

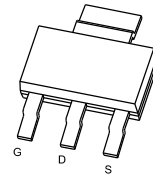
## TP3650S

### 20V P-Channel MOSFET

#### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
-20V	17mΩ@-4.5V	-11A
	27mΩ@-2.5V	

SOT-223



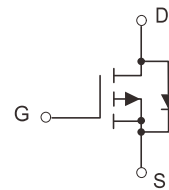
#### DESCRIPTION

The TP3650S uses advanced trench technology to provide excellent  $R_{DS(on)}$ , low gate charge and operation with low gate voltage. This device is suitable for use as a load switching application and a wide variety of other applications.

#### MARKING:



Schematic diagram



#### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	-11	A
Plused Drain Current <sup>(1)</sup>	$I_{DM}$	-40	A
Power Dissipation <sup>(2)</sup>	$P_D$	1.8	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	69	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

## TP3650S

### MOSFET ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			-1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			$\pm 100$	nA
<b>On Characteristics<sup>(3)</sup></b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.65	-0.8	-1.0	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -7.2A$		17	22	m $\Omega$
		$V_{GS} = -2.5V, I_D = -6.4A$		27	40	
Forward transconductance	$g_{FS}$	$V_{DS} = -10V, I_D = -7.2A$		16		S
<b>Dynamic characteristics<sup>(4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$		2700		pF
Output Capacitance	$C_{oss}$			680		
Reverse Transfer Capacitance	$C_{rss}$			590		
Total Gate Charge	$Q_g$	$V_{DS} = -6V, V_{GS} = -4.5V, I_D = -10A$		35		nC
Gate-Source Charge	$Q_{gs}$			5		
Gate-Drain Charge	$Q_{gd}$			10		
<b>SWITCHING CHARACTERISTICS<sup>(4)</sup></b>						
Turn-on delay time	$t_{d(on)}$	$V_{GEN} = -4.5V, V_{DD} = -10V, I_D = -1A, R_g = 10\Omega$		11		ns
Turn-on rise time	$t_r$			35		
Turn-off delay time	$t_{d(off)}$			30		
Turn-off fall time	$t_f$			10		
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Current	$I_S$				-11	A
Diode Forward Voltage <sup>(3)</sup>	$V_{SD}$	$V_{GS} = 0V, I_{SD} = -1.9A$			-1.2	V

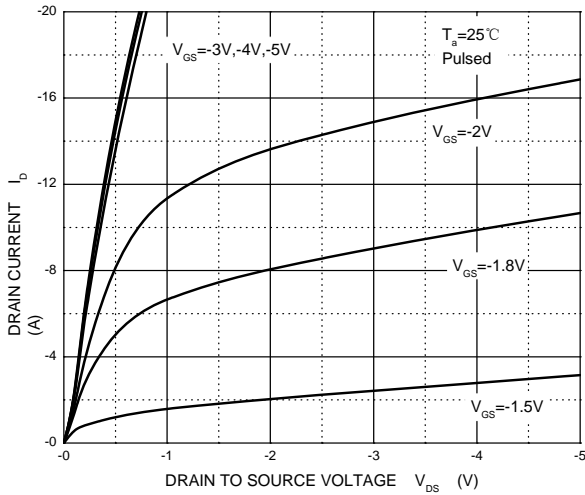
#### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. This test is performed with no heat sink at  $T_a=25^\circ\text{C}$ .
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing.

