

GSM2220Y

20V Dual N-Channel MOSFETs

Product Description

These Dual N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

Features


- 20V, 800mA, $R_{DS(ON)}=300m\Omega@V_{GS}=4.5V$
- Fast switching
- Suit for 1.5V Gate Drive Applications
- Green Device Available
- SOT-563 package design

Applications

- Notebook
- Load Switch
- Networking
- Hand-Held Instruments

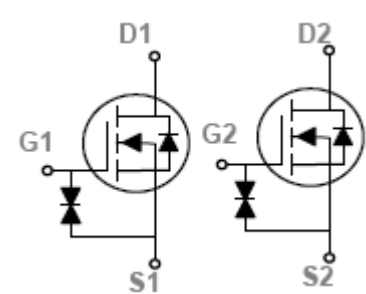
Packages & Pin Assignments

GSM2220YX7F (SOT-563)

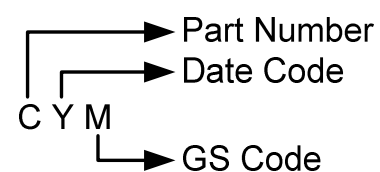
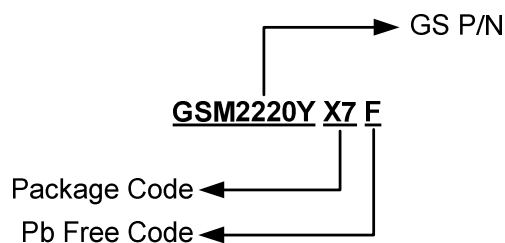


Top Views

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Source 1 | 4 | Source 2 |
| 2 | Gate 1 | 5 | Gate 2 |
| 3 | Drain 2 | 6 | Drain 1 |



Ordering & Marking Information



| Part Number | Package | Part Marking | Quantity |
|-------------|---------|--------------|----------|
| GSM2220YX7F | SOT-563 | CYM | 8000pcs |

Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ Unless otherwise noted

| Symbol | Parameter | Typical | Unit |
|-----------------|--|---------------------------|-----------------------------|
| V_{DS} | Drain-Source Voltage | 20 | V |
| V_{GS} | Gate-Source Voltage | ± 8 | V |
| I_D | Continuous Drain Current | $T_C=25^{\circ}\text{C}$ | 800 |
| | | $T_C=100^{\circ}\text{C}$ | 510 |
| I_{DM} | Pulsed Drain Current | 3.2 | A |
| P_D | Power Dissipation ($T_C=25^{\circ}\text{C}$) | 312 | mW |
| | Power Dissipation (Derate above 25°C) | 2.5 | mW/ $^{\circ}\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to +150 | $^{\circ}\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to +150 | $^{\circ}\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | 400 | $^{\circ}\text{C}/\text{W}$ |

Electrical Characteristics

$T_J=25^{\circ}\text{C}$ Unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------------------|--------------------------------------|--|-----|-------|----------|-----------------------------|
| Static | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0\text{V}, I_D=250\mu\text{A}$ | 20 | | | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BV_{DSS} Temperature Coefficient | Reference to 25°C , $I_D=1\text{mA}$ | | -0.01 | | $\text{V}/^{\circ}\text{C}$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$ | 0.3 | 0.6 | 1.0 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | | | 3 | |
| I_{GSS} | Gate Leakage Current | $V_{DS}=0\text{V}, V_{GS}=\pm 6\text{V}$ | | | ± 20 | μA |
| I_{DSS} | Drain Current Leakage Current | $V_{DS}=20\text{V}, V_{GS}=0\text{V}$ | | | 1 | μA |
| | | $V_{DS}=16\text{V}, V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$ | | | 10 | μA |
| I_S | Continuous Source Current | $V_G=V_D=0\text{V}$, Force Current | | | 0.8 | A |
| I_{SM} | Pulsed Source Current | | | | 1.6 | |
| $R_{DS(on)}$ | Drain-Source On-Resistance | $V_{GS}=4.5\text{V}, I_D=0.5\text{A}$ | | 200 | 300 | m Ω |
| | | $V_{GS}=2.5\text{V}, I_D=0.4\text{A}$ | | 235 | 400 | |
| | | $V_{GS}=1.8\text{V}, I_D=0.2\text{A}$ | | 295 | 550 | |
| | | $V_{GS}=1.5\text{V}, I_D=0.1\text{A}$ | | 365 | 800 | |
| | | $V_{GS}=1.2\text{V}, I_D=0.1\text{A}$ | | 600 | 1500 | |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0\text{V}, I_S=0.2\text{A}$ | | | 1 | V |
| Dynamic | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=10\text{V}, V_{GS}=4.5\text{V}$, $I_D=0.5\text{A}$ | | 1 | 2 | nC |
| Q_{gs} | Gate-Source Charge | | | 0.26 | 0.5 | |
| Q_{gd} | Gate-Drain Charge | | | 0.2 | 0.4 | |
| C_{iss} | Input Capacitance | $V_{DS}=10\text{V}, V_{GS}=0\text{V}$, $F=1\text{MHz}$ | | 38.2 | 75 | pF |
| C_{oss} | Output Capacitance | | | 14.4 | 28 | |
| C_{riss} | Reverse Transfer Capacitance | | | 6 | 12 | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}=10\text{V}, I_D=0.5\text{A}$, $V_{GS}=4.5\text{V}, R_G=10\Omega$ | | 5 | 10 | ns |
| t_r | Rise Time | | | 3.5 | 7 | |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 14 | 28 | |
| t_f | Fall Time | | | 6 | 12 | |

