

# GSM3981

## 20V P-Channel Enhancement Mode MOSFET

### Product Description

GSM3981, P-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge. These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

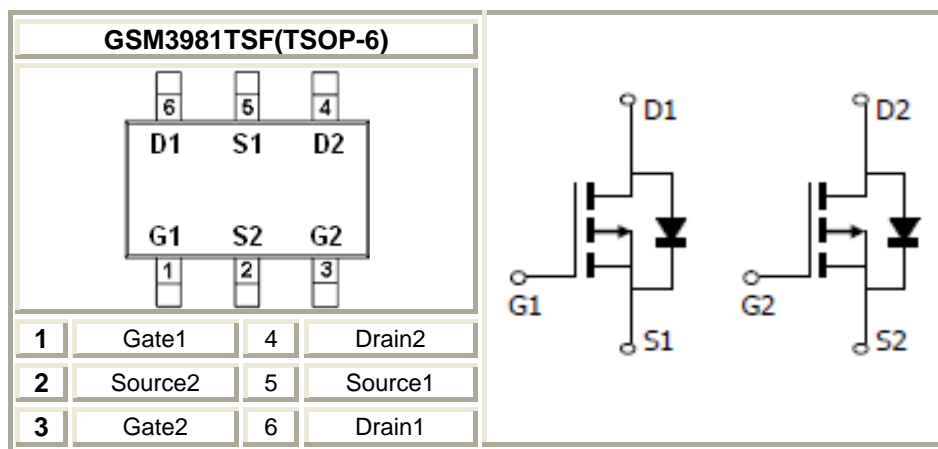
### Features

- -20V/-3.2A,  $R_{DS(ON)}=100m\Omega@V_{GS}=-4.5V$
- -20V/-2.4A,  $R_{DS(ON)}=135m\Omega@V_{GS}=-2.5V$
- -20V/-1.5A,  $R_{DS(ON)}=190m\Omega@V_{GS}=-1.8V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- TSOP-6 package design

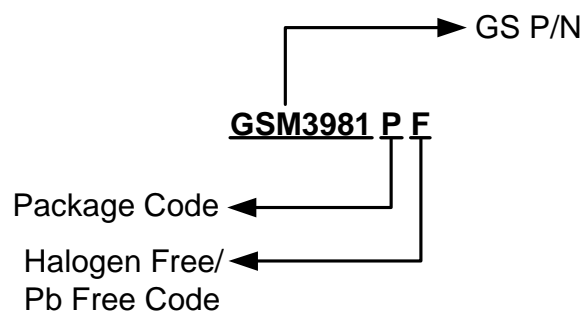
### Applications

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- Net Working System

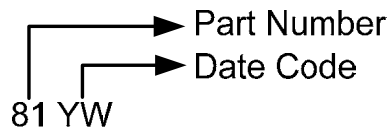
### Packages & Pin Assignments



### Ordering Information



## Marking Information



Part Number	Package	Part Marking
GSM3981TSF	TSOP-6	81YW

## Absolute Maximum Ratings

(T<sub>A</sub>=25°C unless otherwise noted)

