

Six-Pack NPT IGBT

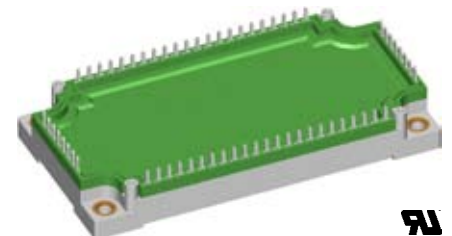
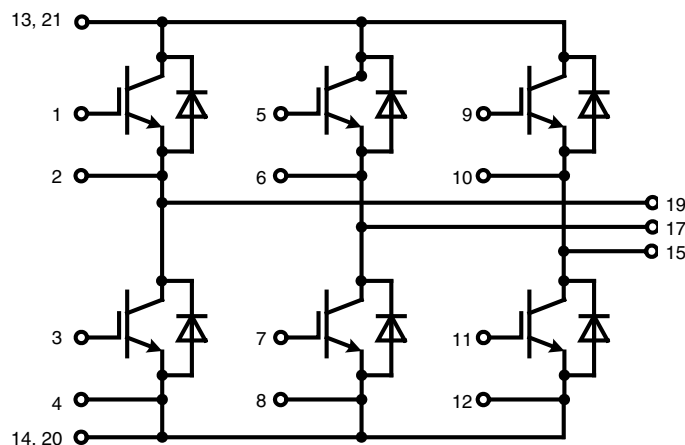
$V_{CES} = 1200\text{ V}$

$I_{C25} = 125\text{ A}$

$V_{CE(sat) \text{ typ.}} = 2.2\text{ V}$

Part name (Marking on product)

MWI 75-12A8



E 72873

Pin configuration see outlines.

Features:

- NPT IGBT technology
- low saturation voltage
- low switching losses
- switching frequency up to 30 kHz
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- ultra fast free wheeling diodes
- solderable pins for PCB mounting
- space savings

Application:

- AC motor control
- AC servo and robot drives
- power supplies

Package:

- designed for wave soldering
- with copper base plate

Output Inverter T1 - T6

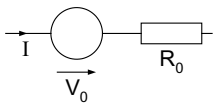
| Symbol | Definitions | Conditions | Ratings | | | Unit |
|---------------|---------------------------------------|--|--------------------------------|------|----------|---------------|
| | | | min. | typ. | max. | |
| V_{CES} | collector emitter voltage | $T_{VJ} = 25^{\circ}\text{C}$ | | | 1200 | V |
| V_{GES} | max. DC gate voltage | continuous | | | ± 20 | V |
| V_{GEM} | max. transient collector gate voltage | transient | | | ± 30 | V |
| I_{C25} | collector current | $T_C = 25^{\circ}\text{C}$ | | | 125 | A |
| I_{C80} | | $T_C = 80^{\circ}\text{C}$ | | | 85 | A |
| P_{tot} | total power dissipation | $T_C = 25^{\circ}\text{C}$ | | | 500 | W |
| $V_{CE(sat)}$ | collector emitter saturation voltage | $I_C = 75\text{ A}; V_{GE} = 15\text{ V}$ | | | 2.2 | V |
| | | | | | 2.5 | V |
| $V_{GE(th)}$ | gate emitter threshold voltage | $I_C = 3\text{ mA}; V_{GE} = V_{CE}$ | $T_{VJ} = 25^{\circ}\text{C}$ | 4.5 | 6.5 | V |
| I_{CES} | collector emitter leakage current | $V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$ | $T_{VJ} = 25^{\circ}\text{C}$ | | 5 | mA |
| | | | $T_{VJ} = 125^{\circ}\text{C}$ | 3 | | mA |
| I_{GES} | gate emitter leakage current | $V_{GE} = \pm 20\text{ V}$ | | | 400 | nA |
| C_{ies} | input capacitance | $V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$ | | | 5.5 | nF |
| $Q_{G(on)}$ | total gate charge | $V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 75\text{ A}$ | | | 350 | nC |
| $t_{d(on)}$ | turn-on delay time | inductive load $V_{CE} = 600\text{ V}; I_C = 75\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 15\ \Omega$ | $T_{VJ} = 125^{\circ}\text{C}$ | | 100 | ns |
| t_r | current rise time | | | | 50 | ns |
| $t_{d(off)}$ | turn-off delay time | | | | 650 | ns |
| t_f | current fall time | | | | 50 | ns |
| E_{on} | turn-on energy per pulse | | | | 12.1 | mJ |
| E_{off} | turn-off energy per pulse | | | | 10.5 | mJ |
| RBSOA | reverse bias safe operating area | $V_{GE} = \pm 15\text{ V}; R_G = 15\ \Omega;$ | $T_{VJ} = 125^{\circ}\text{C}$ | | 150 | A |
| | | | $V_{CEK} \leq 1200\text{ V}$ | | | |
| SCSOA | short circuit safe operating area | | $T_{VJ} = 125^{\circ}\text{C}$ | | 10 | μs |
| t_{sc} | short circuit duration | $V_{CE} = 1200\text{ V}; V_{GE} = \pm 15\text{ V};$ | | | 300 | A |
| I_{sc} | short circuit current | $R_G = 15\ \Omega;$ non-repetitive | | | | |
| R_{thJC} | thermal resistance junction to case | (per IGBT) | | | 0.25 | K/W |

