

Features

- 100V/40A,
 $R_{DS(ON)} = 40\text{m}\Omega(\text{Typ.})@V_{GS}=10\text{V}$
- Low $R_{DS(ON)}$
- Planar Technology
- Reliable and Rugged

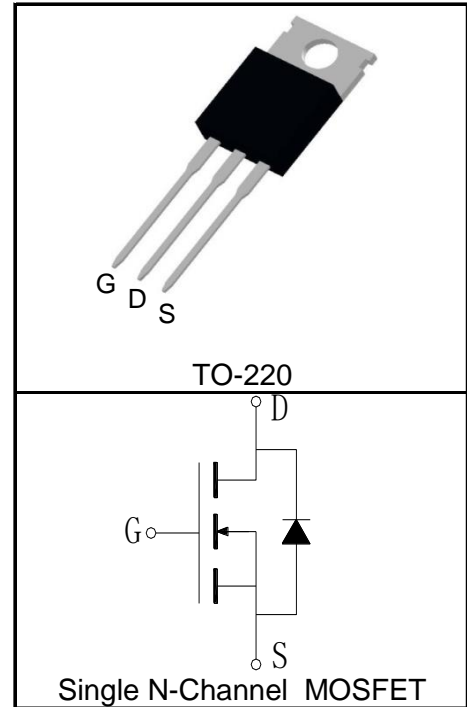
Applications

- DC-DC Converters and Off-line UPS
- Power Management in Inverter System



Halogen-Free

Pin Description



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|--|--|-------------------------------|---------------------------|
| Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted) | | | |
| V_{DSS} | Drain-Source Voltage | 100 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | |
| T_J | Maximum Junction Temperature | 175 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 175 | $^\circ\text{C}$ |
| I_S | Diode Continuous Forward Current | $T_C=25^\circ\text{C}$ 40 | A |
| Mounted on Large Heat Sink | | | |
| $I_{DP}^{①}$ | 300 μs Pulse Drain Current Tested | $T_C=25^\circ\text{C}$ 160 | A |
| $I_D^{②}$ | Continuous Drain Current ($V_{GS}=10\text{V}$) | $T_C=25^\circ\text{C}$ 40 | A |
| | | $T_C=100^\circ\text{C}$ 28 | |
| P_D | Maximum Power Dissipation | $T_C=25^\circ\text{C}$ 188 | W |
| | | $T_C=100^\circ\text{C}$ 94 | |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 0.8 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}^{③}$ | Thermal Resistance-Junction to Ambient | 62.5 | $^\circ\text{C}/\text{W}$ |
| Drain-Source Avalanche Ratings | | | |
| $E_{AS}^{④}$ | Avalanche Energy, Single Pulsed | 196 | mJ |

