## Product Summary

- $V_{DS}$ = -20V, $I_D$ = -6A

  $R_{DS(ON)}$ < 28mΩ(max) @ $V_{GS}$=-2.5V

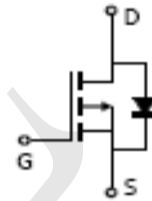  $R_{DS(ON)}$ < 20mΩ(max) @ $V_{GS}$=-4.5V

## Application

- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

## Package and Pin Configuration

SOT-23



## Circuit diagram



## Marking:



20P7C    Or    2623
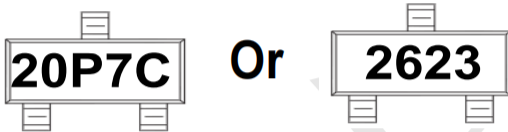
## Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Drain Current -Continuous | $I_D$ | -6 | A |
| Drain Current -Pulsed [Note 1] | $I_{DM}$ | -24 | A |
| Maximum Power Dissipation | $P_D$ | 1.8 | W |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 To 150 | ℃ |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Ambient [Note 2] | $R_{θJA}$ | 69 | ℃/W |

1

## Electrical Characteristics (TA=25℃ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=-250µA | -20 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-12V,$V_{GS}$=0V | - | - | -1 | µA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** [Note 3] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=-250µA | -0.4 | -0.55 | -1.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=-4.5V, $I_D$=-6A | - | 18 | 20 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-5A | - | 22 | 28 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-5V,$I_D$=-6A | | 20 | - | S |
| **Dynamic Characteristics** [Note4] | | | | | | |
| Input Capacitance | $C_{Iss}$ | $V_{DS}$=-6V,$V_{GS}$=0V, F=1.0MHz | - | 1730 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 320 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 210 | - | PF |
| **Switching Characteristics** [Note 4] | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=-6V,$I_D$=-1A , $R_L$=6Ω,$V_{GEN}$=-4.5V,$R_g$=6Ω | - | 20 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 35 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 90 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 70 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-6V,$I_D$=-6A,$V_{GS}$=-4.5V | - | 19.5 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4.1 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 5.2 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage [Note 3] | $V_{SD}$ | $V_{GS}$=0V,$I_S$=-1.0A | - | - | -1.2 | V |
| Diode Forward Current [Note 2] | $I_S$ | | - | - | -6 | A |

