

GSM2320Y

20V N-Channel MOSFETs

Product Description

These 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.

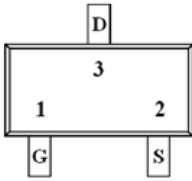
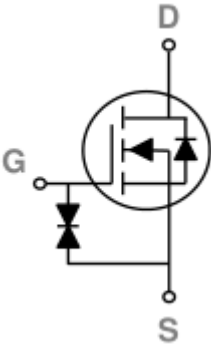
Features

- 20V, 800mA, $R_{DS(ON)}=300m\Omega@V_{GS}=4.5V$
- Improved dv/dt capability
- Fast switching
- Suit for 1.5V Gate Drive Applications
- Green Device Available
- SOT-523 package design

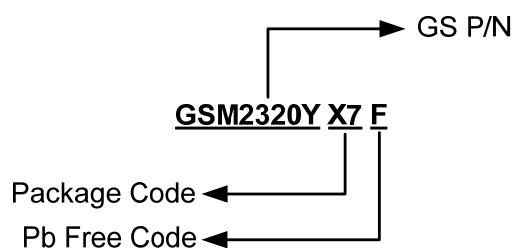
Applications

- Notebook
- Load Switch
- Hand-Held Instruments
- Battery Protection

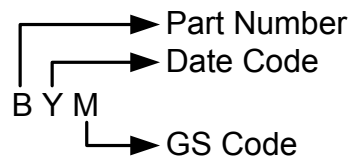
Packages & Pin Assignments

| GSM2320YX7F (SOT-523) | |
|--|-------------|
|  <p>Top Views</p> | |
|  | |
| Pin | Description |
| 1 | Gate |
| 2 | Source |
| 3 | Drain |

Ordering Information



Marking Information



| Part Number | Package | Part Marking | Quantity |
|-------------|---------|--------------|----------|
| GSM2320YX7F | SOT-523 | BYM | 3000pcs |

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°C Unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------------------|---|---|-----|-------|------|-------|
| Static | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 20 | | | V |
| ΔBV _{DSS} /ΔT _J | BV _{DSS} Temperature Coefficient | Reference to 25°C, I _D =1mA | | -0.01 | | V/°C |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250uA | 0.3 | 0.6 | 1.0 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | | 3 | | mV/°C |
| I _{GSS} | Gate Leakage Current | V _{DS} =0V, V _{GS} =±6V | | | ±20 | uA |
| I _{DSS} | Drain Current Leakage Current | V _{DS} =20V, V _{GS} =0V | | | 1 | uA |
| | | V _{DS} =16V, V _{GS} =0V, T _J =125°C | | | 10 | |
| I _S | Continuous Source Current | V _G =V _D =0V, Force Current | | | 0.8 | A |
| I _{SM} | Pulsed Source Current | | | | 1.6 | |
| R _{DS(on)} | Drain-Source On-Resistance | V _{GS} =4.5V, I _D =0.5A | | 200 | 300 | mΩ |
| | | V _{GS} =2.5V, I _D =0.4A | | 235 | 400 | |
| | | V _{GS} =1.8V, I _D =0.2A | | 295 | 550 | |
| | | V _{GS} =1.5V, I _D =0.1A | | 365 | 800 | |
| | | V _{GS} =1.2V, I _D =0.1A | | 600 | 1500 | |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =0.2A | | | 1 | V |
| Dynamic | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =10V, V _{GS} =4.5V, I _D =0.5A | | 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} =10V, V _{GS} =0V, F=1MHz | | 38.2 | 75 | pF |
| C _{oss} | Output Capacitance | | | 14.4 | 28 | |
| C _{rss} | Reverse Transfer Capacitance | | | 6 | 12 | |
| t _{d(on)} | Turn-On Delay Time | V _{DD} =10V, I _D =0.5A, V _{GS} =4.5V, R _G =10Ω | | 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

