

MOS FIELD EFFECT TRANSISTOR 2SK3297

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

The 2SK3297 is N-channel DMOS FET device that features a low gate charge and excellent switching characteristics, and designed for high voltage applications such as switching power supply, AC adapter.

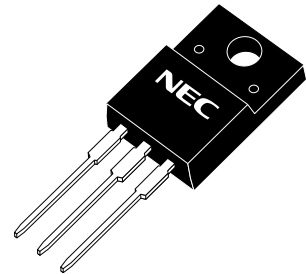
ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|-----------------|
| 2SK3297 | Isolated TO-220 |

FEATURES

- Low gate charge
 $Q_G = 18 \text{ nC TYP. (} V_{DD} = 450 \text{ V, } V_{GS} = 10 \text{ V, } I_D = 5.0 \text{ A)}$
- Gate voltage rating $\pm 30 \text{ V}$
- Low on-state resistance
 $R_{DS(ON)} = 1.6 \Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 2.5 \text{ V)}$
- Avalanche capability ratings
- Isolated TO-220 package

(Isolated TO-220)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

| | | | |
|--|----------------|-------------|------------------|
| Drain to Source Voltage ($V_{GS} = 0 \text{ V}$) | V_{DSS} | 600 | V |
| Gate to Source Voltage ($V_{DS} = 0 \text{ V}$) | V_{GSS} | ± 30 | V |
| Drain Current(DC) ($T_C = 25^\circ\text{C}$) | $I_{D(DC)}$ | ± 5.0 | A |
| Drain Current(pulse) ^{Note1} | $I_{D(pulse)}$ | ± 20 | A |
| Total Power Dissipation ($T_A = 25^\circ\text{C}$) | P_{T1} | 2.0 | W |
| Total Power Dissipation ($T_C = 25^\circ\text{C}$) | P_{T2} | 35 | W |
| Channel Temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |
| Single Avalanche Current ^{Note2} | I_{AS} | 5.0 | A |
| Single Avalanche Energy ^{Note2} | E_{AS} | 16.7 | mJ |

Notes1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

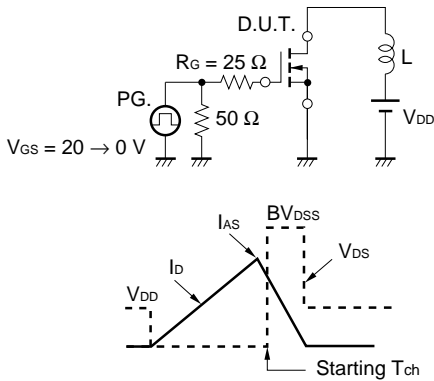
2. Starting $T_{ch} = 25^\circ\text{C}$, $V_{DD} = 150 \text{ V}$, $R_G = 25 \Omega$, $V_{GS} = 20 \rightarrow 0 \text{ V}$