2

## Typical Electrical and Thermal Characteristics
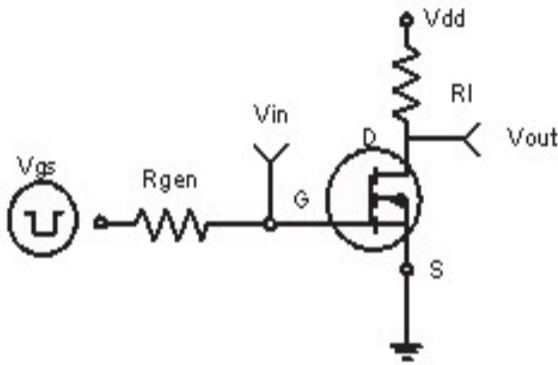


**Figure 1:Switching Test Circuit**
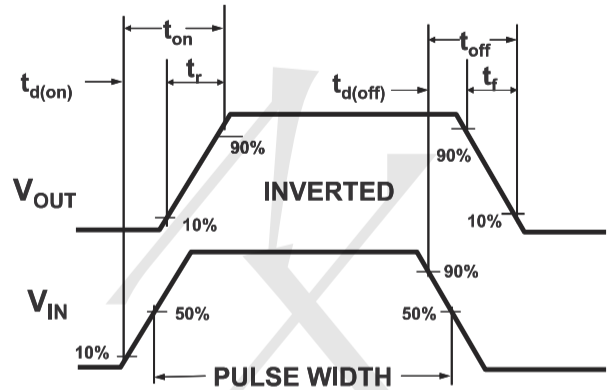


**Figure 2:Switching Waveforms**



T_J-Junction Temperature(℃)
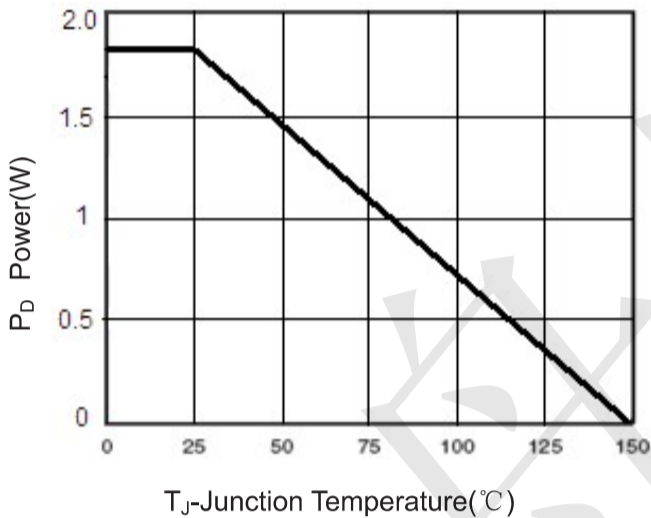
**Figure 3 Power Dissipation**
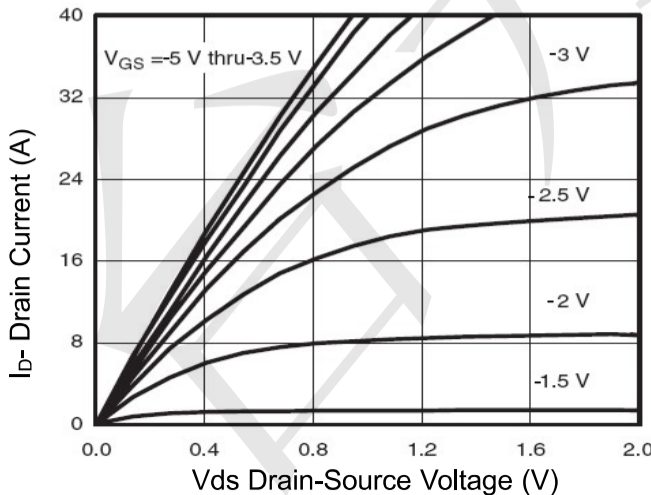


T_J-Junction Temperature(℃)

**Figure 4 Drain Current**



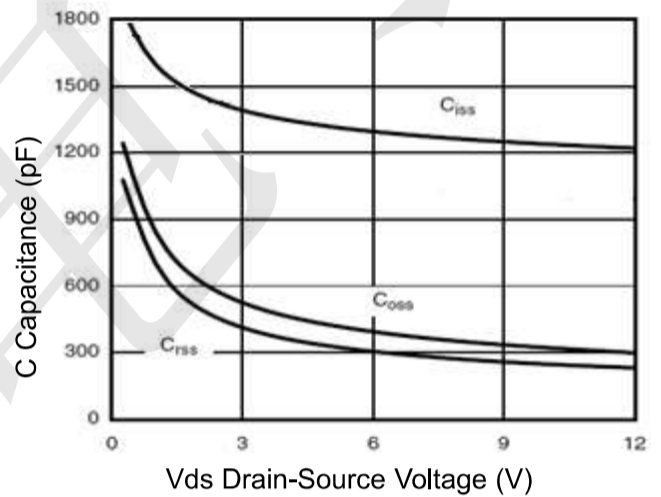Vds Drain-Source Voltage (V)
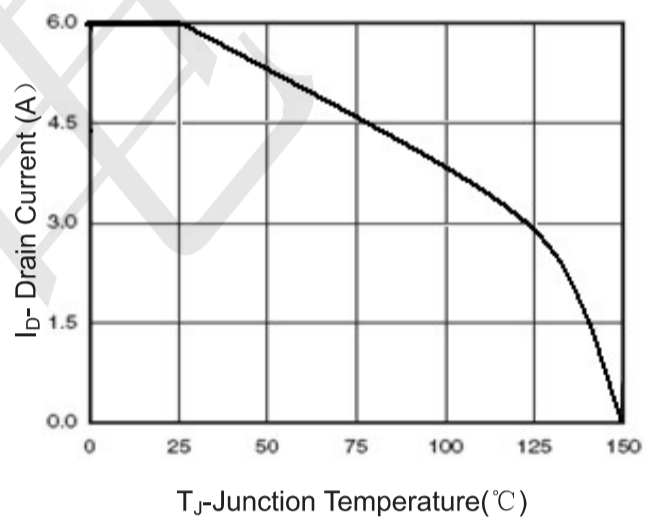
**Figure 5 Output Characteristics**



