UNISONIC TECHNOLOGIES CO., LTD

MJE13005-XS

NPN SILICON TRANSISTOR

NPN SILICON POWER TRANSISTORS

DESCRIPTION

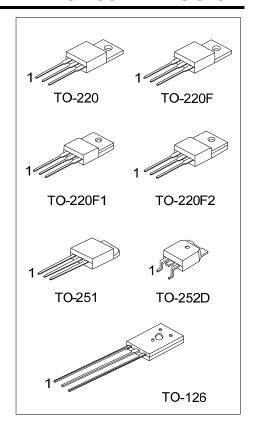
These devices are designed for high-voltage, high-speed power switching inductive circuits where fall time is critical. They are particularly suited for 115 and 220 V SWITCHMODE.

■ FEATURES

- * V_{CEO(SUS)}= 400V
- * Inductive switching matrix 2 to 4 Amp, 25 and 100°C t_C @ 3A, 100°C is 180 ns (Typ.)
- * 700V blocking capability

APPLICATIONS

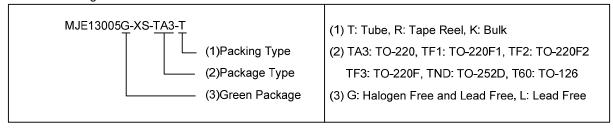
- * Switching regulator's, inverters
- * Motor controls
- * Solenoid/Relay drivers
- * Deflection circuits



■ ORDERING INFORMATION

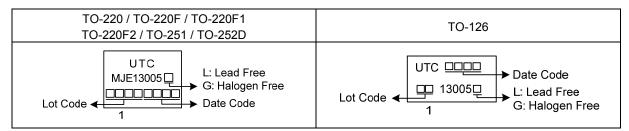
| Ordering Number | | Package | Pin Assignment | | | Packing | |
|---------------------|--------------------|-----------------------------|----------------|---|---|-----------|--|
| Lead Free | Halogen Free | Package | 1 | 2 | 3 | Facking | |
| MJE13005L-XS-TA3-T | MJE13005G-XS-TA3-T | TO-220 | В | С | E | Tube | |
| MJE13005L-XS-TF1-T | MJE13005G-XS-TF1-T | TO-220F1 | В | С | E | Tube | |
| MJE13005L-XS-TF2-T | MJE13005G-XS-TF2-T | TO-220F2 | В | С | Е | Tube | |
| MJE13005L-XS-TF3-T | MJE13005G-XS-TF3-T | TO-220F | В | С | E | Tube | |
| MJE13005L- XS-TM3-T | MJE13005G-XS-TM3-T | MJE13005G-XS-TM3-T TO-251 B | | С | E | Tube | |
| MJE13005L-XS-TND-R | MJE13005G-XS-TND-R | TO-252D | В | С | Е | Tape Reel | |
| MJE13005L-XS-T60-K | MJE13005G-XS-T60-K | TO-126 | В | С | E | Bulk | |

Note: Pin Assignment: B: Base C: Collector E: Emitter



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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|--|-------------------------------------|-----------------------------------|------------|-------|
| Collector-Emitter Voltage | | V _{CEO(SUS)} | 400 | V |
| Collector-Emitter Voltage (V _{BE} =0) | | V_{CES} | 700 | V |
| Collector-Base Voltage | | V_{CBO} | 700 | V |
| Emitter Base Voltage | | V_{EBO} | 9 | V |
| Collector Current | Continuous | I _C | 4 | Α |
| | Peak (1) | I _{CM} | 8 | Α |
| Base Current | Continuous | I _B | 2 | Α |
| | Peak (1) | I _{BM} | 4 | Α |
| - ··· 0 | Continuous | Ι _Ε | 6 | Α |
| Emitter Current | Peak (1) | I _{EM} | 12 | Α |
| D D: : // 17 0700 | TO-220F/TO-220F1 TO-220F2/TO-126 | | 40 | W |
| Power Dissipation at T _c =25°C | TO-220 | | 75 | W |
| | TO-251/TO-252D | P _D | 50 | W |
| Derate above 25°C | TO-220F/TO-220F1 TO-220F2/TO-126 | | 320 | mW/°C |
| | TO-220 | | 600 | mW/°C |
| | TO-251/TO-252D | | 400 | mW/°C |
| Operating and Storage Junction Temperature | | T _J , T _{STG} | -65 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

