

GSM1013E

20V P-Channel Enhancement Mode MOSFET

Product Description

GSM1013E, 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 low in-line power loss are needed in commercial industrial surface mount applications.

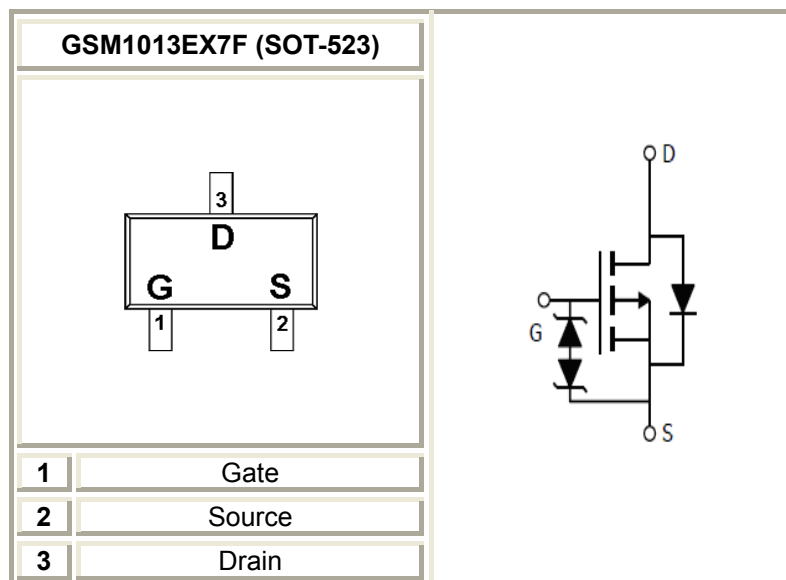
Features

- $-20V/-0.6A, R_{DS(ON)}=800m\Omega@V_{GS}=-4.5V$
- $-20V/-0.5A, R_{DS(ON)}=950m\Omega@V_{GS}=-2.5V$
- $-20V/-0.4A, R_{DS(ON)}=1250m\Omega@V_{GS}=-1.8V$
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- ESD Protection (>2KV) Diode design-in
- Low Battery Voltage Operation
- SOT-523 package design

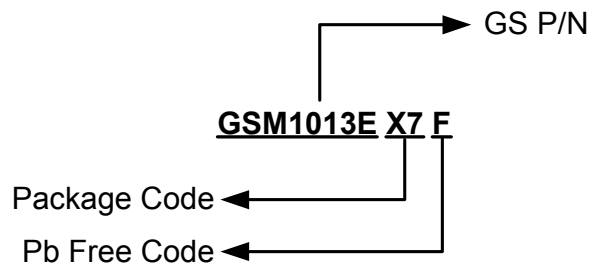
Applications

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Smart Phones, Pagers

Packages & Pin Assignments

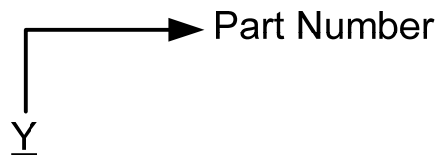


Ordering Information



Part Number	Package	Quantity Reel
GSM1013EX7F	SOT-523	3000 PCS

Marking Information



Absolute Maximum Ratings

(T_A=25°C Unless otherwise noted)