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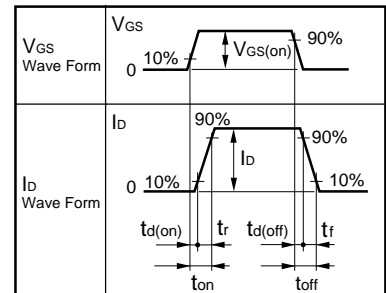
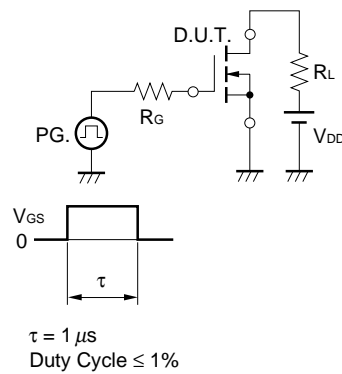
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| Characteristics | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|-------------------------------------|----------------------|---|------|------|------|------|
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 600 V, V _{GS} = 0 V | | | 100 | μA |
| Gate Leakage Current | I _{GSS} | V _{GS} = ±30 V, V _{DS} = 0 V | | | ±100 | nA |
| Gate to Source Cut-off Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 mA | 2.5 | | 3.5 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = 10 V, I _D = 2.5 A | 1.5 | | | S |
| Drain to Source On-state Resistance | R _{DS(on)} | V _{GS} = 10 V, I _D = 2.5 A | | 1.3 | 1.6 | Ω |
| Input Capacitance | C _{iss} | V _{DS} = 10 V | | 750 | | pF |
| Output Capacitance | C _{oss} | V _{GS} = 0 V | | 130 | | pF |
| Reverse Transfer Capacitance | C _{rss} | f = 1 MHz | | 9.7 | | pF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} = 150 V, I _D = 2.5 A | | 17 | | ns |
| Rise Time | t _r | V _{GS(on)} = 10 V | | 3 | | ns |
| Turn-off Delay Time | t _{d(off)} | R _G = 10 Ω | | 37 | | ns |
| Fall Time | t _f | | | 10 | | ns |
| Total Gate Charge | Q _G | V _{DD} = 450 V | | 18 | | nC |
| Gate to Source Charge | Q _{GS} | V _{GS} = 10 V | | 4 | | nC |
| Gate to Drain Charge | Q _{GD} | I _D = 5.0 A | | 7 | | nC |
| Body Diode Forward Voltage | V _{F(S-D)} | I _F = 5.0 A, V _{GS} = 0 V | | 0.9 | | V |
| Reverse Recovery Time | t _{rr} | I _F = 5.0 A, V _{GS} = 0 V | | 1.4 | | μs |
| Reverse Recovery Charge | Q _{rr} | di/dt = 50 A/μs | | 5.3 | | μC |