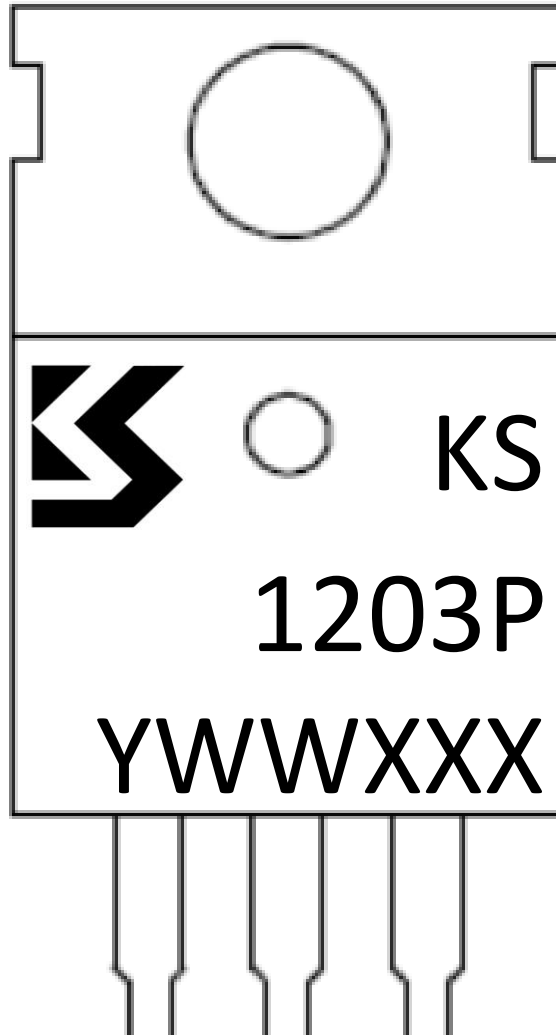
Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | KS1203CAP | | | Unit |
|--|----------------------------------|---|-----------|------|-----------|------------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 100 | 115 | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=100V, V_{GS}=0V$ | | | 1 | μA |
| | | $T_J=125^\circ\text{C}$ | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 2 | 3 | 4 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^{(5)}$ | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=20A$ | | 40 | 50 | m Ω |
| Diode Characteristics | | | | | | |
| $V_{SD}^{(5)}$ | Diode Forward Voltage | $I_{SD}=20A, V_{GS}=0V$ | | 0.89 | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=20A, di_{SD}/dt=100A/\mu s$ | | 105 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 480 | | nC |
| Dynamic Characteristics⁽⁶⁾ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | | 1.6 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=50V,$ Frequency=1.0MHz | | 1950 | | pF |
| C_{oss} | Output Capacitance | | | 265 | | |
| C_{riss} | Reverse Transfer Capacitance | | | 60 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=50V, I_{DS}=20A,$ $V_{GEN}=10V, R_G=3\Omega$ | | 12 | | ns |
| t_r | Turn-on Rise Time | | | 33 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 42 | | |
| t_f | Turn-off Fall Time | | | 28 | | |
| Gate Charge Characteristics⁽⁶⁾ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=50V, V_{GS}=10V,$ $I_{DS}=20A$ | | 52 | | nC |
| Q_{gs} | Gate-Source Charge | | | 11 | | |
| Q_{gd} | Gate-Drain Charge | | | 18 | | |

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by $T_{Jmax}, I_{AS} = 28A, L = 0.5\text{mH}, V_{DD} = 48V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

Ordering and Marking Information

| Device | Package | Packaging | Quantity | Reel Size | Tape width |
|-----------|---------|-----------|----------|-----------|------------|
| KS1203CAP | TO-220 | Tube | 50 | - | - |

