

GSM1012E

20V N-Channel Enhancement Mode MOSFET

Product Description

GSM1012E, N-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.

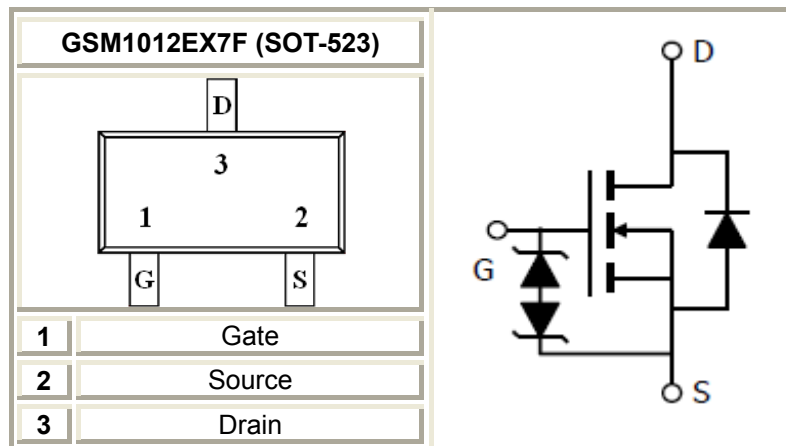
Features

- 20V/0.6A, $R_{DS(ON)}=360m\Omega@V_{GS}=4.5V$
- 20V/0.5A, $R_{DS(ON)}=420m\Omega@V_{GS}=2.5V$
- 20V/0.4A, $R_{DS(ON)}=560m\Omega@V_{GS}=1.8V$
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation
- **ESD Protected**
- SOT-523 package design

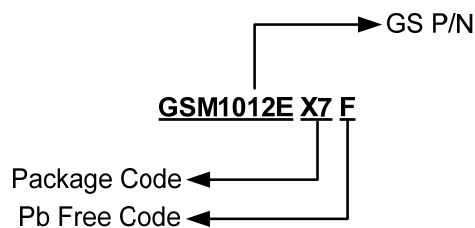
Applications

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

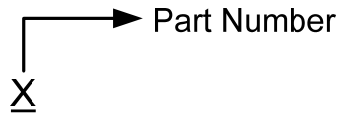
Packages & Pin Assignments



Ordering Information



Marking Information



Part Number	Package	Part Marking
GSM1012EX7F	SOT-523	<u>X</u>

Absolute Maximum Ratings

(T_A=25°C unless otherwise noted)

