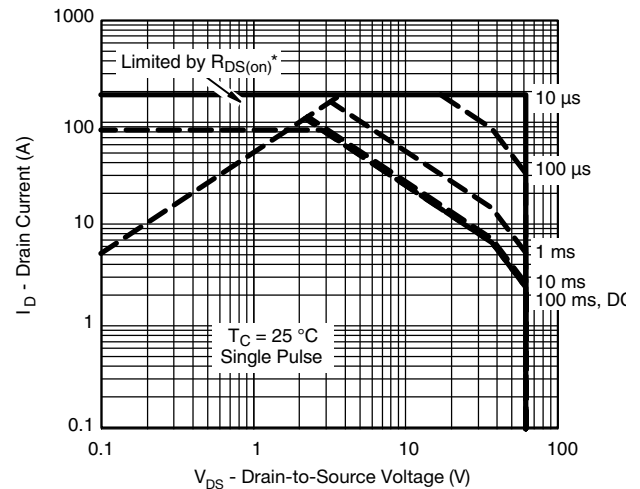
Gate Charge

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage

Avalanche Current vs. Time

Drain Source Breakdown vs. Junction Temperature

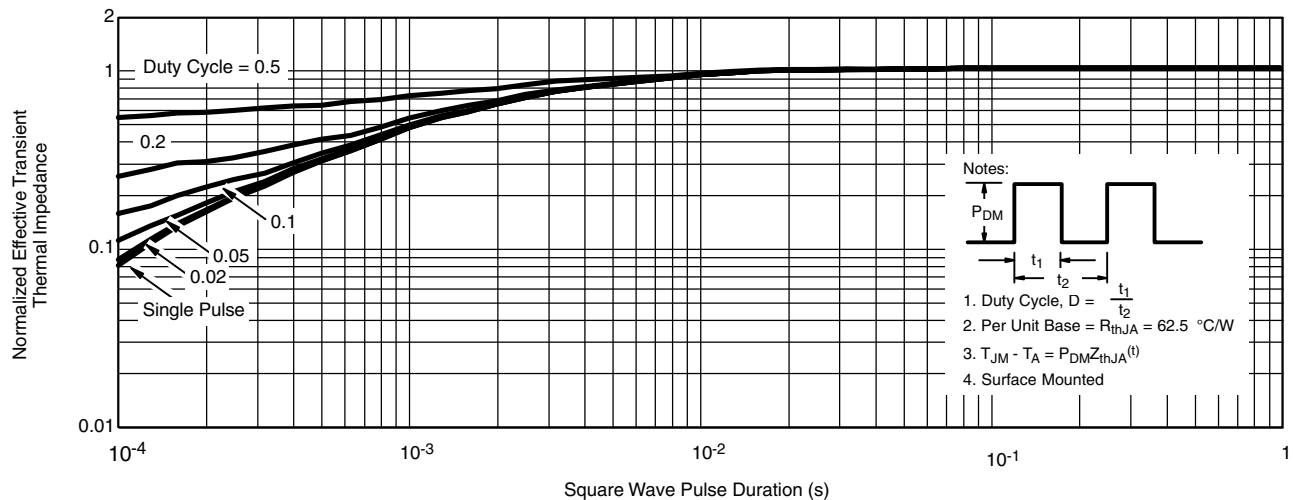
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature

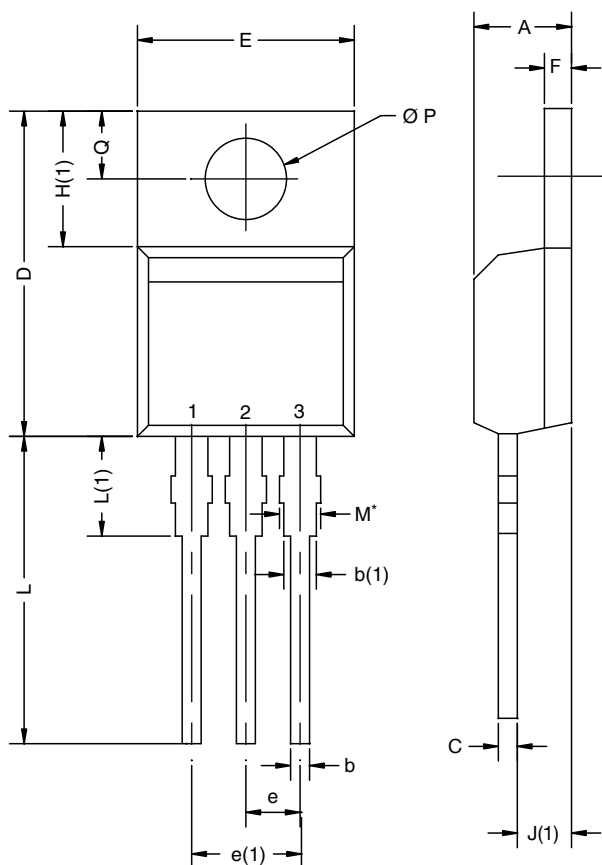


Safe Operating Area
 $* V_{GS} > \text{minimum } V_{GS} \text{ at which } R_{DS(on)} \text{ is specified}$



Normalized Thermal Transient Impedance, Junction-to-Case

TO-220AB

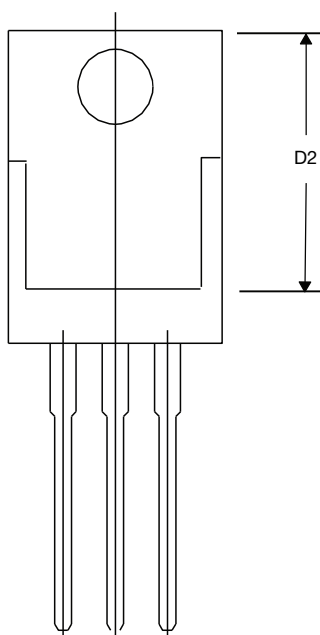


| DIM. | MILLIMETERS | | INCHES | |
|------|-------------|-------|--------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 4.25 | 4.65 | 0.167 | 0.183 |
| b | 0.69 | 1.01 | 0.027 | 0.040 |
| b(1) | 1.20 | 1.73 | 0.047 | 0.068 |
| c | 0.36 | 0.61 | 0.014 | 0.024 |
| D | 14.85 | 15.49 | 0.585 | 0.610 |
| D2 | 12.19 | 12.70 | 0.480 | 0.500 |
| E | 10.04 | 10.51 | 0.395 | 0.414 |
| e | 2.41 | 2.67 | 0.095 | 0.105 |
| e(1) | 4.88 | 5.28 | 0.192 | 0.208 |
| F | 1.14 | 1.40 | 0.045 | 0.055 |
| H(1) | 6.09 | 6.48 | 0.240 | 0.255 |
| J(1) | 2.41 | 2.92 | 0.095 | 0.115 |
| L | 13.35 | 14.02 | 0.526 | 0.552 |
| L(1) | 3.32 | 3.82 | 0.131 | 0.150 |
| Ø P | 3.54 | 3.94 | 0.139 | 0.155 |
| Q | 2.60 | 3.00 | 0.102 | 0.118 |

ECN: T14-0413-Rev. P, 16-Jun-14
 DWG: 5471

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
 Heatsink hole for HVM



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