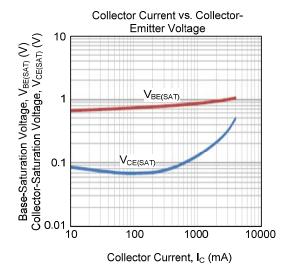
| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------|-------------------------------------|---------------|---------|------|
| Junction to Ambient | TO-220/TO-220F TO-220F1/TO-220F2 | θ_{JA} | 62.5 | °C/W |
| | TO-252D | | 80 | °C/W |
| Junction to Case | TO-220F/TO-220F1 TO-126 | 0 | 3.125 | °C/W |
| | TO-220 | θ_{JC} | 1.67 | °C/W |
| | TO-251/TO-252D | | 2.5 | °C/W |

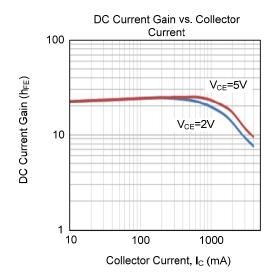
ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

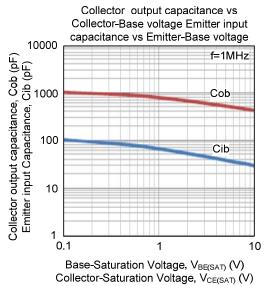
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|--|-----------------------|--|-----|-------------|-----|------|--|
| OFF CHARACTERISTICS (Note 1) | _ | 1 | | | 1 | 1 | |
| Collector-Emitter Sustaining Voltage | V _{CEO(SUS)} | I _C =10mA , I _B =0 | 400 | | | V | |
| Collector Cutoff Current | | V _{CBO} =Rated Value, | | | 1 | | |
| | Ісво | V _{BE(OFF)} =1.5V | ' | | ' | mA | |
| | | V _{CBO} =Rated Value, | | | 5 | | |
| | | V _{BE(OFF)} =1.5V, T _C =100°C | | | o l | | |
| Emitter Cutoff Current | I _{EBO} | V _{EB} =9V, I _C =0 | | | 1 | mA | |
| SECOND BREAKDOWN | | | | | | | |
| Second Breakdown Collector Current | | | | Coo Fig. 1 | | 1.1 | |
| with bass forward biased | I _{S/B} | | | See Fig. 11 | | | |
| Clamped Inductive SOA with Base | RBSOA | | | Soo Fig. | | 10 | |
| Reverse Biased | RBSUA | | | See Fig. 12 | | | |
| ON CHARACTERISTICS (Note 1) | | | | | | | |
| | h _{FE1} | I _C =0.5A, V _{CE} =5V | 15 | | 35 | | |
| DC Current Gain | h _{FE2} | I _C =1A, V _{CE} =5V | 10 | | 35 | | |
| | h _{FE3} | I _C =2A, V _{CE} =5V | 8 | | 30 | | |
| | V _{CE(SAT)} | I _C =1A, I _B =0.2A | | | 0.5 | V | |
| Callantar Fraittar Catruration Valtage | | I _C =2A, I _B =0.5A | | | 0.6 | V | |
| Collector-Emitter Saturation Voltage | | I _C =4A, I _B =1A | | | 1 | V | |
| | | I _C =2A, I _B =0.5A, Ta=100°C | | | 1 | V | |
| | | I _C =1A, I _B =0.2A | | | 1.2 | V | |
| Base-Emitter Saturation Voltage | V _{BE (SAT)} | I _C =2A, I _B =0.5A | | | 1.6 | V | |
| | | I _C =2A, I _B =0.5A, T _C =100°C | | | 1.5 | V | |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| Current-Gain-Bandwidth Product | f_{T} | I _C =500mA, V _{CE} =10V, f=1MHz | 4 | | | MHz | |
| Output Capacitance | C _{OB} | V _{CB} =10V, I _E =0, f=0.1MHz | | 30 | | pF | |
| SWITCHING CHARACTERISTICS | | | - | | - | | |
| Resistive Load (Table 1) | | | | | | | |
| Delay Time | t _D | | | 0.025 | 0.1 | μs | |
| Rise Time | t _R | V _{CC} =125V, I _C =2A, I _{B1} =I _{B2} =0.4A, | | 0.3 | 0.7 | μs | |
| Storage Time | ts | t _P =25µs, Duty Cycle≤1% | | 1.7 | 4 | μs | |
| Fall Time | t _F | 7 | | 0.4 | 0.9 | μs | |
| Notos: 1 Dulas Tost: Dulas Width-Ema | D 1 0 1 | 1100/ | | • | • | | |

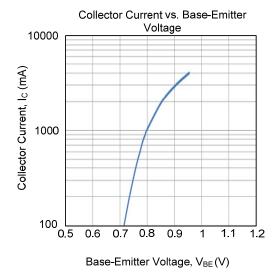
Notes: 1. Pulse Test: Pulse Width=5ms, Duty Cycle≤10% 2. Pulse Test: P_W=300µs, Duty Cycle≤2%

■ TYPICAL CHARACTERISTICS









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