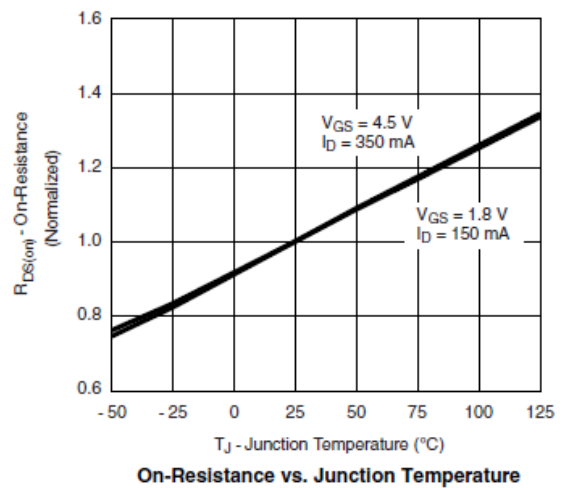
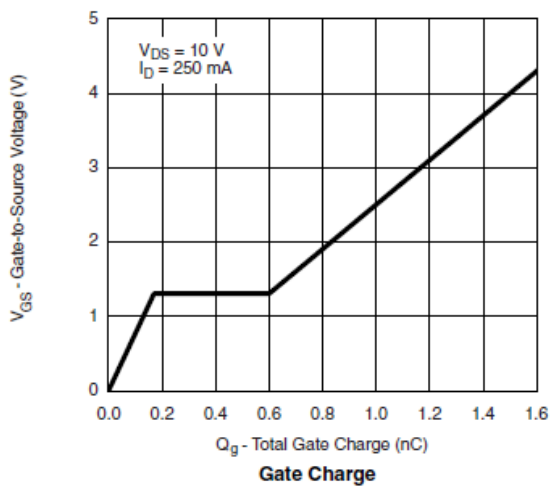
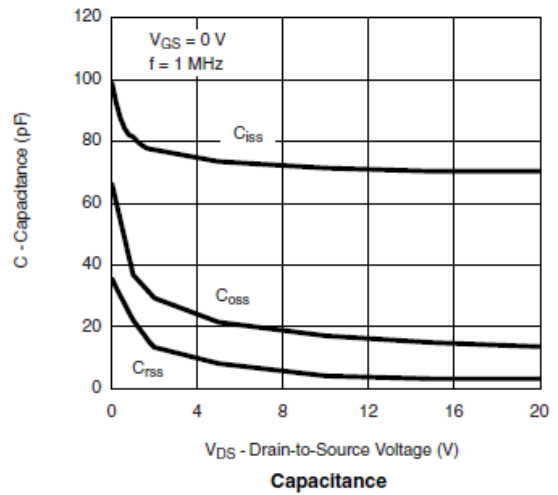
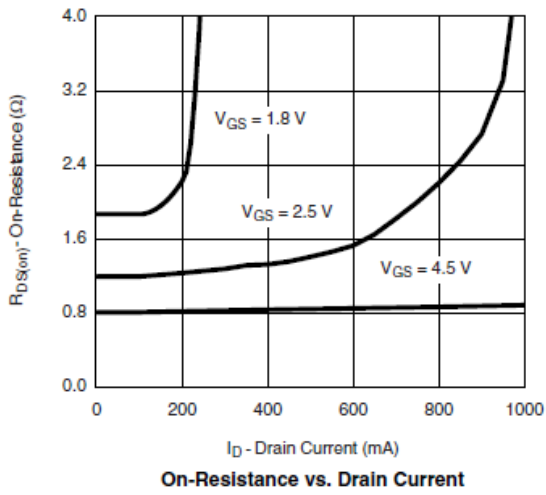
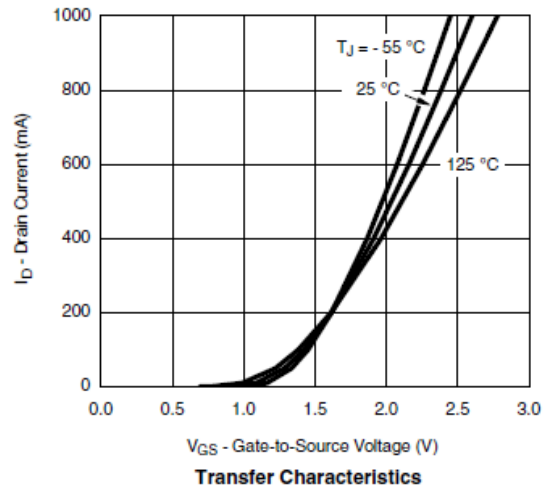
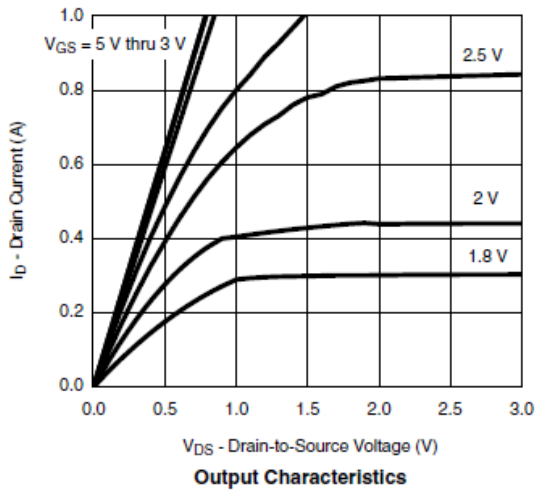
Symbol	Parameter	Typical	Unit	
V _{DSS}	Drain-Source Voltage	-20	V	
V _{GSS}	Gate –Source Voltage	±12	V	
I _D	Continuous Drain Current(T _J =150°C)	T _A =25°C	-0.7	A
		T _A =70°C	-0.4	
I _{DM}	Pulsed Drain Current	-1.0	A	
I _S	Continuous Source Current(Diode Conduction)	-0.3	A	
P _D	Power Dissipation	T _A =25°C	0.27	W
		T _A =70°C	0.16	
T _J	Operating Junction Temperature	-55/150	°C	
T _{STG}	Storage Temperature Range	-55/150	°C	

