



OBJECTIVE

2N7321R, 2N7321H

REGISTRATION PENDING

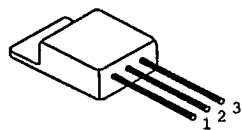
Available As FRS9440R, FRS9440H

2.5A, -500V

RDS(on)=4.22Ω

T-39-11

This Objective Data Sheet Represents the Proposed Device Performance.



TO-257AA

Radiation-Hardened P-Channel Power MOSFETs

Features:

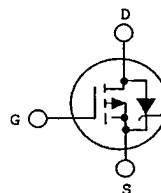
- Second Generation Rad Hard MOSFET results from new design concepts.
- Gamma
 - meets pre-rad specifications to 100 KRad(Si).
 - defined end-point specs at 300 and 1000 KRad(Si).
 - performance permits limited use to 3000 KRad(Si).
- Gamma Dot
 - survives 3E9 Rad(Si)/sec at 80% BVDS typically.
 - survives 2E12 Rad(Si)/sec typically if current-limited to IDM.
- Neutron
 - pre-rad specifications for 3E12 neutrons/cm2.
 - usable to 3E13 neutrons/cm2.
- Single Event
 - typically survives 1E5 ions/cm2 having an LET $\leq 35\text{MeV/mg/cm}^2$ and a range $\geq 30\text{ }\mu\text{m}$ at 80% BVDS.

The Harris Semiconductor Sector has designed a series of SECOND GENERATION hardened power MOSFET's of both N and P channel enhancement types with ratings from 100 to 500 volts, 1 to 6 amperes, and on resistance as low as 25 milliohm. Total dose hardness is offered at 100K and 1000K RAD (Si) with neutron hardness ranging from $1E13$ n/cm² for 500 volt product to $1E14$ n/cm² for 100 volt product. Dose rate hardness (GAMMA DOT) exists for rates to $1E9$ Rad(Si)/sec without current limiting and $2E12$ Rad(Si)/sec with current limiting. Heavy ion survival from single event drain burn-out exists for linear energy transfer (LET) of 35 at 80% of rated voltage.

This MOSFET is an enhancement-mode silicon-gate power field-effect transistor of the vertical DMOS (VDMOS) structure. It is specially designed and processed to exhibit minimal characteristic changes to total dose (GAMMA) and neutron (n) exposures. Design and processing efforts are also directed to enhance survival to heavy ion (SEU) and/or dose rate (GAMMA DOT) exposure.

The MOSFET is well suited for applications exposed to radiation environments such as switching regulation, switching converters, synchronous rectification, motor drives, relay drivers and drivers for high-power bipolar switching transistors requiring high speed and low gate drive power. This type can be operated directly from integrated circuits.

This part may be supplied as a die or in various packages other than shown above. Reliability screening is available as either non TX (commercial), TX equivalent of MIL-S-19500, TXV equivalent of MIL-S-19500, or space equivalent of MIL-S-19500. Contact the Harris Semiconductor High-Reliability Marketing group for any desired deviations from the data sheet.



SYMBOL

3 DISCRETE DEVICES (POWER MOSFETs)

Maximum Ratings, Absolute-Maximum Values ($T_c = 25^\circ\text{C}$):

Drain-Source Voltage, V _{DS}	-500	V
Drain-Gate Voltage, V _{DGR} (R _{gs} = 20 kΩ)	-500	V
Continuous Drain Current, I _d @T _c = 25°C	2.5	A
@T _c = 100°C	1.5	A
Pulsed Drain Current, I _{DM}	7.5	A
Gate-Source Voltage, V _{GS}	±20	V
Power Dissipation, P _T : At T _c = 25°C	75	W
At T _c = 100°C	30	W
Derated above 25°C	0.60	W/°C
Inductive Current, Clamped, L = 100 μH, I _{LM} (See Test Figure)	7.5	A
Continuous Source Current (Body diode), I _S	2.5	A
Pulsed Source Current (Body diode), I _{SM}	7.5	A
Operating and Storage Temperature, T _j , T _{stg}	-55 to +150	°C
Lead Temperature (During soldering): TL		

Distance > 0.063 in. (1.6 mm) from case, 10 s max 300 °C

3-173