Typical Performance Characteristics

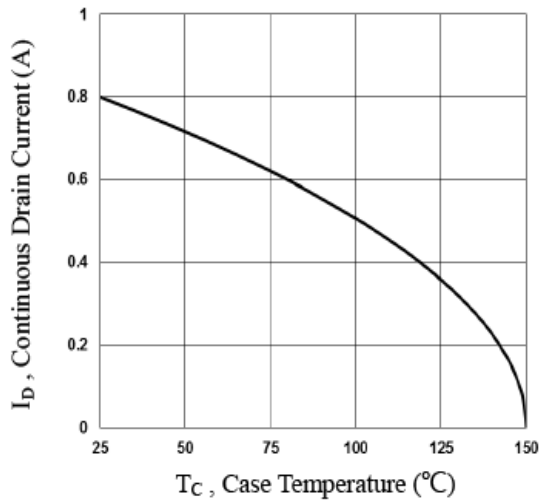


Fig.1 Continuous Drain Current vs. T_C

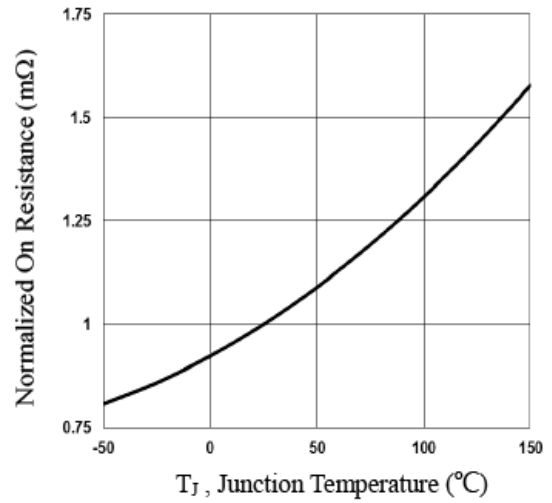


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

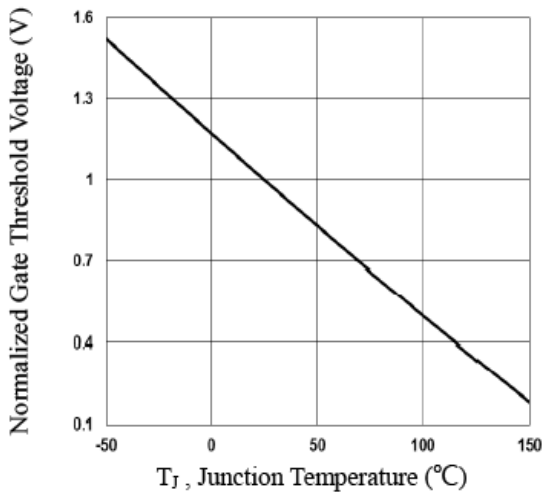


Fig.3 Normalized V_{th} vs. T_J