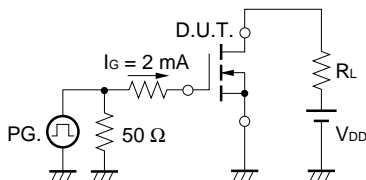
TEST CIRCUIT 1 AVALANCHE CAPABILITY



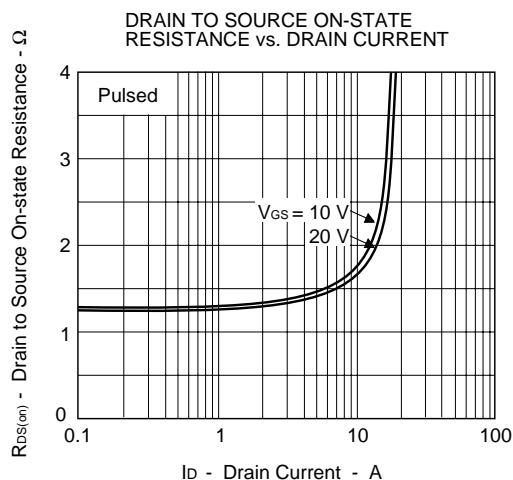
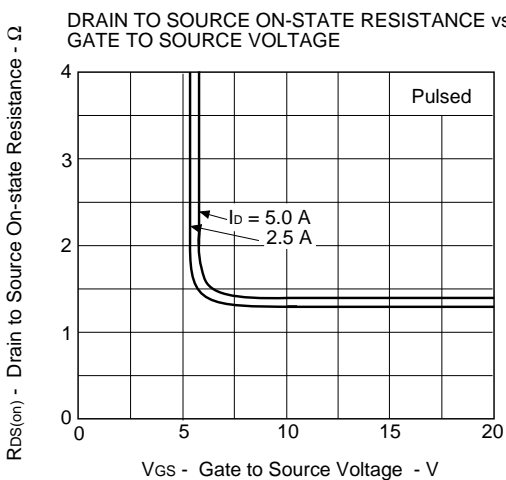
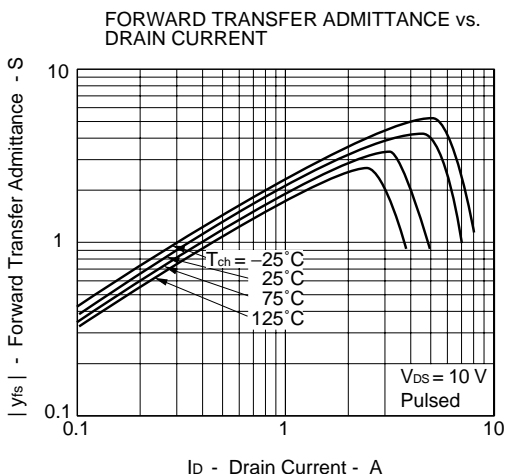
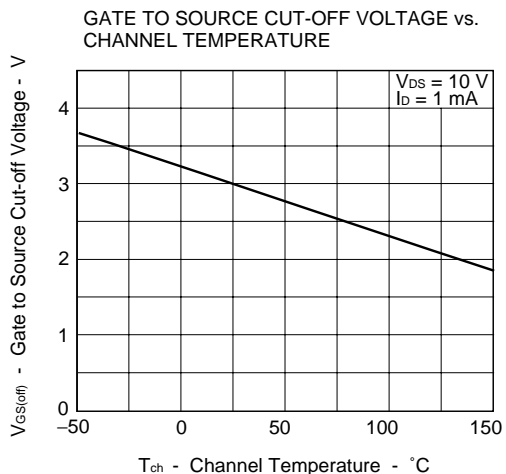
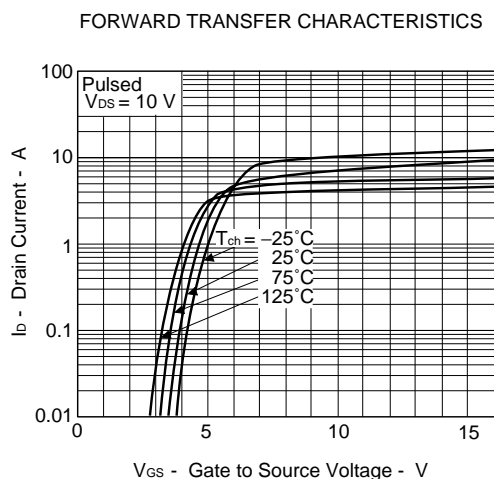
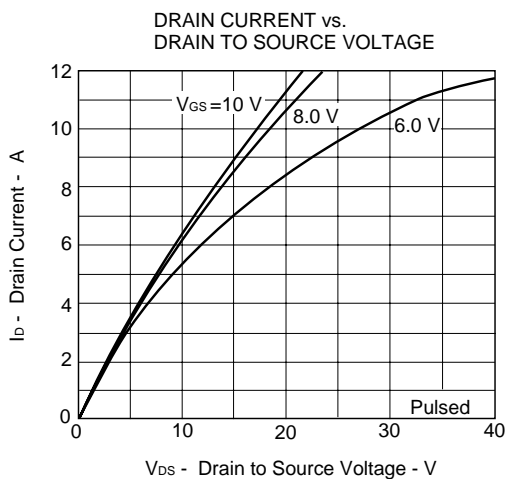
TEST CIRCUIT 2 SWITCHING TIME