$I_D$- Drain Current (A)
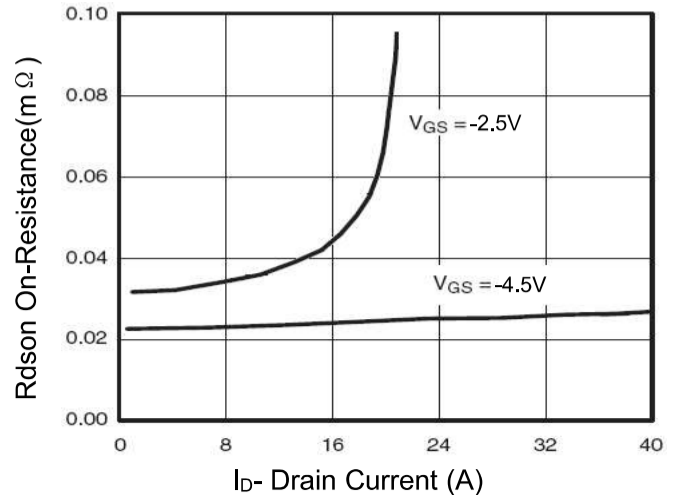
**Figure 6 Drain-Source On-Resistance**

3

**Figure 7 Transfer Characteristics**



**Figure 8 Drain-Source On-Resistance**



**Figure 9 Rdson vs Vgs**



**Figure 10 Capacitance vs Vds**



**Figure 11 Gate Charge**



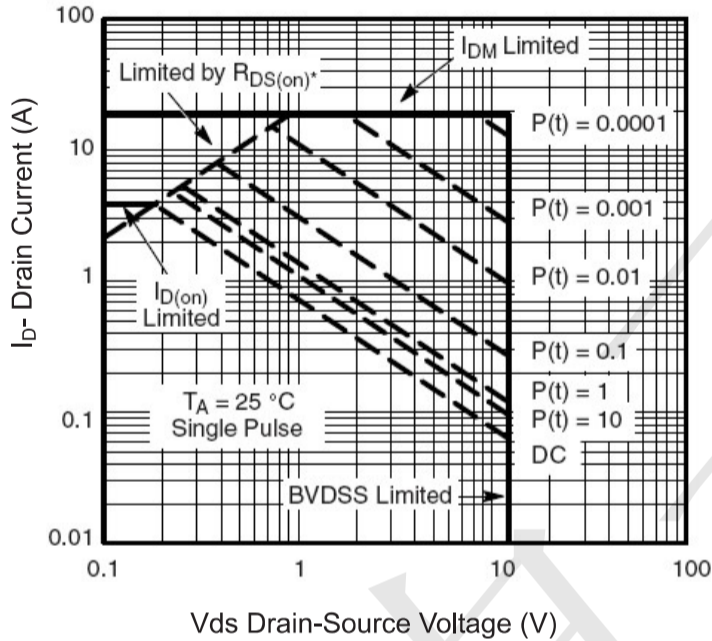**Figure 12 Source- Drain Diode Forward**