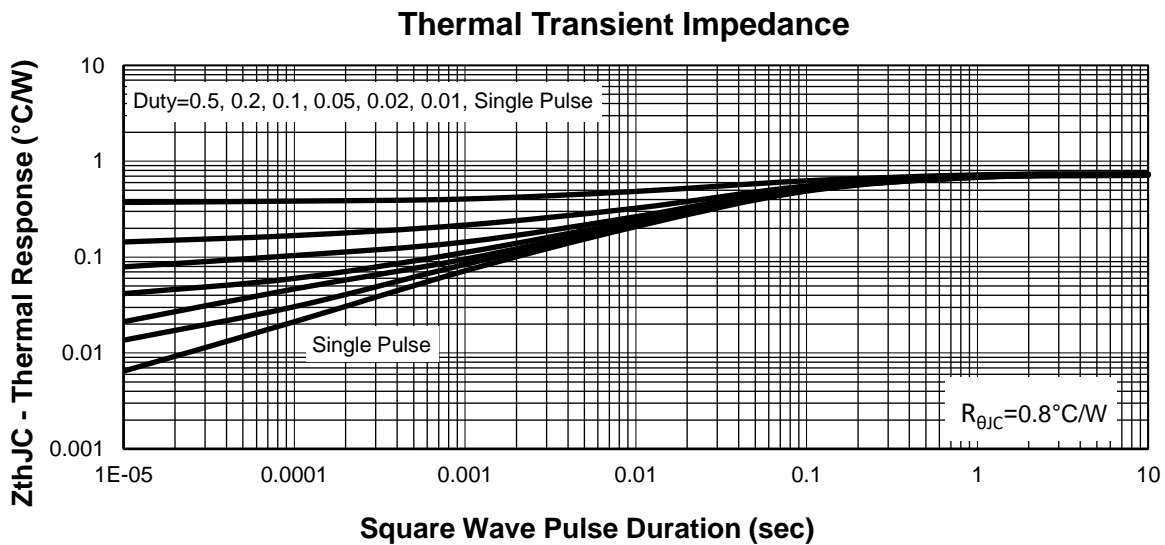
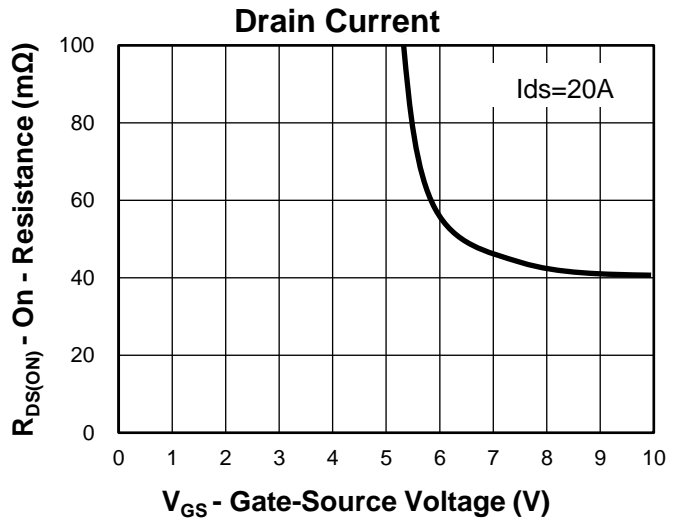
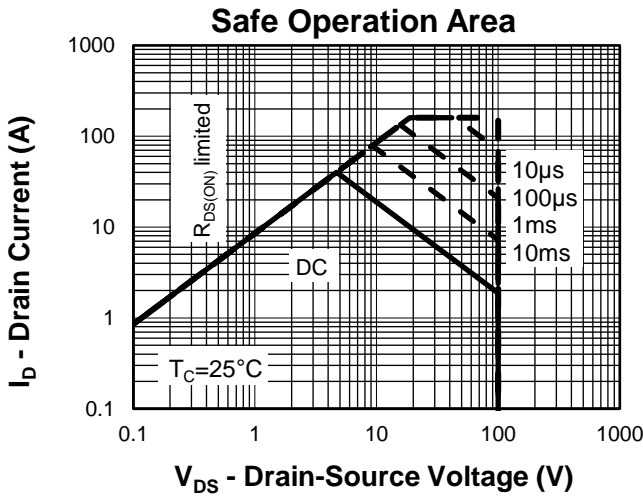
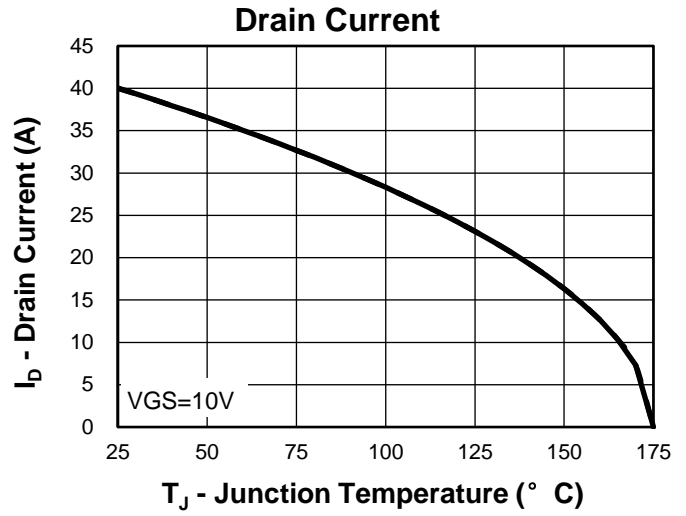
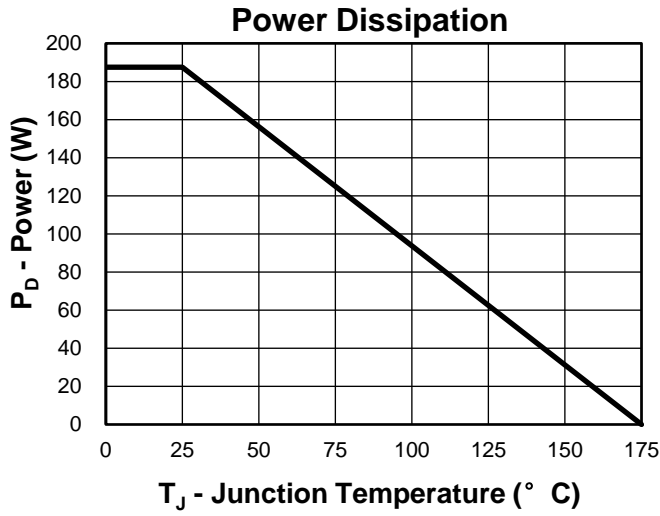


Y =Year,2017-A,2018-B,etc.