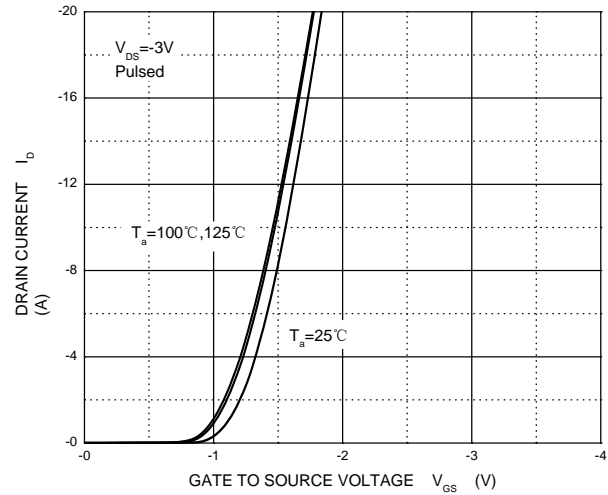
## TP3650S

### Typical Electrical and Thermal Characteristics

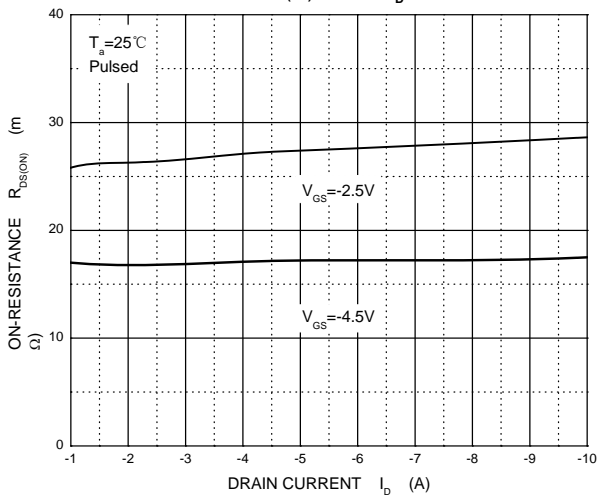
Output Characteristic



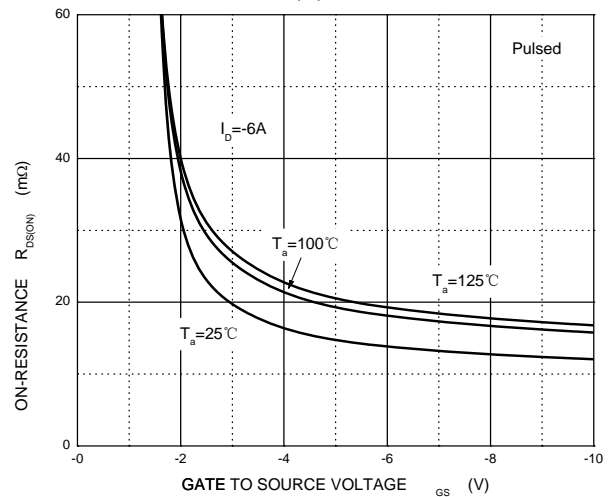
Transfer Characteristics



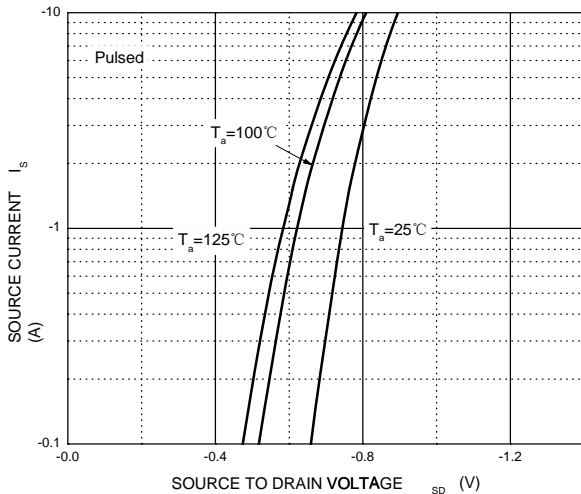
$R_{DS(ON)}$  —  $I_D$



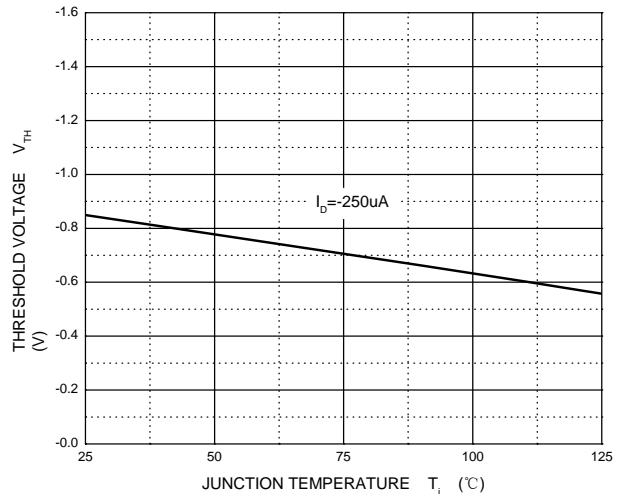
$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$



Threshold Voltage



## TP3650S

### SOT-223 Package Information

尺寸 标注	最小 (mm)	最大 (mm)	尺寸 标注	最小 (mm)	最大 (mm)
A	6.40	6.60	C	1.45	1.65
e	2.286 (BSC)		C1	0.03	0.15
b	0.66	0.76	C2	0.20	0.35
b1	2.95	3.05	L	0.76	1.16
B	3.40	3.60	L1	1.70	1.80
B1	6.85	7.15	$\theta$	0°	8°