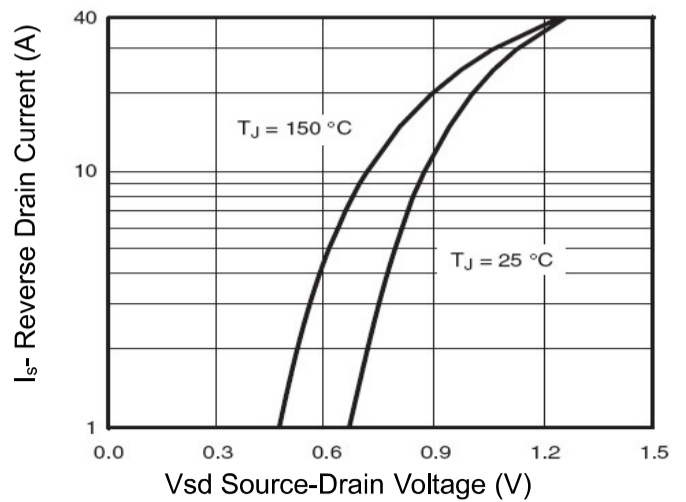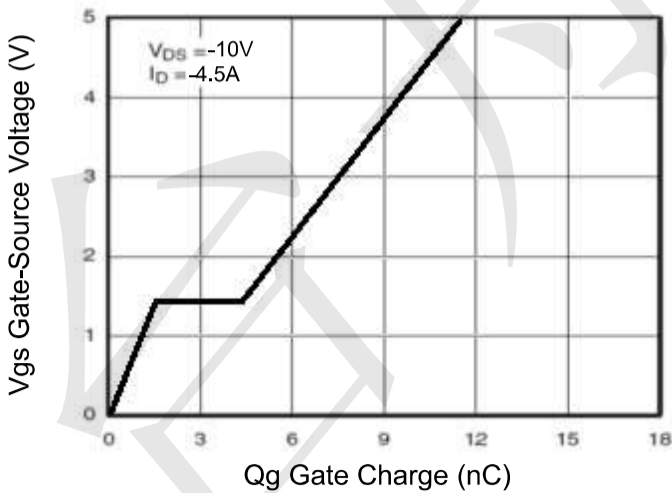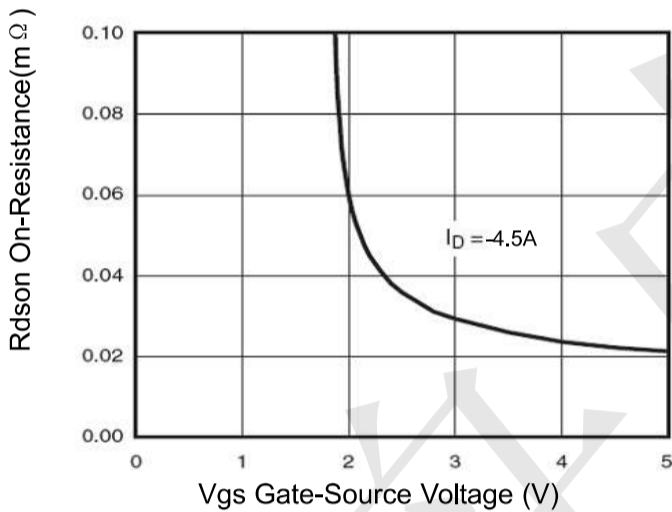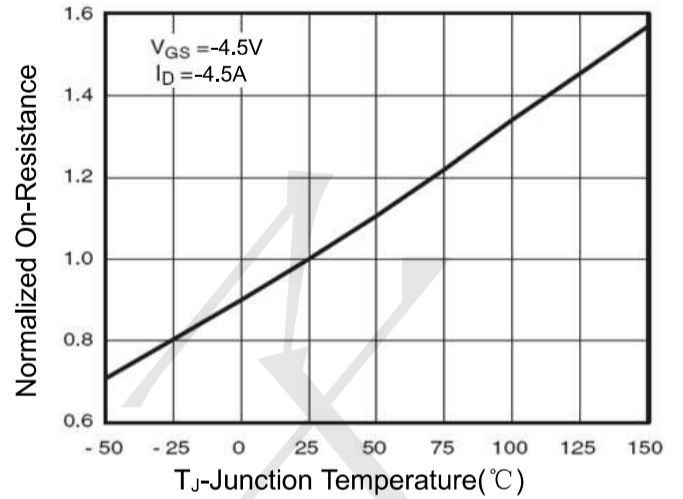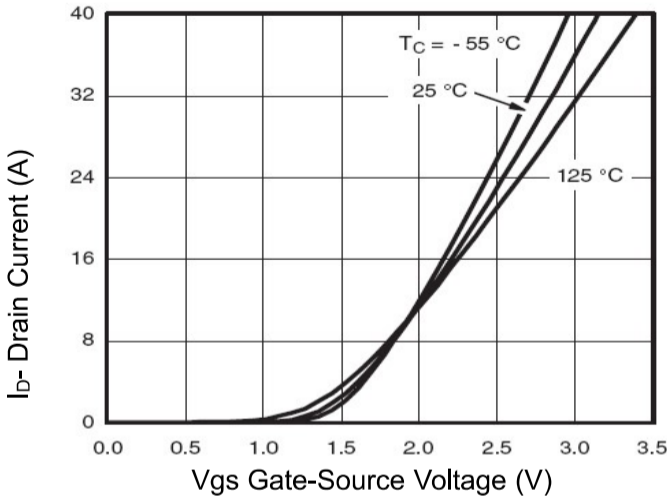
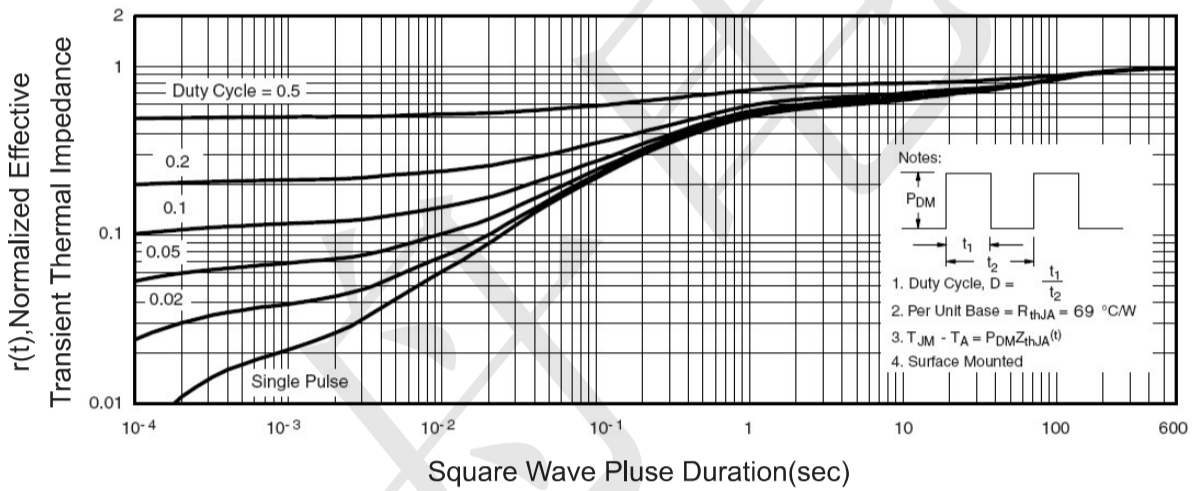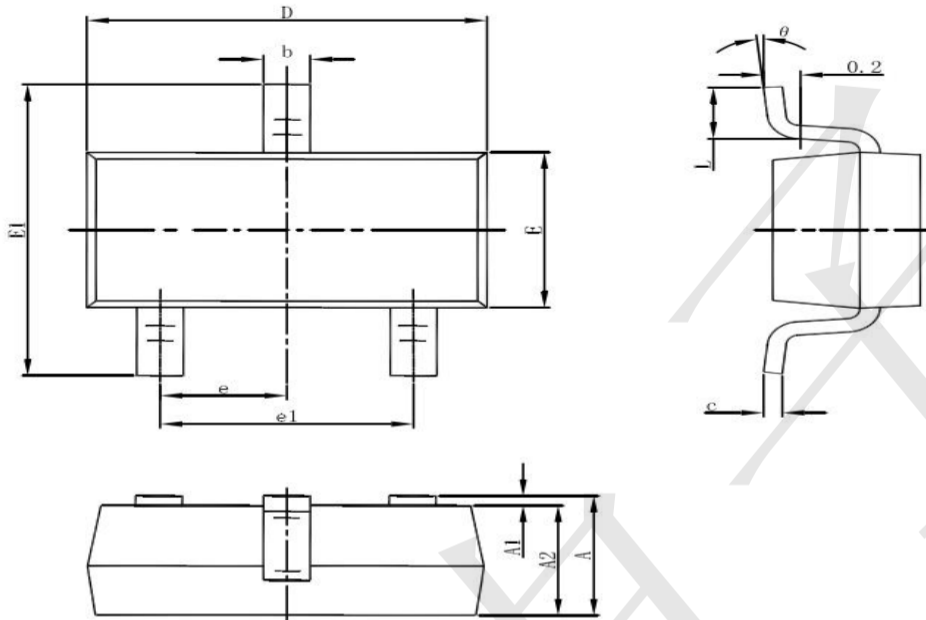**Figure 13 Safe Operation Area**



**Figure 14 Normalized Maximum Transient Thermal Impedance**

**3-pin SOT23-3 Outline Dimensions**



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------|------|------|------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

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