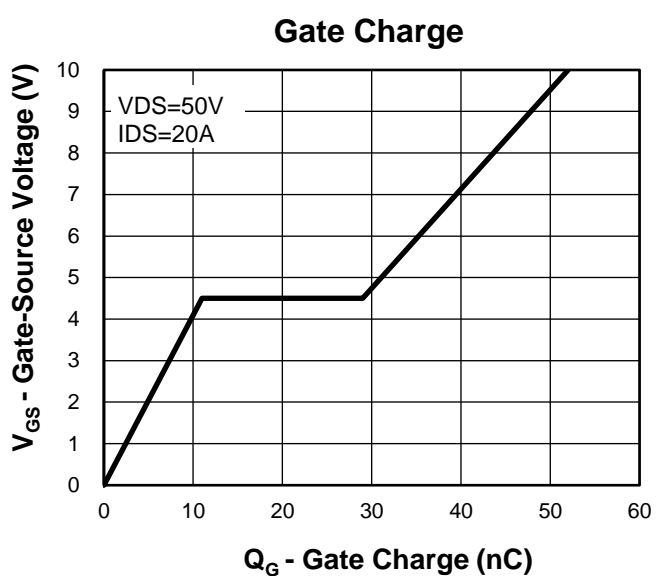
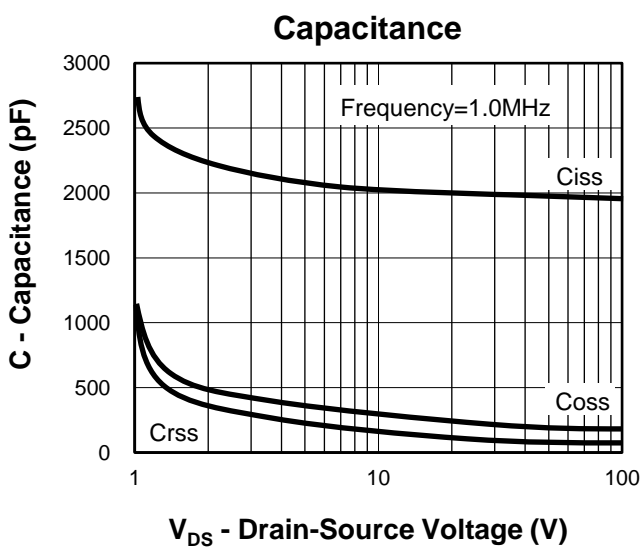
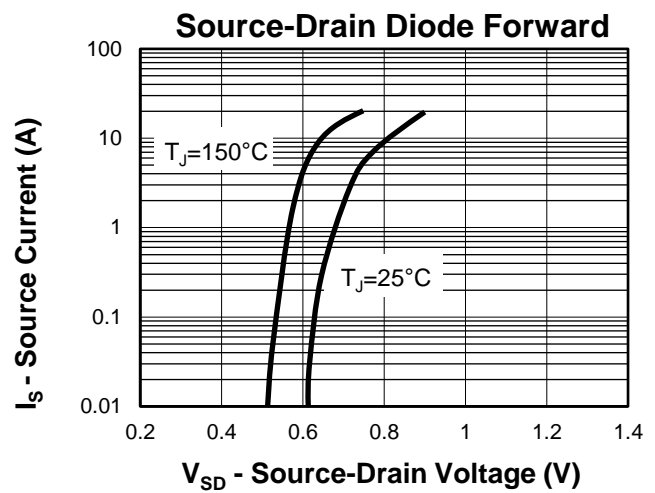
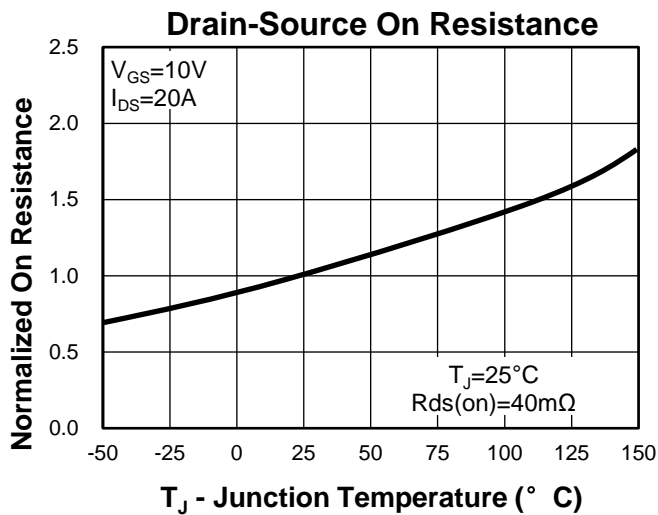