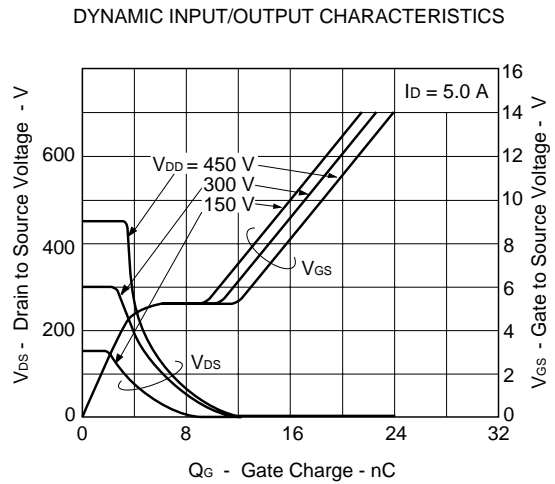
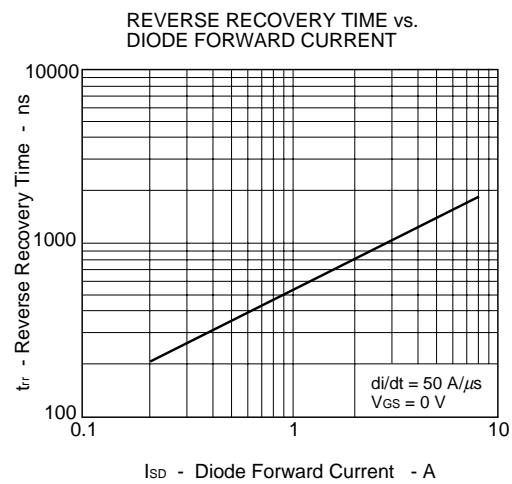
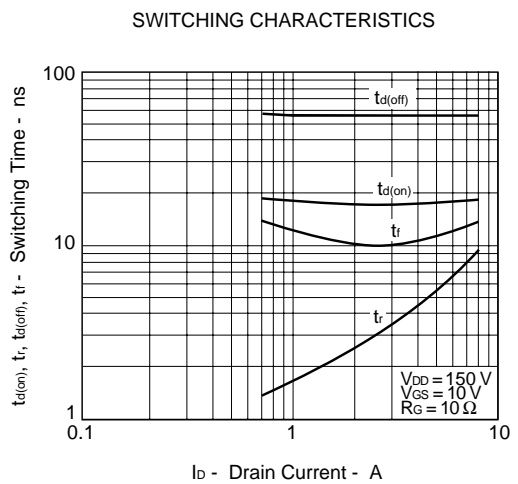
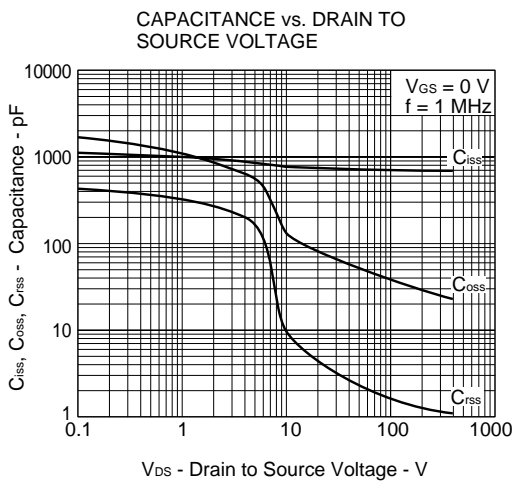
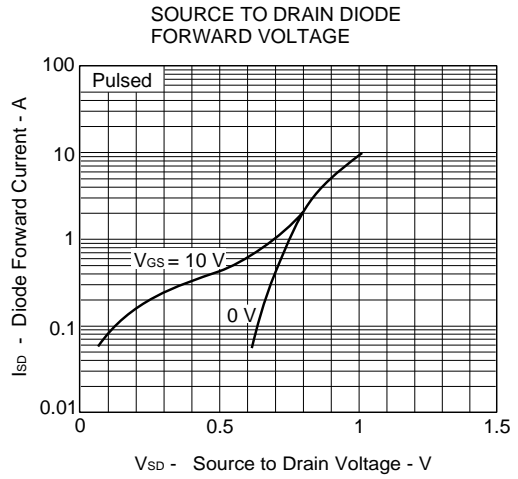
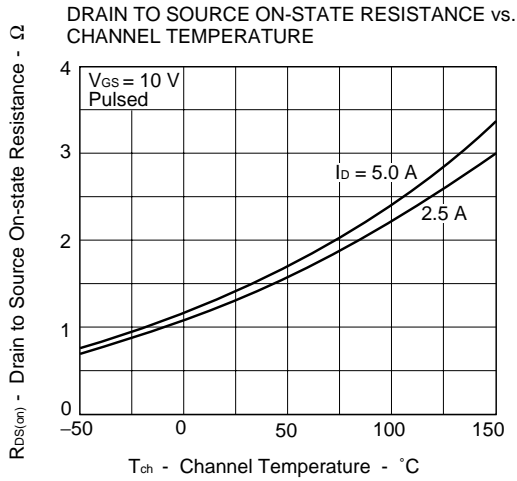