Output Inverter D1 - D6

| Symbol | Definitions | Conditions | Ratings | | | Unit |
|------------|-------------------------------------|---|--------------------------------|------|------|------|
| | | | min. | typ. | max. | |
| V_{RRM} | max. repetitive reverse voltage | $T_{VJ} = 25^{\circ}\text{C}$ | | | 1200 | V |
| I_{F25} | forward current | $T_C = 25^{\circ}\text{C}$ | | | 150 | A |
| I_{F80} | | $T_C = 80^{\circ}\text{C}$ | | | 100 | A |
| V_F | forward voltage | $I_F = 75\text{ A}; V_{GE} = 0\text{ V}$ | $T_{VJ} = 25^{\circ}\text{C}$ | | 2.2 | V |
| | | | $T_{VJ} = 125^{\circ}\text{C}$ | | 1.6 | V |
| I_{RM} | max. reverse recovery current | $V_R = 600\text{ V}; I_F = 75\text{ A}; V_{GE} = 0\text{ V}$ $di_F/dt = -750\text{ A}/\mu\text{s}$ | $T_{VJ} = 125^{\circ}\text{C}$ | | 79 | A |
| t_{rr} | reverse recovery time | | | | 220 | ns |
| R_{thJC} | thermal resistance junction to case | (per diode) | | | 0.41 | K/W |

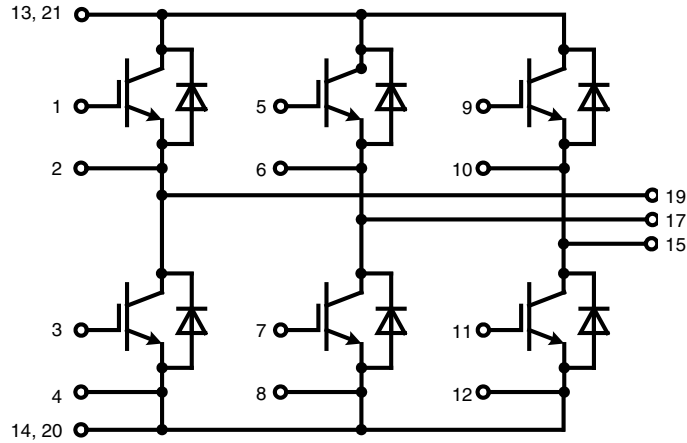
Module

| Symbol | Definitions | Conditions | Ratings | | | Unit |
|----------------|--|--|---------|------|------|------|
| | | | min. | typ. | max. | |
| T_{VJ} | <i>operating temperature</i> | | -40 | | 125 | °C |
| T_{VJM} | <i>max. virtual junction temperature</i> | | | | 150 | °C |
| T_{stg} | <i>storage temperature</i> | | -40 | | 125 | °C |
| V_{ISOL} | <i>isolation voltage</i> | $I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$ | | | 2500 | V~ |
| M_d | <i>mounting torque (M5)</i> | | 3 | | 6 | Nm |
| d_s | <i>creep distance on surface</i> | | 10 | | | mm |
| d_A | <i>strike distance through air</i> | | 10 | | | mm |
| $R_{pin-chip}$ | <i>resistance pin to chip</i> | | | 1.8 | | mΩ |
| R_{thCH} | <i>thermal resistance case to heatsink</i> | with heatsink compound | | 0.01 | | K/W |
| Weight | | | | 300 | | g |