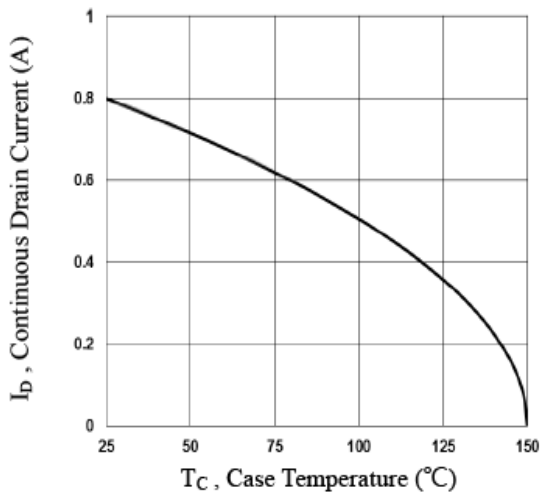


Fig.1 Continuous Drain Current vs. T_c

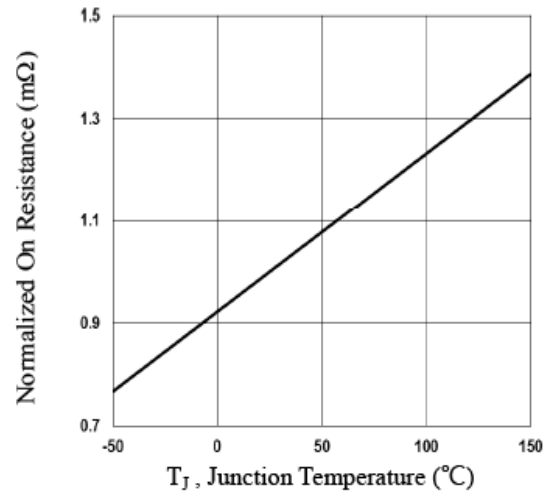


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

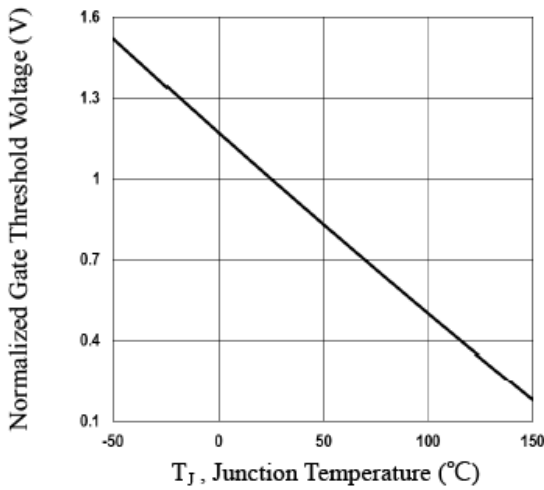


Fig.3 Normalized V_{th} vs. T_j

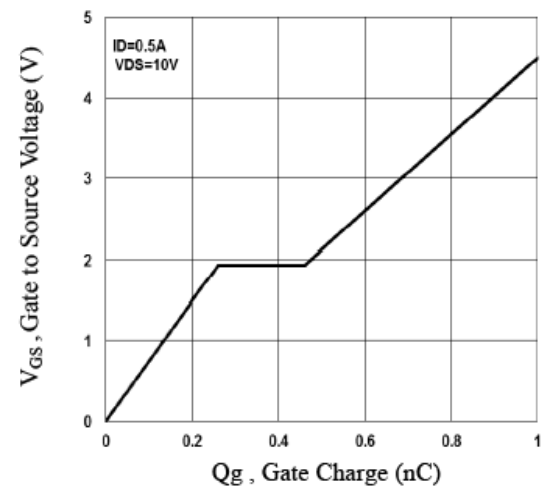


Fig.4 Gate Charge Waveform

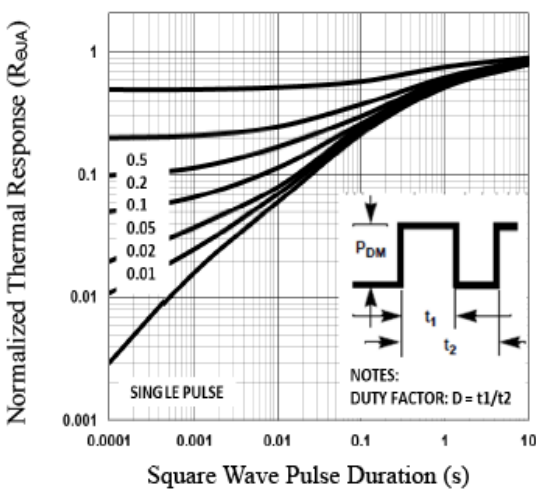


Fig.5 Normalized Transient Response

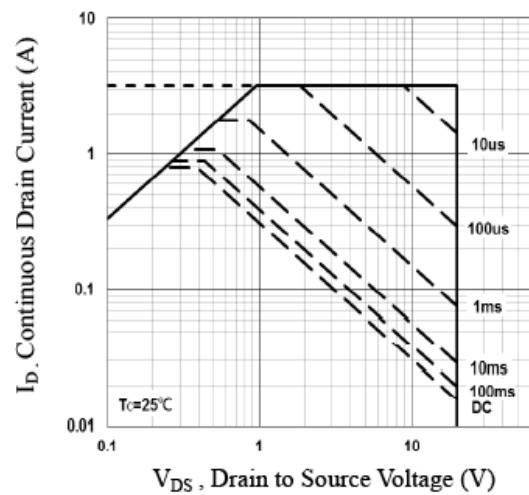
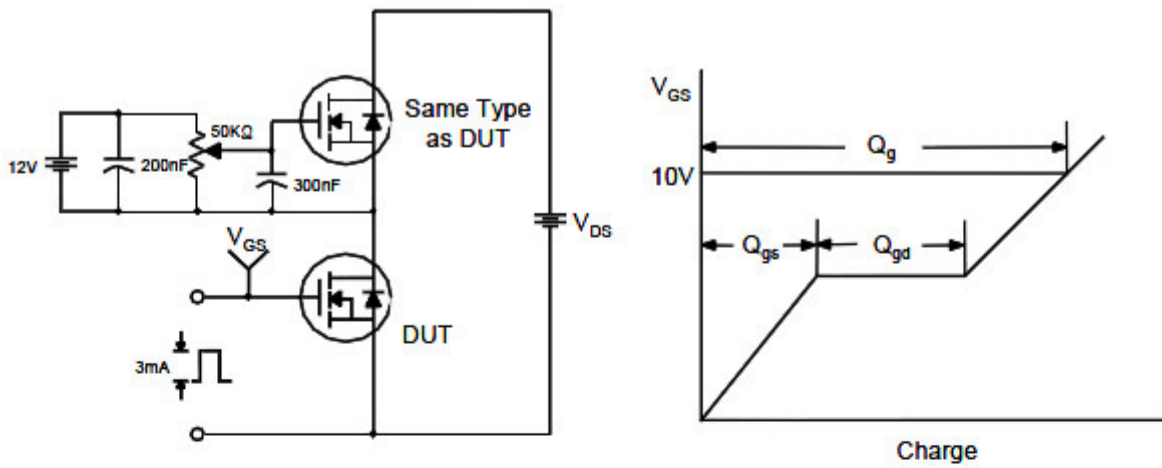


Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

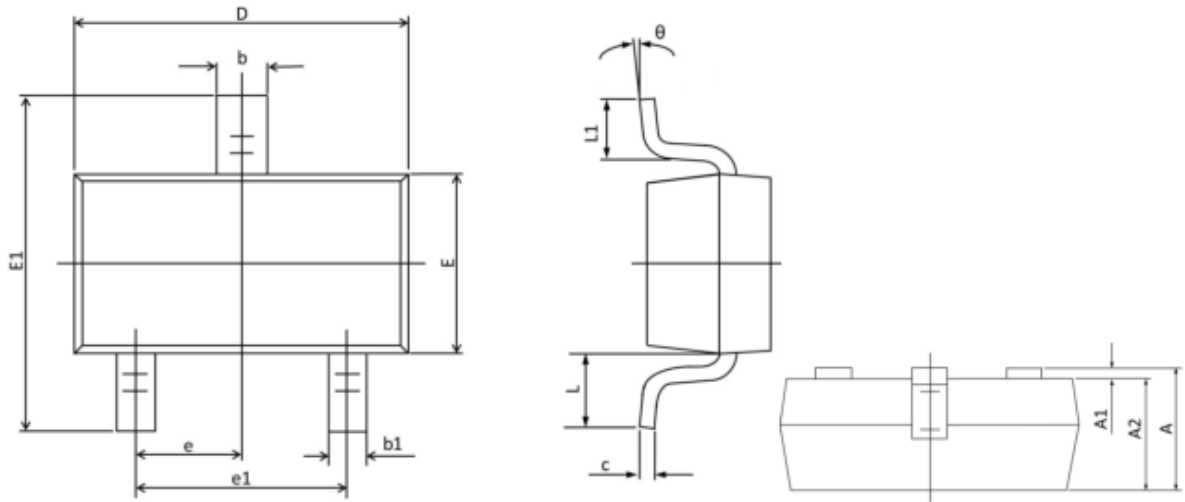


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

SOT-523










| Dimensions | | | | |
|------------|-------------|-------|---------|-------|
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.700 | 0.900 | 0.028 | 0.035 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.700 | 0.800 | 0.028 | 0.031 |
| b | 0.250 | 0.350 | 0.010 | 0.014 |
| b1 | 0.150 | 0.250 | 0.006 | 0.010 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 1.500 | 1.750 | 0.059 | 0.069 |
| E | 0.700 | 0.900 | 0.028 | 0.035 |
| E1 | 1.400 | 1.750 | 0.055 | 0.069 |
| e | 0.5 TYP | | 0.02TYP | |
| e1 | 0.9 | 1.100 | 0.035 | 0.043 |
| L | 0.300 | 0.460 | 0.012 | 0.018 |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |



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