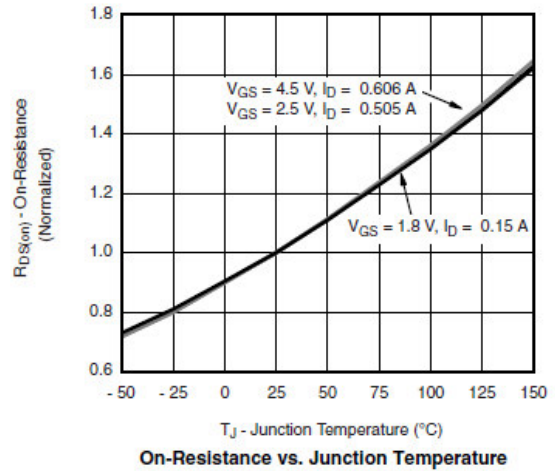
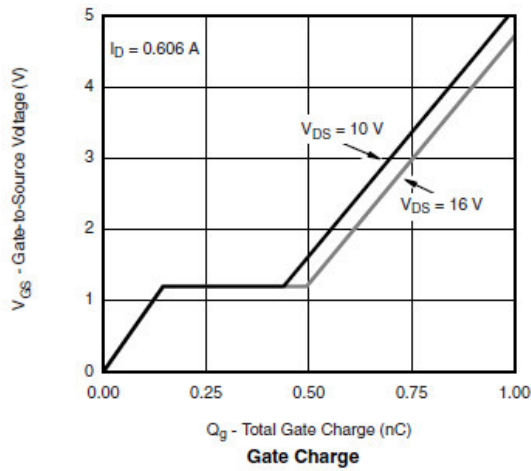
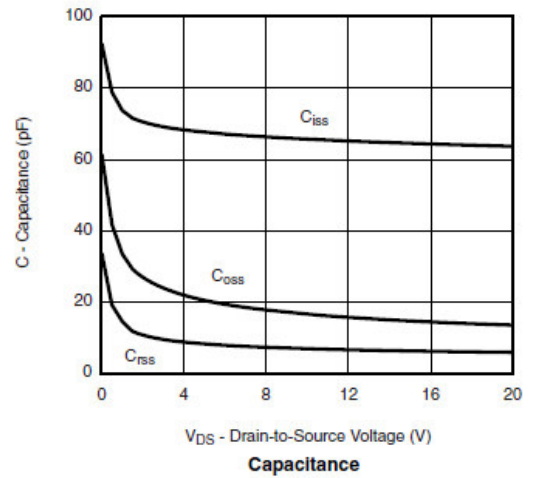
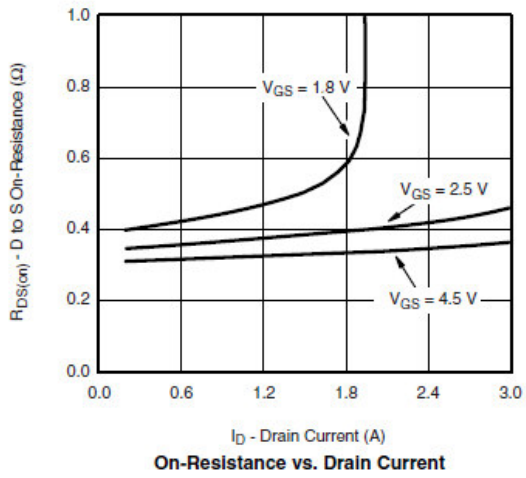
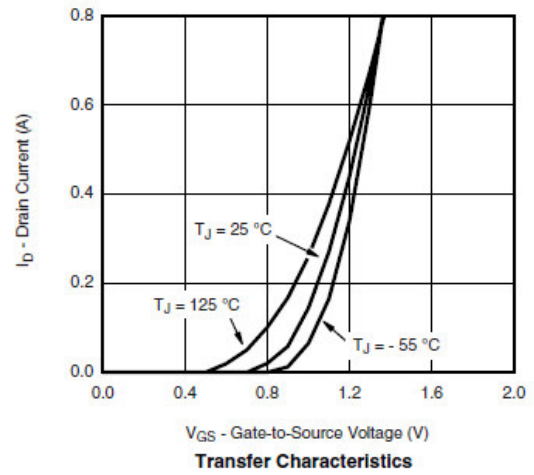
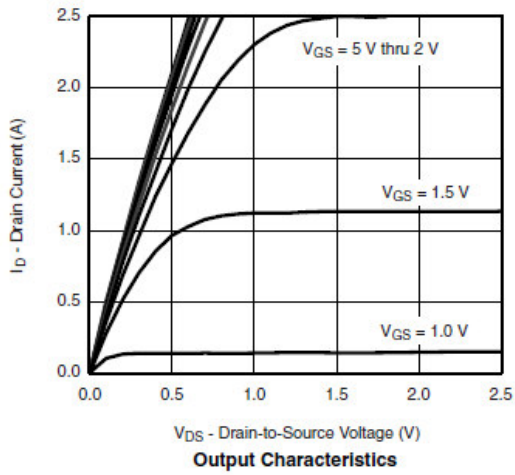
Symbol	Parameter	Typical	Unit	
V _{DSS}	Drain-Source Voltage	20	V	
V _{GSS}	Gate –Source Voltage	±12	V	
I _D	Continuous Drain Current(T _J =150°C)	T _A =25°C	0.7	A
		T _A =70°C	0.4	
I _{DM}	Pulsed Drain Current	1.0	A	
I _S	Continuous Source Current(Diode Conduction)	0.3	A	
P _D	Power Dissipation	T _A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