Equivalent Circuits for Simulation


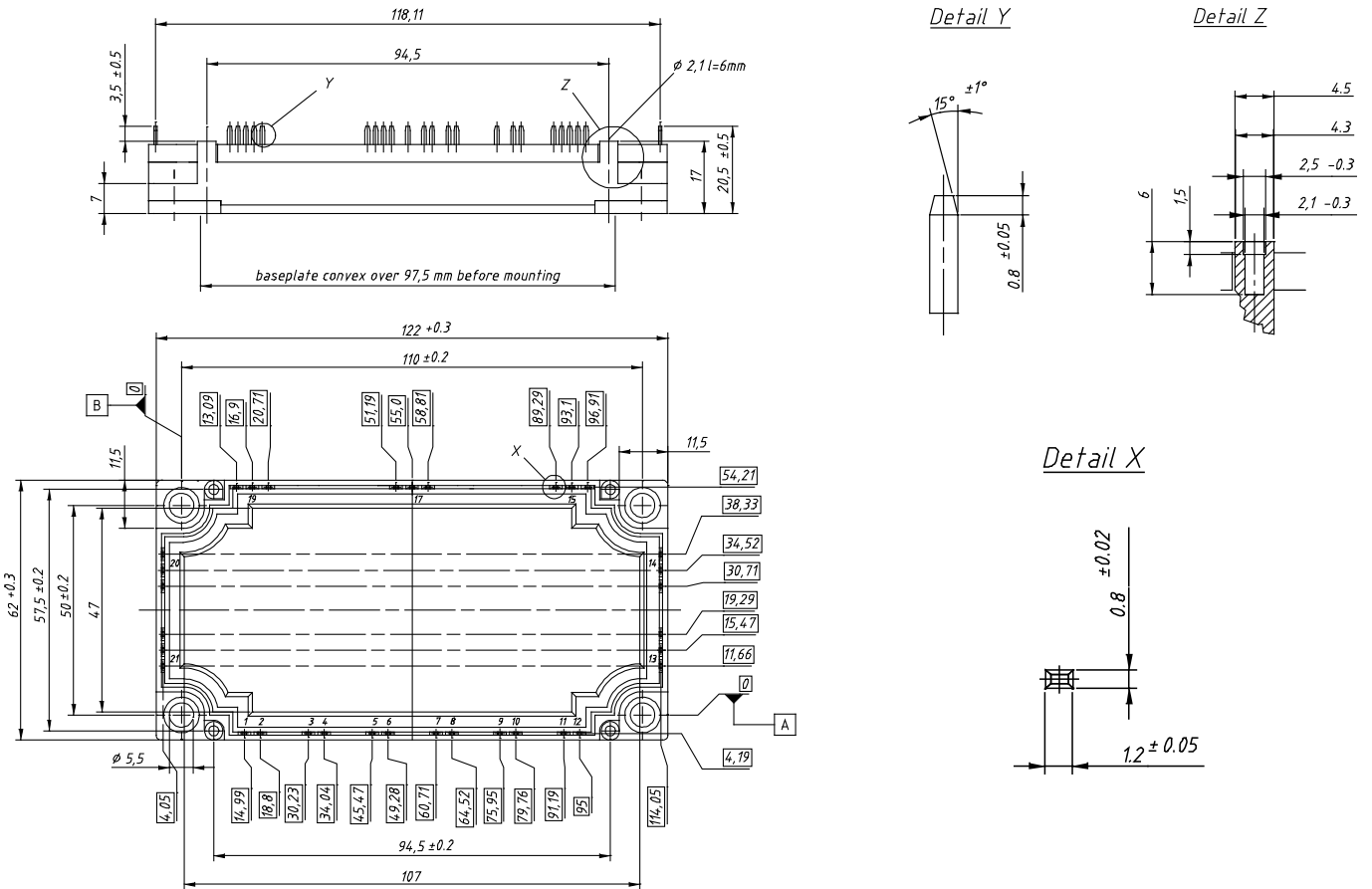
| Symbol | Definitions | Conditions | min. | Ratings | | Unit |
|--------|--------------|------------|------------------------------|---------|------|------|
| | | | | typ. | max. | |
| V_0 | <i>IGBT</i> | T1 - T6 | $T_{VJ} = 125^\circ\text{C}$ | 1.5 | | V |
| R_0 | | | | 13.5 | | mΩ |
| V_0 | <i>Diode</i> | D1 - D6 | $T_{VJ} = 125^\circ\text{C}$ | 1.3 | | V |
| R_0 | | | | 4 | | mΩ |