Electrical Characteristics

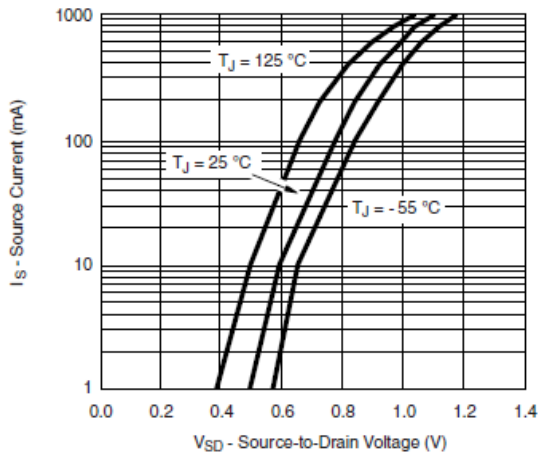
($T_A=25^{\circ}\text{C}$ Unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4		-1.0	
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$			-1	uA
		$V_{DS}=-20V, V_{GS}=0V, T_J=85^{\circ}\text{C}$			-5	
$I_{D(on)}$	On-State Drain Current	$V_{DS}\leq -5V, V_{GS}=-4.5V$	-0.7			A
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-0.6A$		600	800	m Ω
		$V_{GS}=-2.5V, I_D=-0.5A$		800	950	
		$V_{GS}=-1.8V, I_D=-0.4A$		1000	1250	
g_{FS}	Forward Transconductance	$V_{DS}=-10V, I_D=-0.4A$		1		S
V_{SD}	Diode Forward Voltage	$I_S=-0.15A, V_{GS}=0V$		-0.65	-1.2	V
Dynamic						
C_{iss}	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1\text{MHz}$		70	100	pF
C_{oss}	Output Capacitance			20		
C_{rss}	Reverse Transfer Capacitance			10		
Q_g	Total Gate Charge	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-0.25A$		1.0	1.3	nC
Q_{gs}	Gate-Source Charge			0.1		
Q_{gd}	Gate-Drain Charge			0.3		
$t_{d(on)}$	Turn-On Time	$V_{DD}=-10V, R_L=30\Omega, I_D=-0.2A, V_{GEN}=-4.5V, R_G=10\Omega$		10	15	ns
t_r				10	15	
$t_{d(off)}$	Turn-Off Time			40	60	
t_f				30	50	