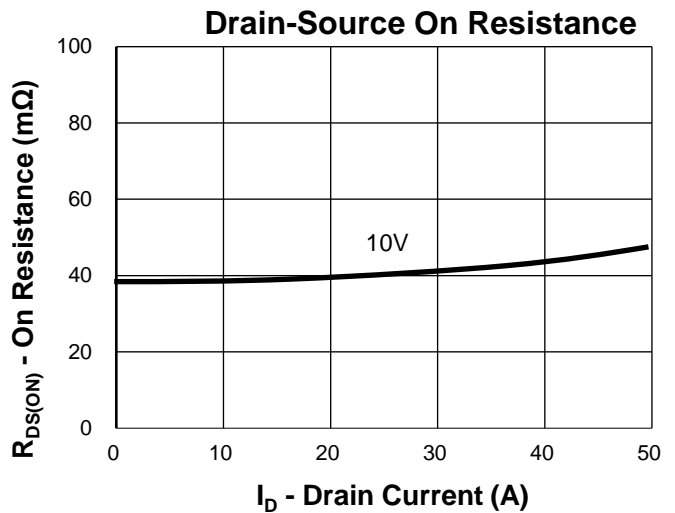
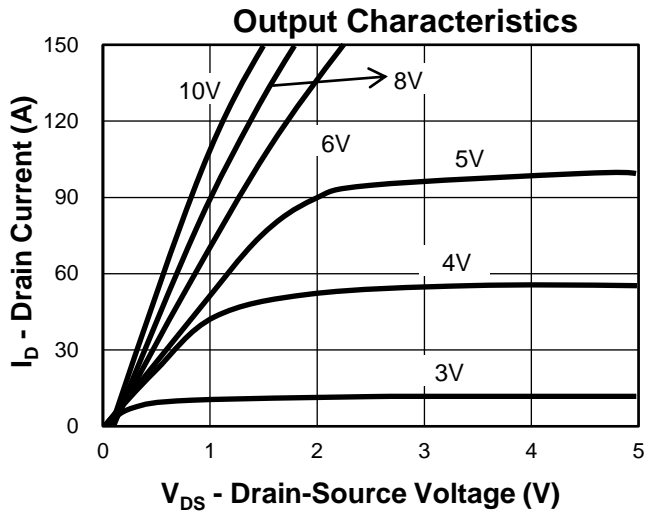
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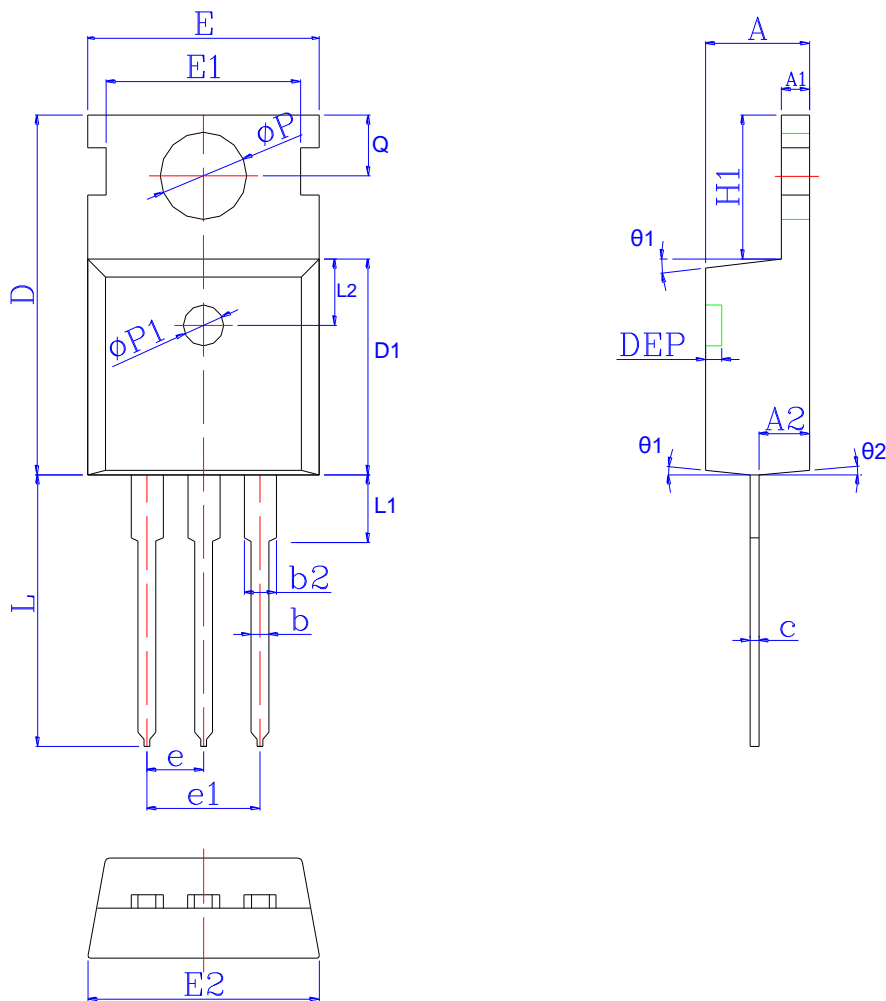
XXX =Lot number.