Circuit Diagram



Outline Drawing

Dimensions in mm (1 mm = 0.0394")



Product Marking

| Ordering | Part Name | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|----------|------------|--------------------|-----------------|----------|---------------|
| Standard | MWI75-12A8 | MWI75-12A8 | Box | 5 | 486787 |

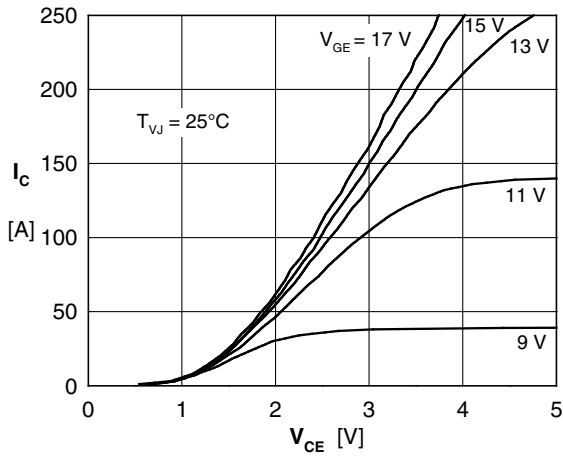


Fig. 1 Typ. output characteristics

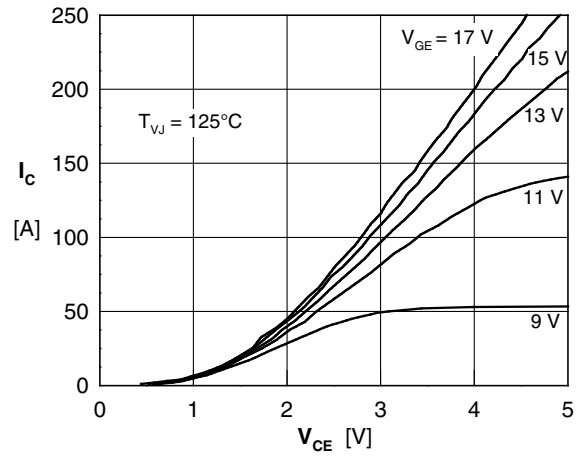


Fig. 2 Typ. output characteristics