TEST CIRCUIT 3 GATE CHARGE

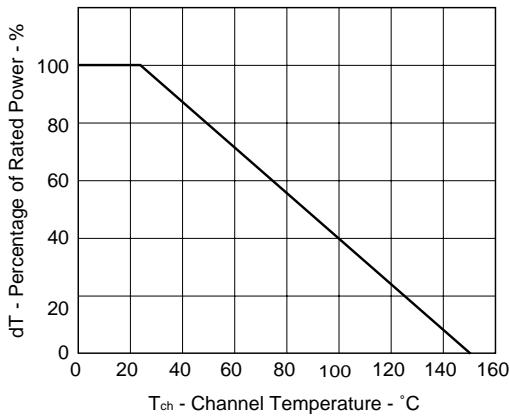


TYPICAL CHARACTERISTICS

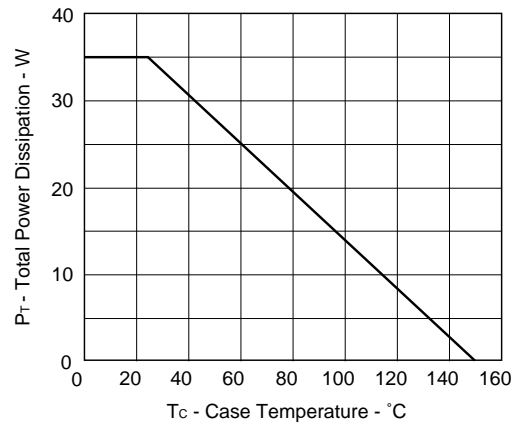




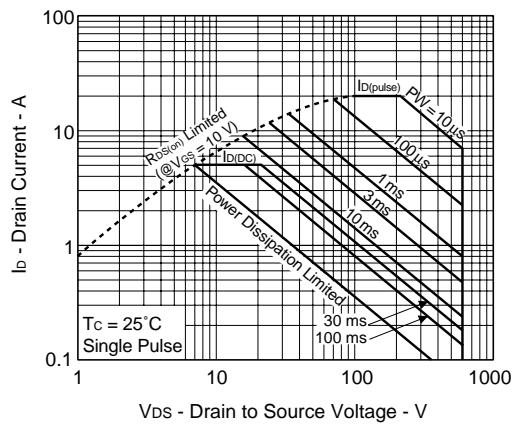
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



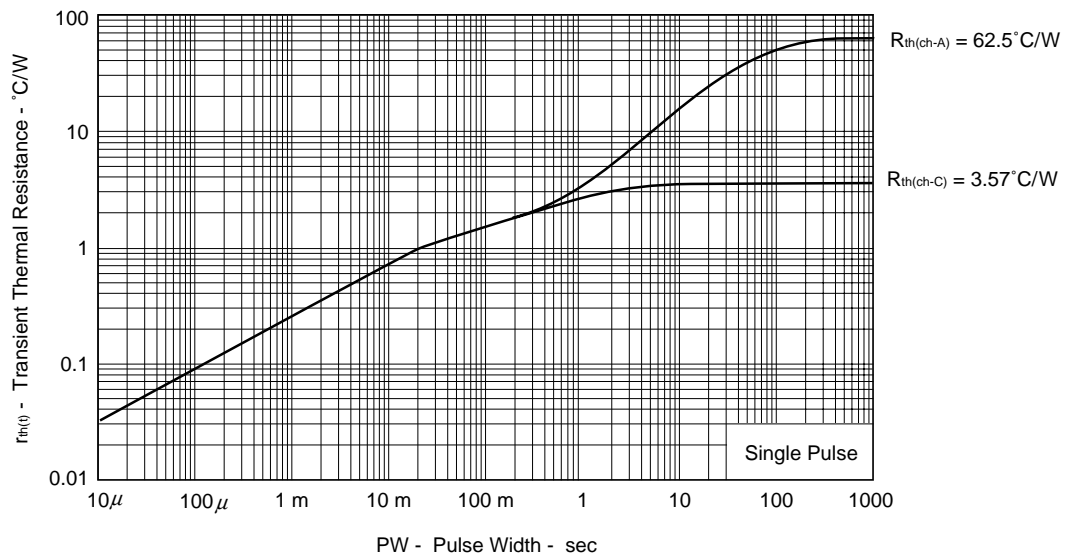
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE

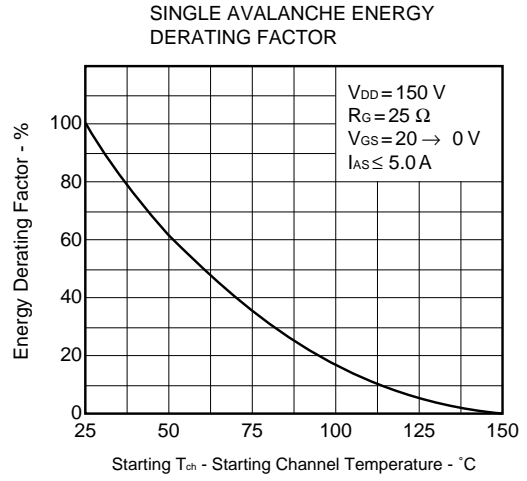
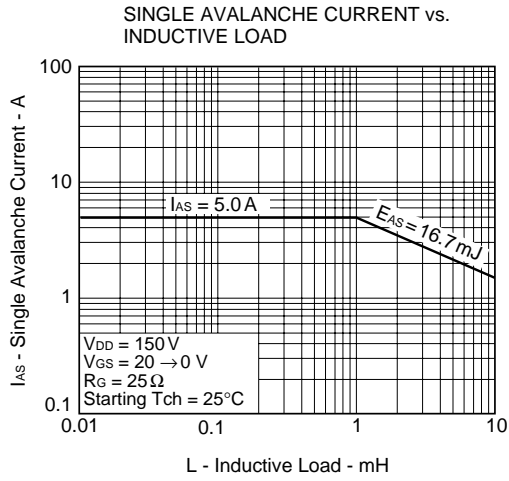


FORWARD BIAS SAFE OPERATING AREA



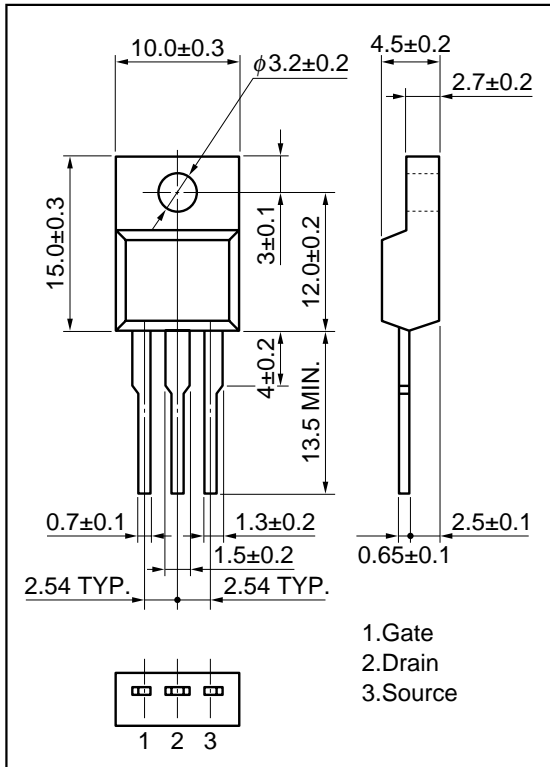
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



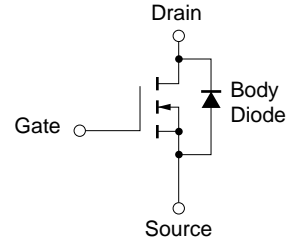


PACKAGE DRAWING(Unit: mm)

Isolated TO-220 (MP-45F)



EQUIVALENT CIRCUIT



Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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