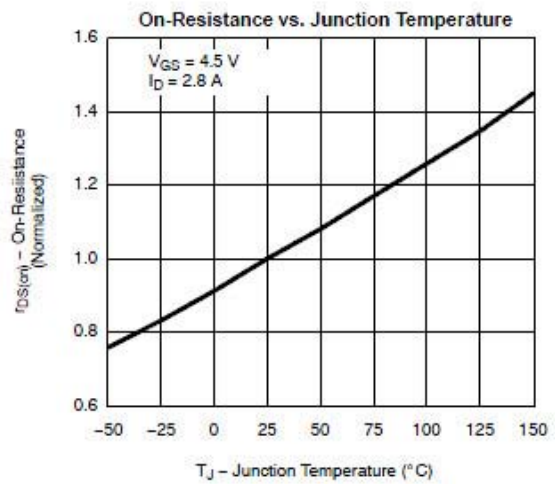
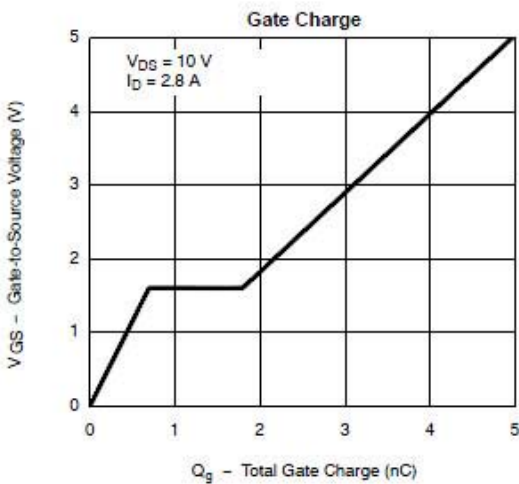
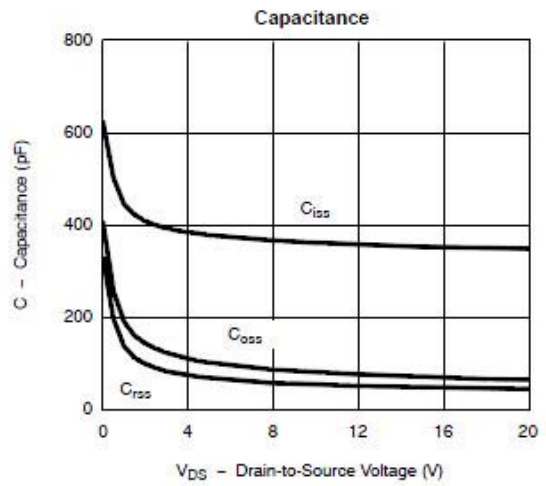
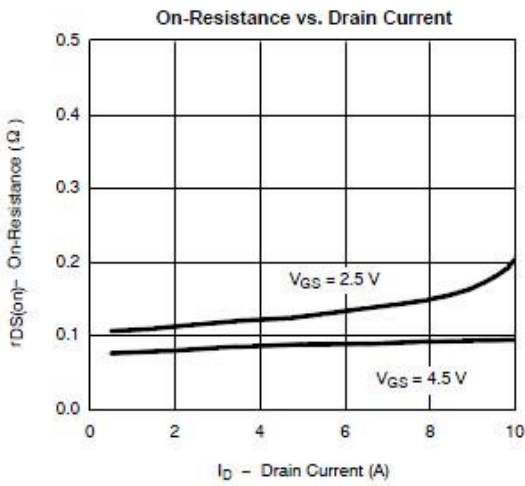
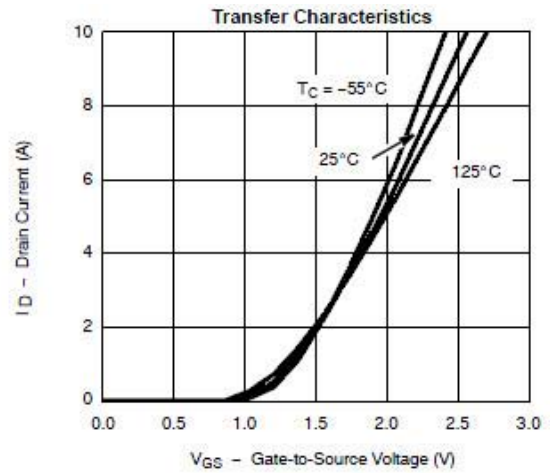
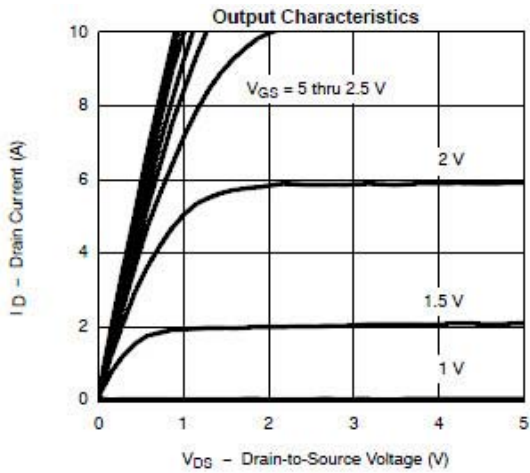
Symbol	Parameter	Typical	Unit	
V <sub>DSS</sub>	Drain-Source Voltage	-20	V	
V <sub>GSS</sub>	Gate –Source Voltage	±12	V	
I <sub>D</sub>	Continuous Drain Current(T <sub>J</sub> =150°C)	T <sub>A</sub> =25°C	-3.2	A
		T <sub>A</sub> =70°C	-2.6	
I <sub>DM</sub>	Pulsed Drain Current	-20	A	
I <sub>S</sub>	Continuous Source Current(Diode Conduction)	-1.7	A	
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	2.0	W
		T <sub>A</sub> =70°C	1.3	
T <sub>J</sub>	Operating Junction Temperature	150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55/150	°C	
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	120	°C/ W	