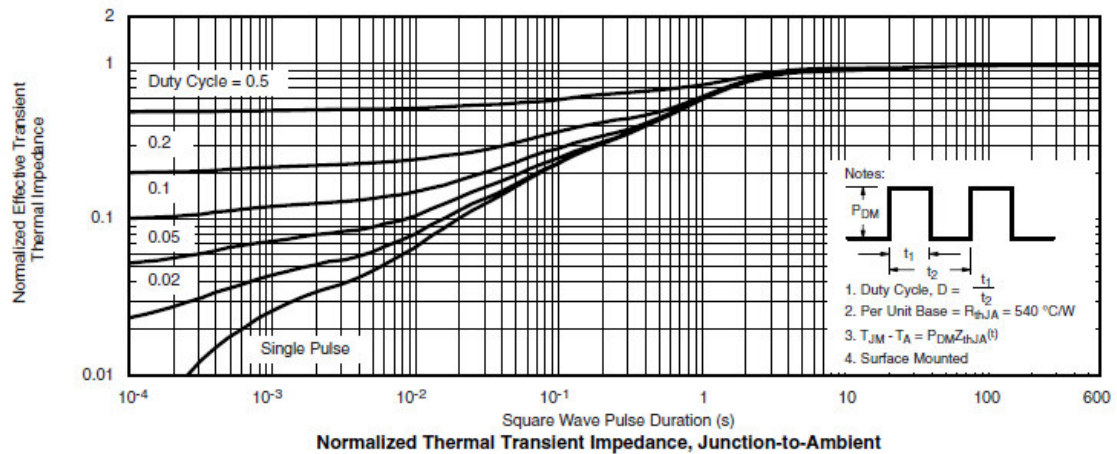
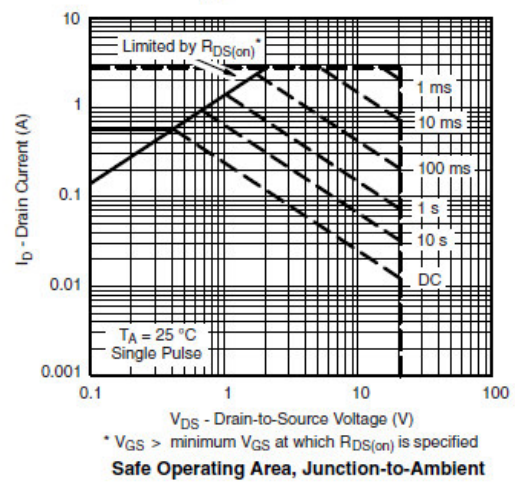
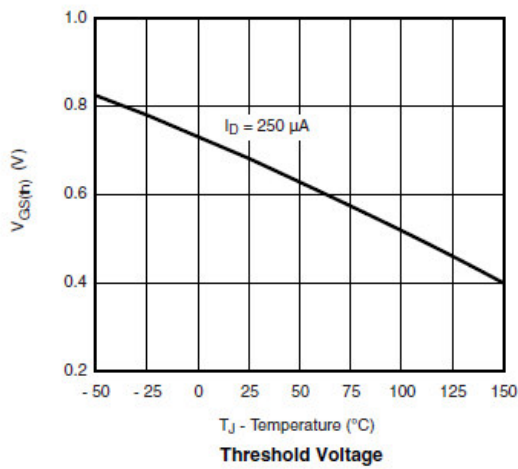
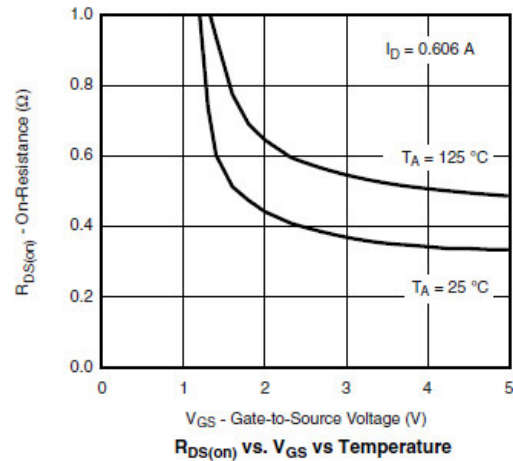
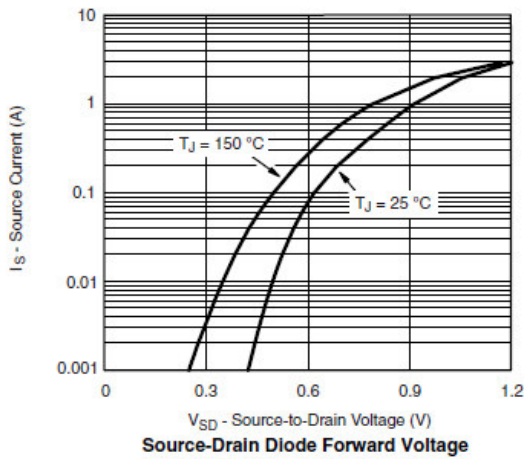
($T_A=25^\circ\text{C}$ unless otherwise noted)