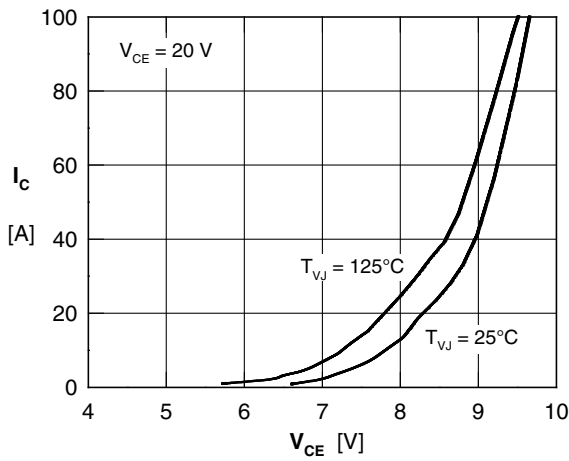


Fig. 3 Typ. transfer characteristics

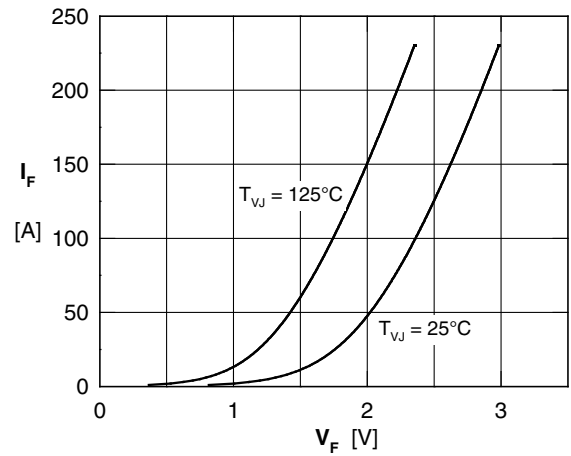


Fig. 4 Typ. forward characteristics of free wheeling diode

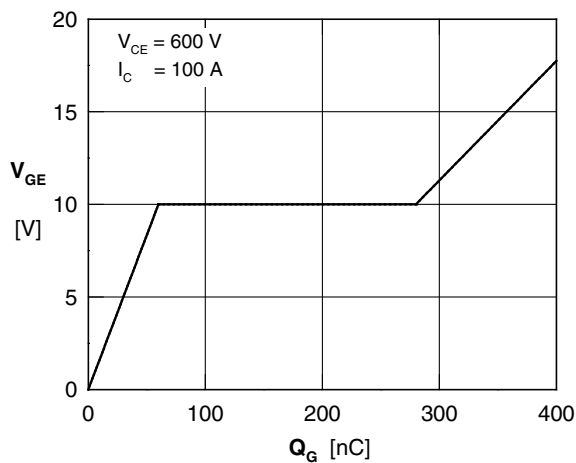


Fig. 5 Typ. turn on gate charge

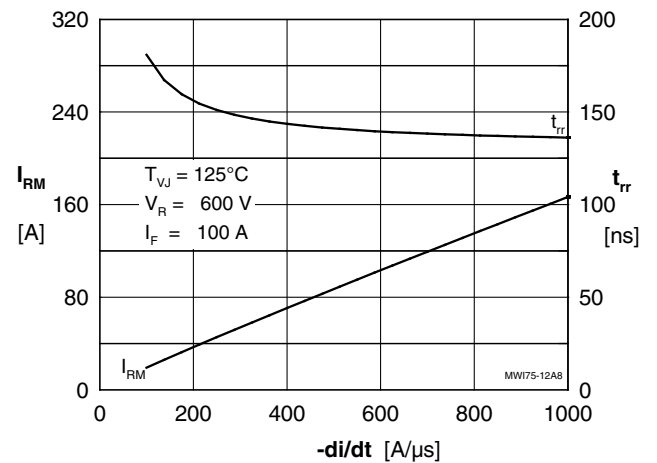


Fig. 6 Typ. turn off characteristics of free wheeling diode

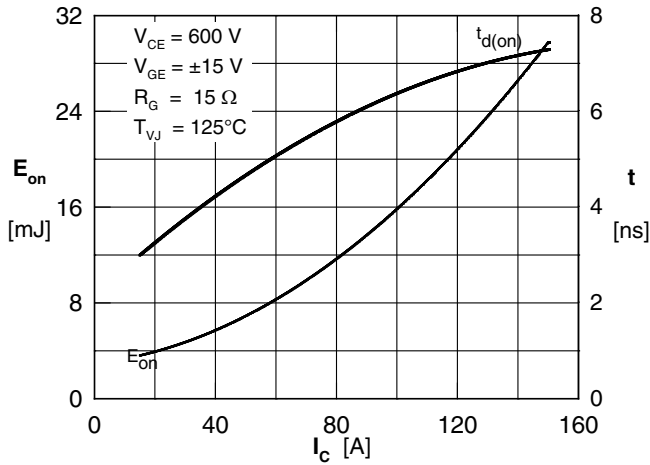


Fig. 7 Typ. turn on energy and switching times versus collector current

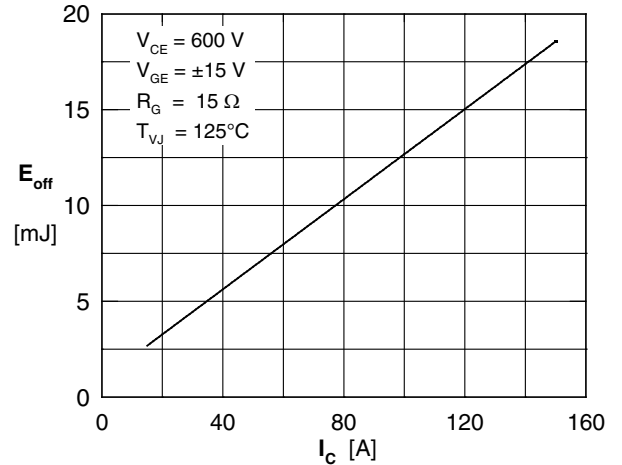