## Electrical Characteristics

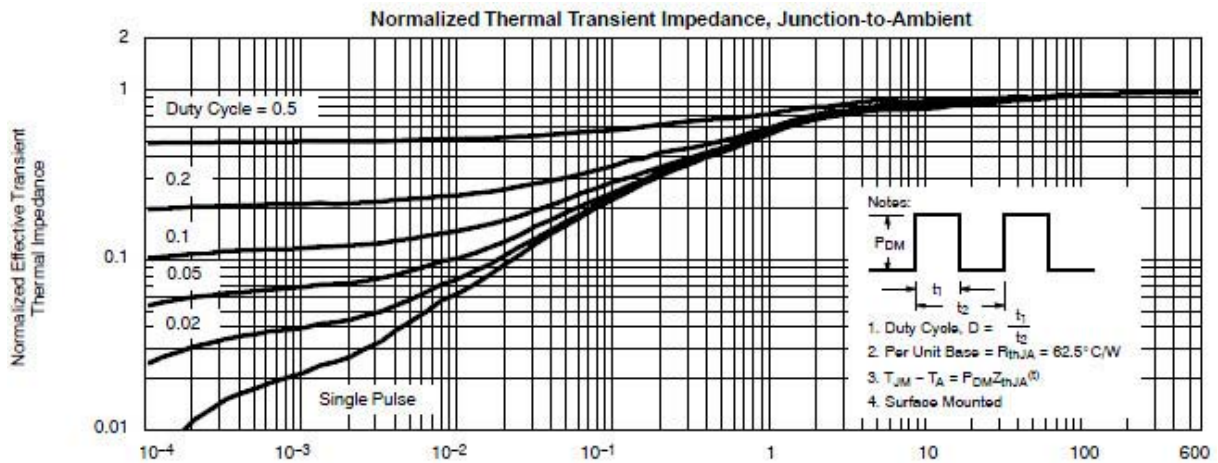
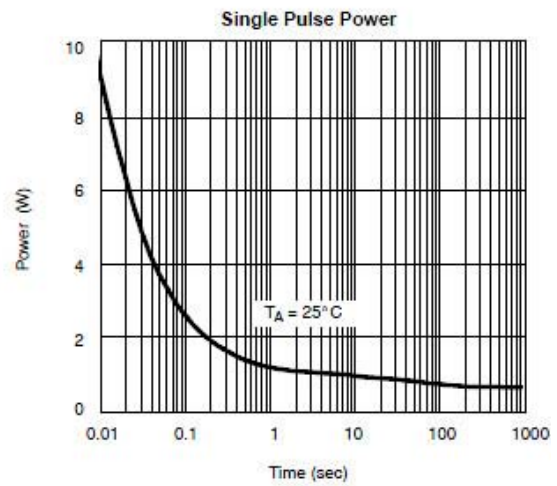
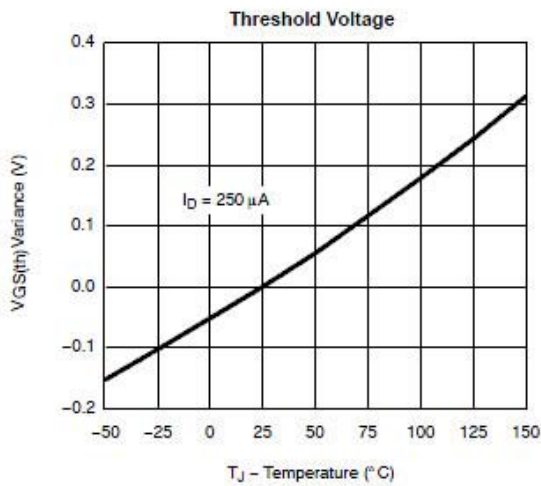
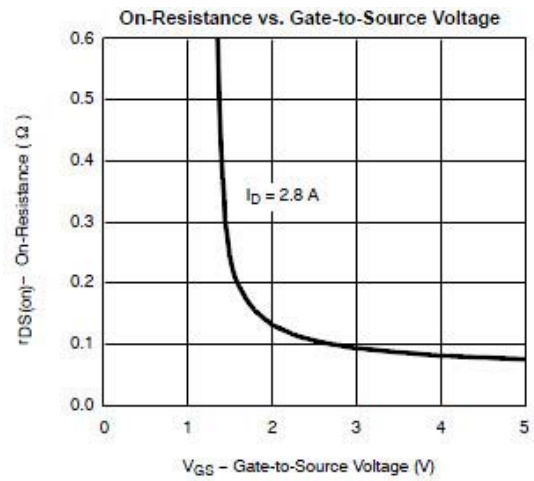
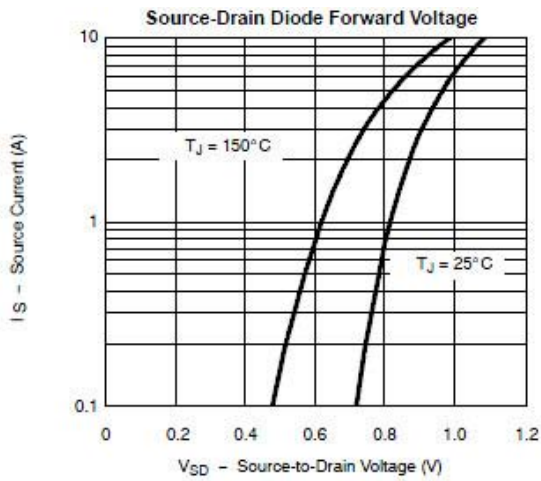
( $T_A=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.3		-0.7	
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-16V, V_{GS}=0V$			-1	uA
		$V_{DS}=-16V, V_{GS}=0V, T_J=85^\circ\text{C}$			-30	
$I_{D(on)}$	On-State Drain Current	$V_{DS}\leq -5V, V_{GS}=-4.5V$	-6			A
		$V_{DS}\leq -5V, V_{GS}=-2.5V$	-3			
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-3.2A$		92	100	m $\Omega$
		$V_{GS}=-2.5V, I_D=-2.6A$		122	135	
		$V_{GS}=-1.8V, I_D=-1.5A$		168	190	
$g_{fs}$	Forward Transconductance	$V_{DS}=-5V, I_D=-2.8A$		6.5		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1.25A, V_{GS}=0V$		-0.75	-1.3	V
<b>Dynamic</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-6V, V_{GS}=0V, f=1\text{MHz}$		415		pF
$C_{oss}$	Output Capacitance			223		
$C_{rss}$	Reverse Transfer Capacitance			87		
$Q_g$	Total Gate Charge	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-2.8A$		5.8	10	nC
$Q_{gs}$	Gate-Source Charge			0.85		
$Q_{gd}$	Gate-Drain Charge			1.7		
$t_{d(on)}$	Turn-On Time	$V_{DD}=-6V, R_L=6\Omega, I_D=-1.0A, V_{GEN}=-4.5V, R_G=6\Omega$		13	25	ns
$T_r$				36	60	
$t_{d(off)}$	Turn-Off Time			42	70	
$T_f$				34	60	