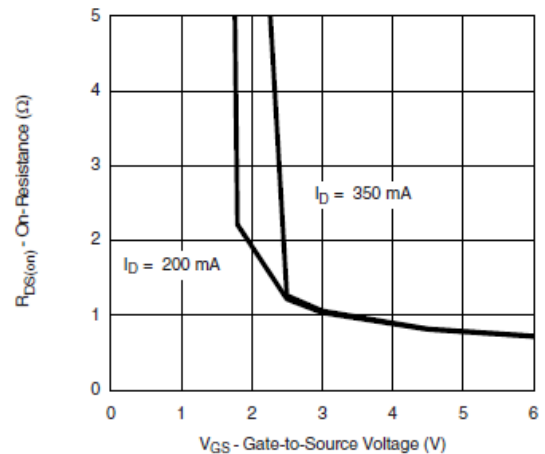
Typical Performance Characteristics



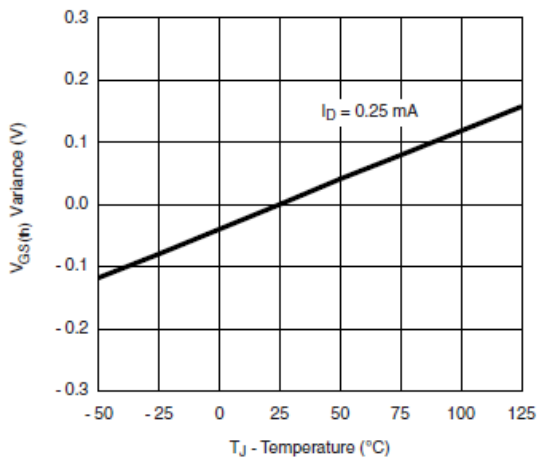
Typical Performance Characteristics(Continue)



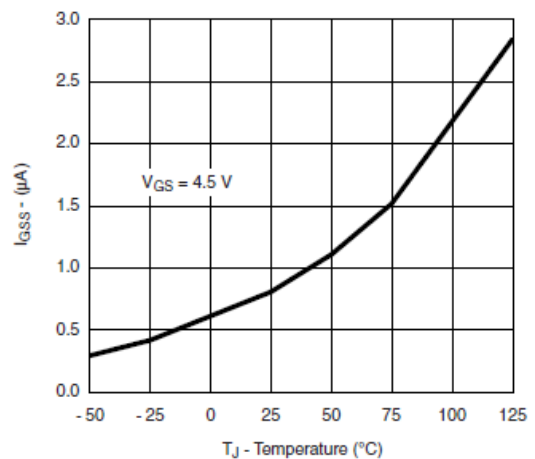
Source-Drain Diode Forward Voltage



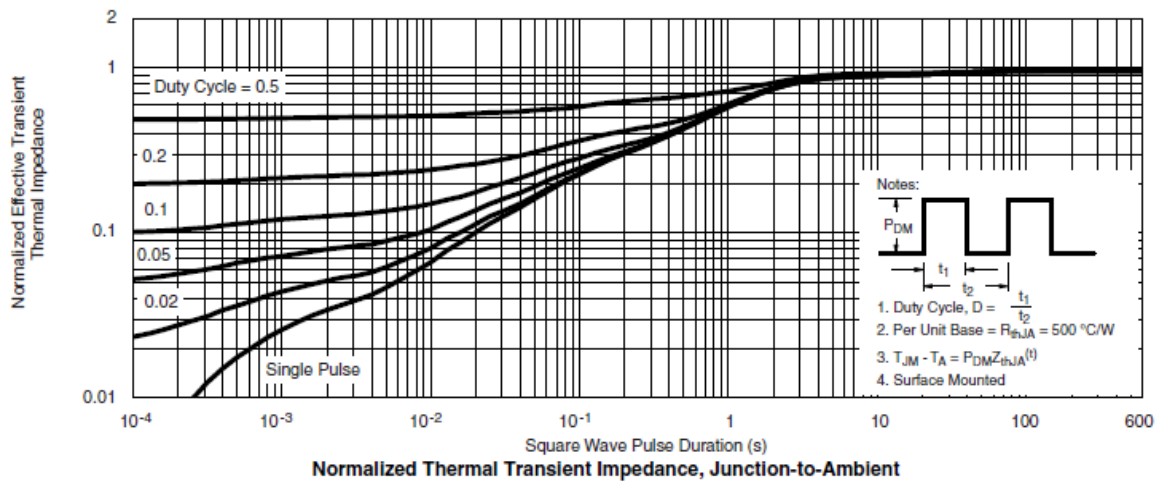
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage Variance vs. Temperature