Fig. 8 Typ. turn off energy and switching times versus collector current

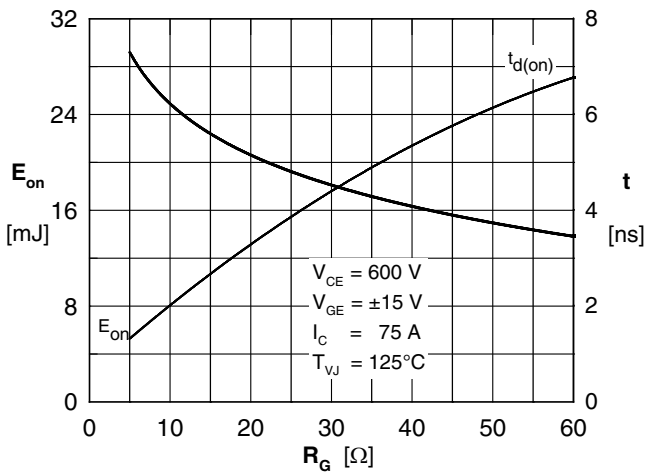


Fig. 9 Typ. turn on energy and switching times versus gate resistor

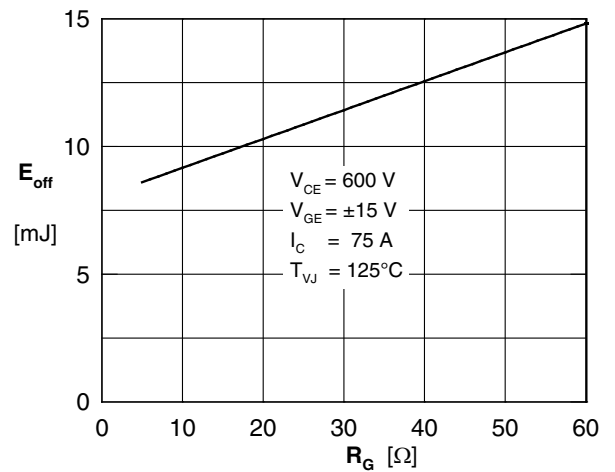


Fig. 10 Typ. turn off energy and switching times versus gate resistor

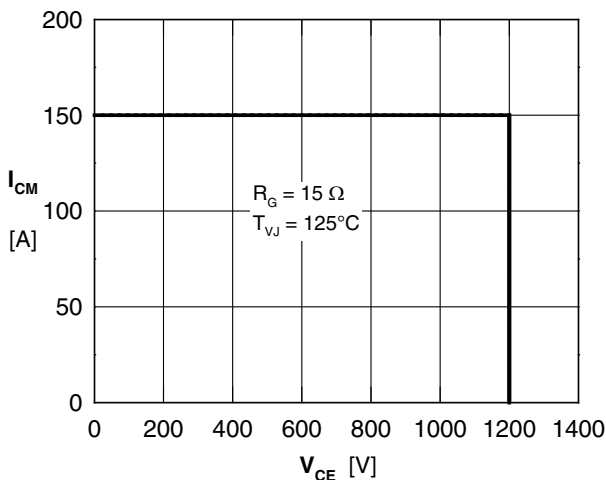


Fig. 11 Reverse biased safe operating area RBSOA

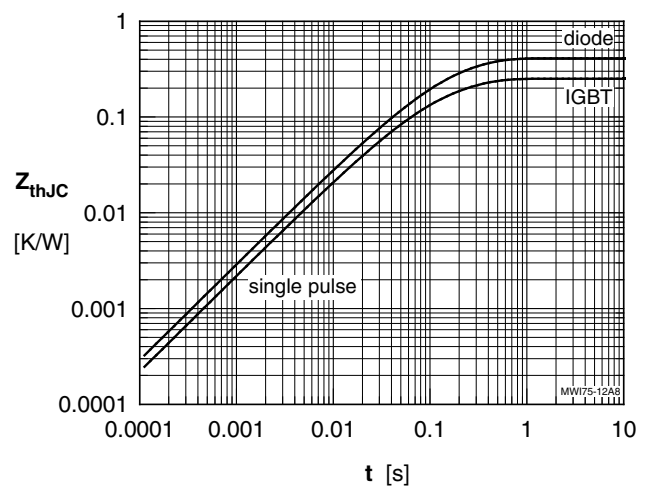


Fig. 12 Typ. transient thermal impedance