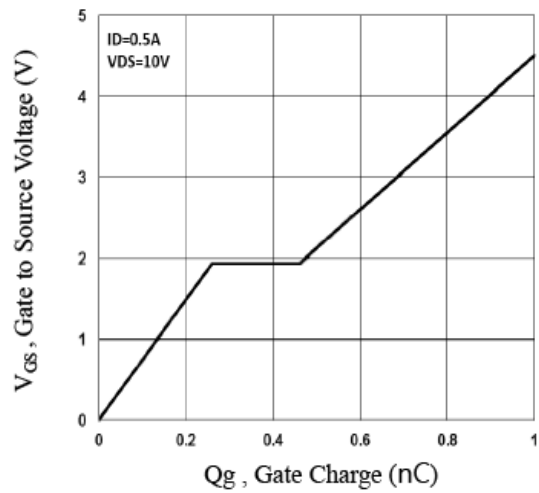


Fig.4 Gate Charge Waveform

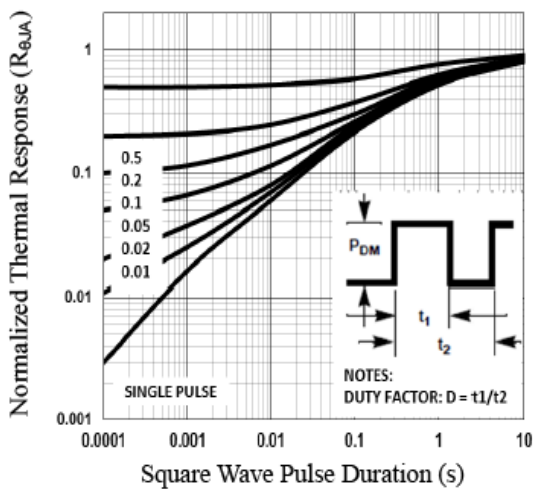


Fig.5 Normalized Transient Impedance

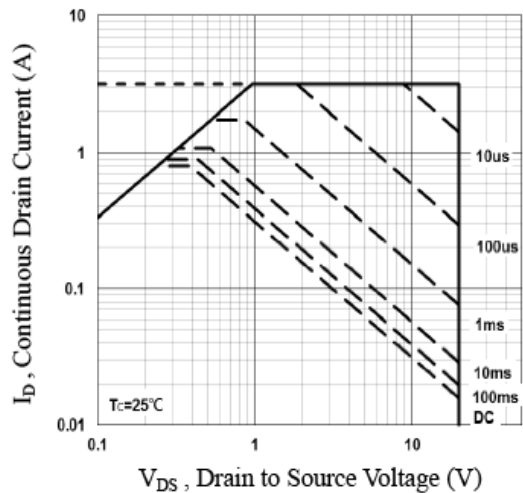
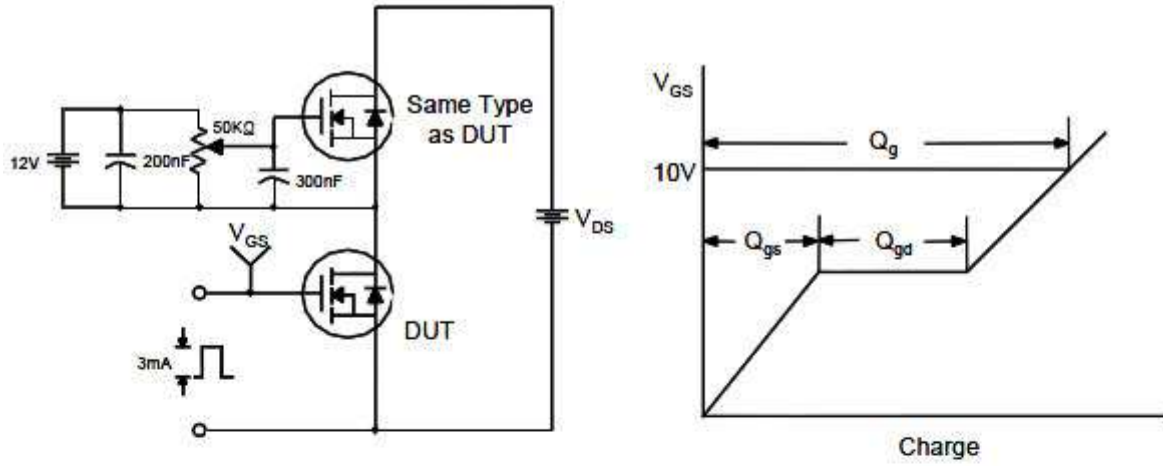


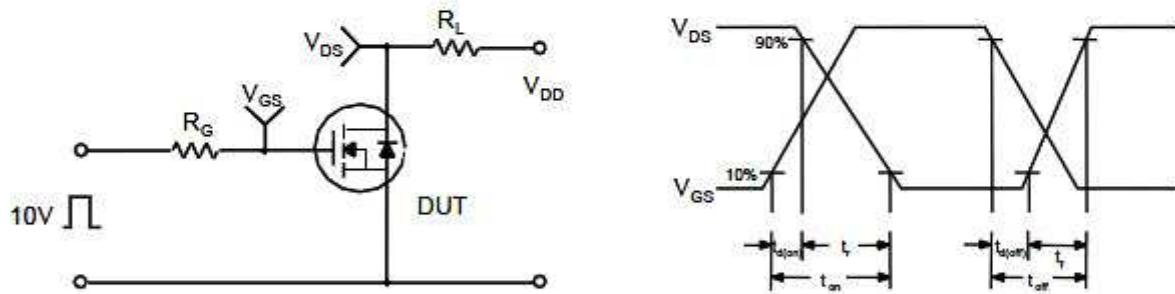
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