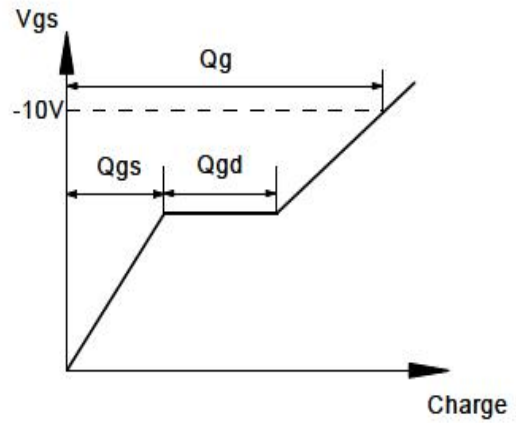
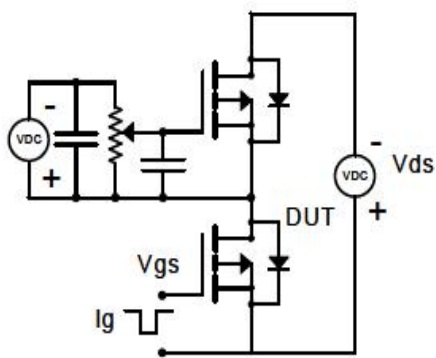
I_{GSS} vs. Temperature



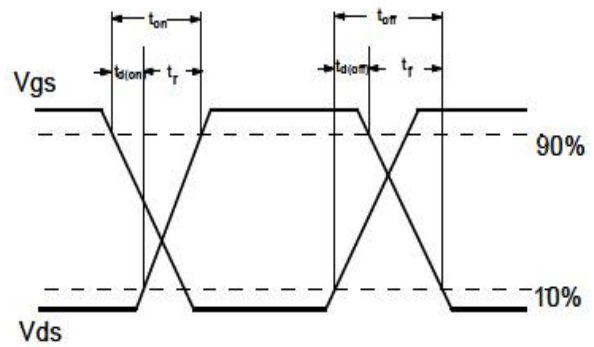
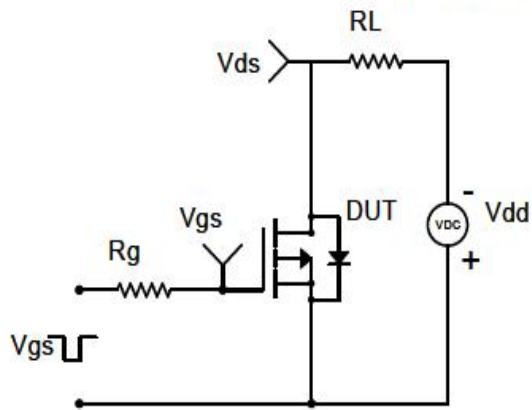
Normalized Thermal Transient Impedance, Junction-to-Ambient