Typical Characteristics



Typical Characteristics



Package Information
TO-220


| SYMBOL | MM | | | INCH | | | SYMBOL | MM | | | INCH | | |
|--------|-------|-------|-------|-------|-------|-------|--------|----------|-------|-------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX | | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.30 | 4.54 | 4.77 | 0.169 | 0.179 | 0.188 | Φp1 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| A1 | 1.15 | 1.30 | 1.40 | 0.045 | 0.051 | 0.055 | e | 2.54 BSC | | | 0.10 BSC | | |
| A2 | 1.90 | 2.25 | 2.60 | 0.075 | 0.089 | 0.102 | e1 | 5.08 BSC | | | 0.20 BSC | | |
| b | 0.60 | 0.80 | 1.00 | 0.024 | 0.031 | 0.039 | H1 | 6.30 | 6.50 | 6.80 | 0.248 | 0.256 | 0.268 |
| b2 | 1.17 | 1.28 | 1.72 | 0.046 | 0.050 | 0.068 | L | 12.70 | 13.18 | 13.65 | 0.500 | 0.519 | 0.537 |
| c | 0.40 | 0.50 | 0.60 | 0.016 | 0.020 | 0.024 | L1 | * | * | 3.95 | * | * | 0.156 |
| D | 15.40 | 15.70 | 16.00 | 0.606 | 0.618 | 0.630 | L2 | 2.50 REF | | | 0.098 REF | | |
| D1 | 8.96 | 9.21 | 9.46 | 0.353 | 0.363 | 0.372 | Φp | 3.50 | 3.60 | 3.75 | 0.138 | 0.142 | 0.148 |
| DEP | * | * | 0.30 | * | * | 0.012 | Q | 2.70 | 2.80 | 3.20 | 0.106 | 0.110 | 0.126 |
| E | 9.66 | 9.97 | 10.28 | 0.380 | 0.393 | 0.405 | θ1 | 5° | 7° | 9° | 5° | 7° | 9° |
| E1 | * | 8.70 | * | * | 0.343 | * | θ2 | 1° | 3° | 5° | 1° | 3° | 5° |
| E2 | 9.80 | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 | | | | | | | |

Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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