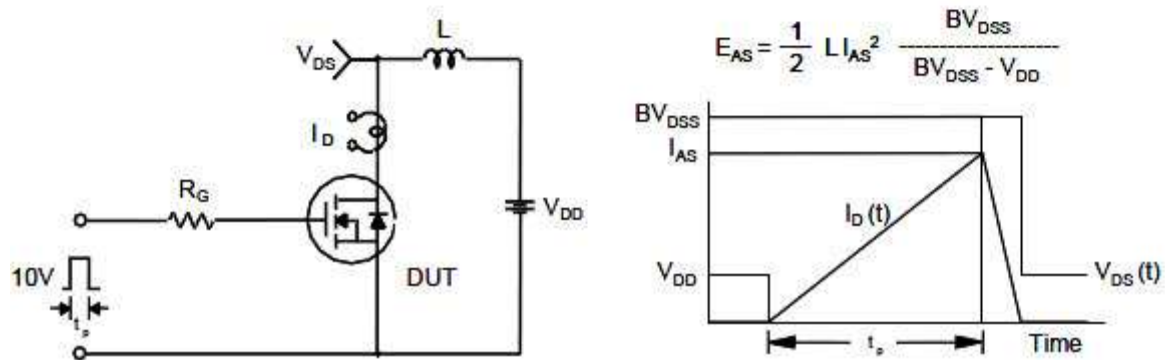
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

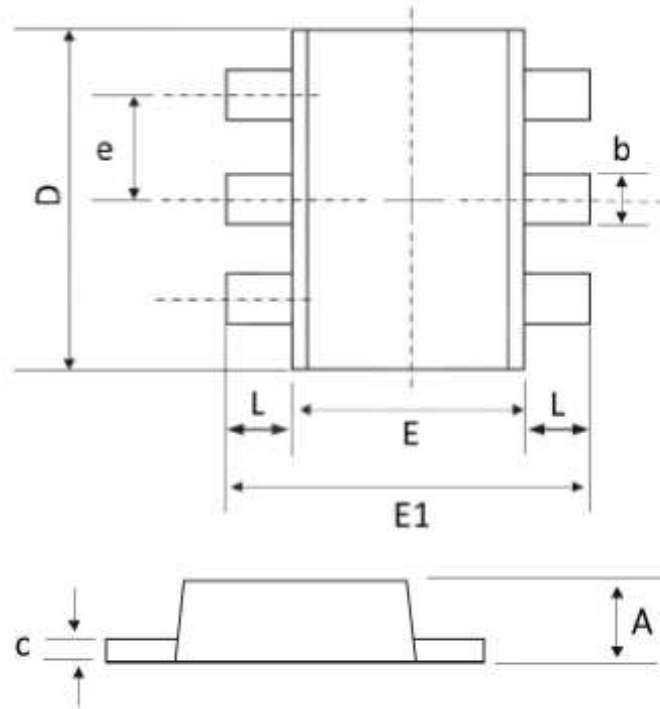


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

SOT-563 Plastic Package









| Dimensions | | | | |
|------------|-------------|-------|-----------|-------|
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.500 | 0.600 | 0.020 | 0.024 |
| b | 0.150 | 0.300 | 0.006 | 0.012 |
| c | 0.100 | 0.180 | 0.004 | 0.007 |
| D | 1.500 | 1.700 | 0.059 | 0.067 |
| E | 1.100 | 1.250 | 0.043 | 0.049 |
| E1 | 1.550 | 1.700 | 0.061 | 0.067 |
| e | 0.5(BSC) | | 0.02(BSC) | |
| L | 0.100 | 0.300 | 0.004 | 0.012 |

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CONTACT US

| GS Headquarter | |
|---|--|
|  | 4F.,No.43-1,Lane11,Sec.6,Minquan E.Rd Neihu District Taipei City 114, Taiwan (R.O.C) |
|  | 886-2-2657-9980 |
|  | 886-2-2657-3630 |
|  | sales_twn@gs-power.com |

| RD Division | |
|---|--------------------------------------|
|  | 824 Bolton Drive Milpitas. CA. 95035 |
|  | 1-408-457-0587 |