## Typical Performance Characteristics

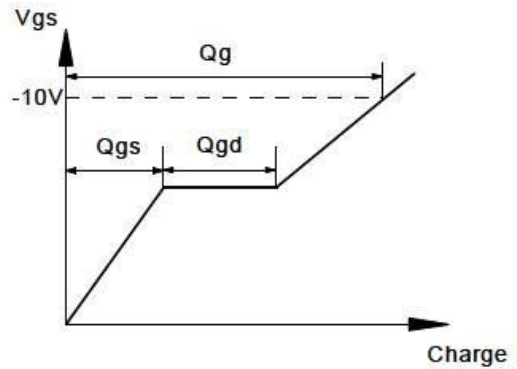
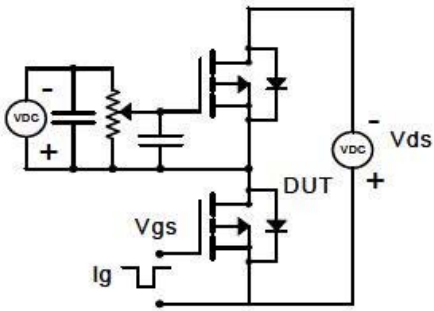


## Typical Performance Characteristics (continue)

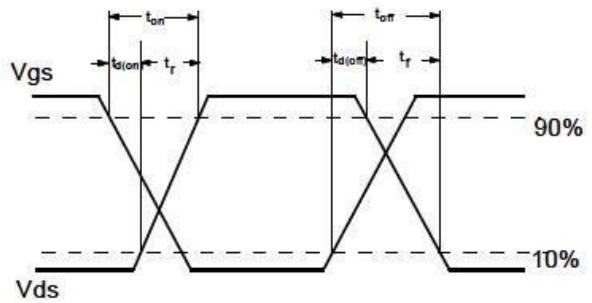
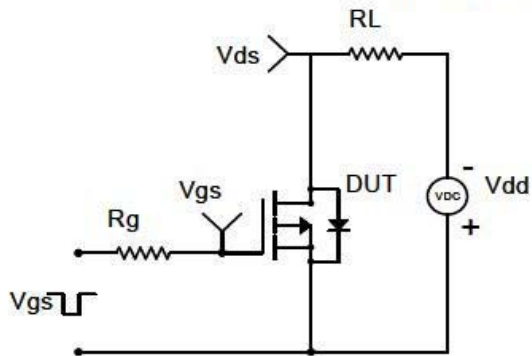


## Typical Characteristics

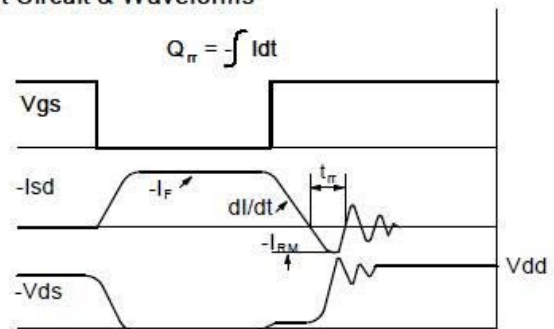
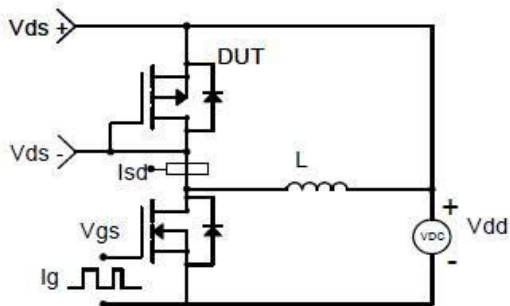
### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms

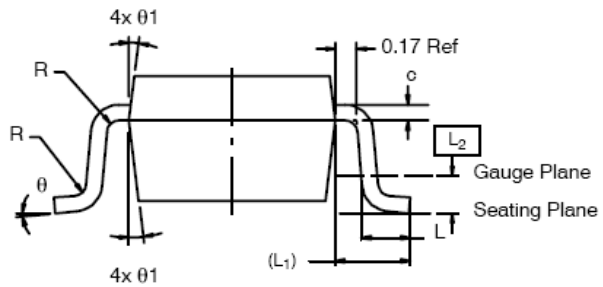
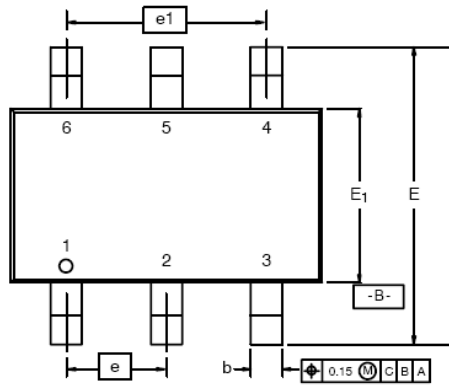


### Diode Recovery Test Circuit & Waveforms



Package Dimension

# TSOP-6 PLASTIC PACKAGE







Dimensions						
SYMBOL	Millimeters			Inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.91	-	1.10	0.036	-	0.043
A <sub>1</sub>	0.01	-	0.10	0.0004	-	0.004
A <sub>2</sub>	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E1	1.55	1.65	1.70	0.061	0.065	0.067
e	1.00 BSC			0.0394 BSC		
e <sub>1</sub>	1.90	2.00	2.10	0.075	0.080	0.085
L	0.35	-	0.50	0.014	-	0.020
L <sub>1</sub>	0.60 Ref			0.024 Ref		
L <sub>2</sub>	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ <sub>1</sub>	7° Nom			7° Nom		








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