Typical Characteristics

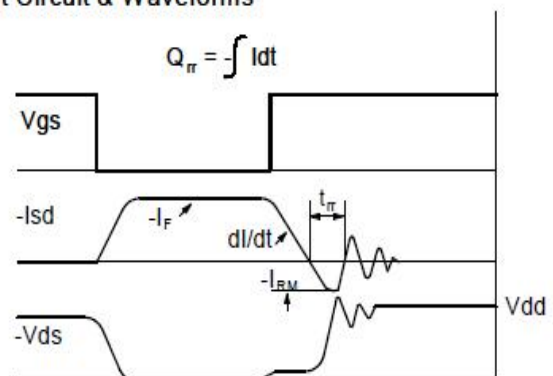
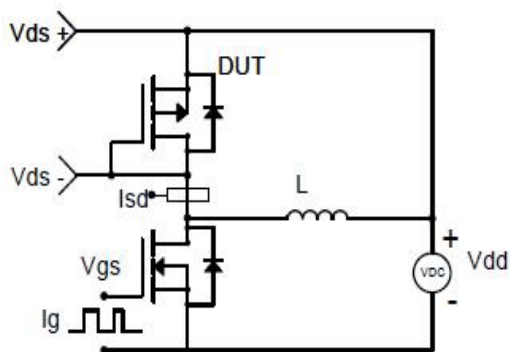
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

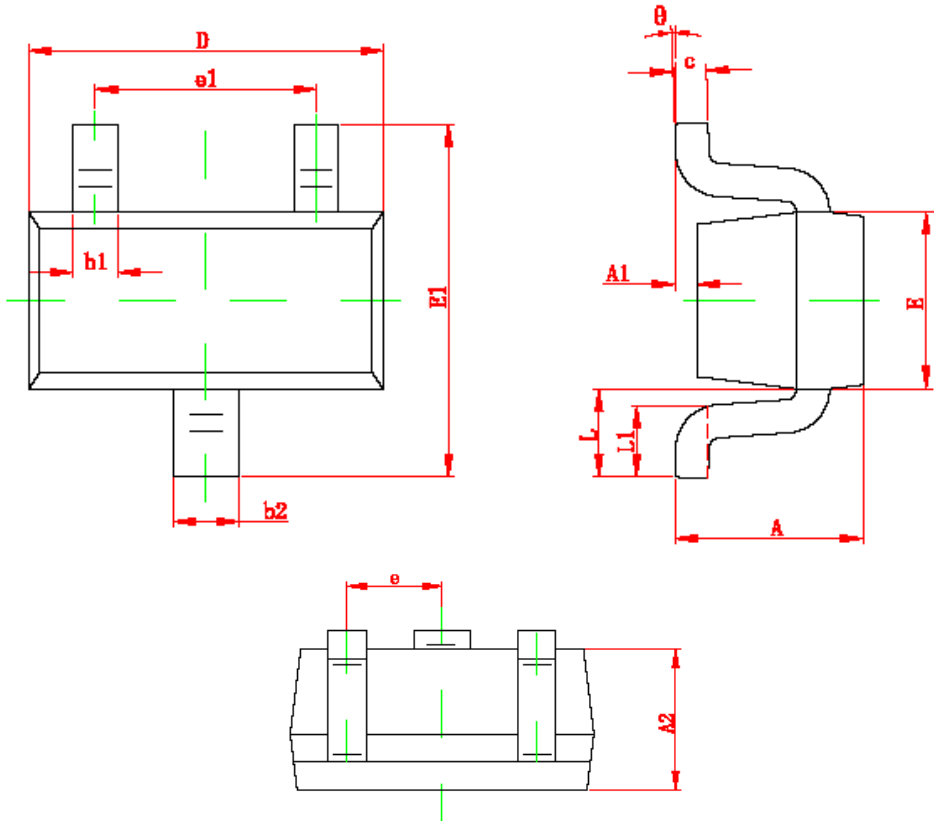


Diode Recovery Test Circuit & Waveforms



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
b1	0.150	0.250	0.006	0.010
b2	0.250	0.325	0.010	0.013
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.750	0.850	0.030	0.033
E1	1.450	1.750	0.057	0.069
e	0.500 (TYP)		0.020 (TYP)	
e1	0.900	1.100	0.035	0.043
L	0.550 (REF)		0.022 (REF)	
L1	0.280	0.440	0.011	0.017
θ	0°	4°	0°	4°



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