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	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3		0.8	
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			± 1	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16V, V_{GS}=0V$			1	uA
		$V_{DS}=16V, V_{GS}=0V, T_J=85^\circ\text{C}$			5	
$I_{D(on)}$	On-State Drain Current	$V_{DS}\geq 5V, V_{GS}=4.5V$	0.7			A
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=0.6A$		300	360	m Ω
		$V_{GS}=2.5V, I_D=0.5A$		240	420	
		$V_{GS}=1.8V, I_D=0.4A$		420	560	
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		pF
C_{oss}	Output Capacitance			20		
C_{riss}	Reverse Transfer Capacitance			8		
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=0.6A$		1.06	1.38	nC
Q_{gs}	Gate-Source Charge			0.18		
Q_{gd}	Gate-Drain Charge			0.32		
$t_{d(on)}$	Turn-On Time	$V_{DD}=10V, R_L=20\Omega, I_D=0.5A, V_{GEN}=4.5V, R_G=1\Omega$		18	26	ns
t_r				20	28	
$t_{d(off)}$	Turn-Off Time			70	110	
t_f				25	40	

Typical Performance Characteristics

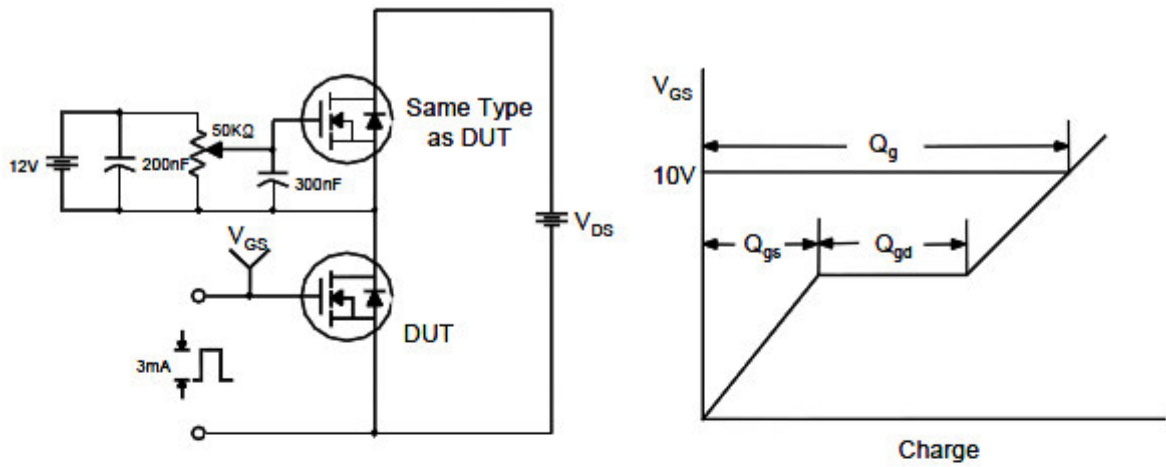


Typical Performance Characteristics (continue)

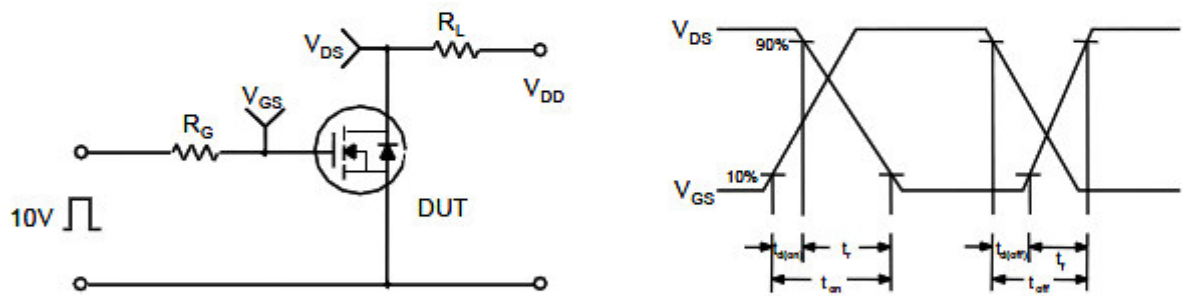


Typical Characteristics

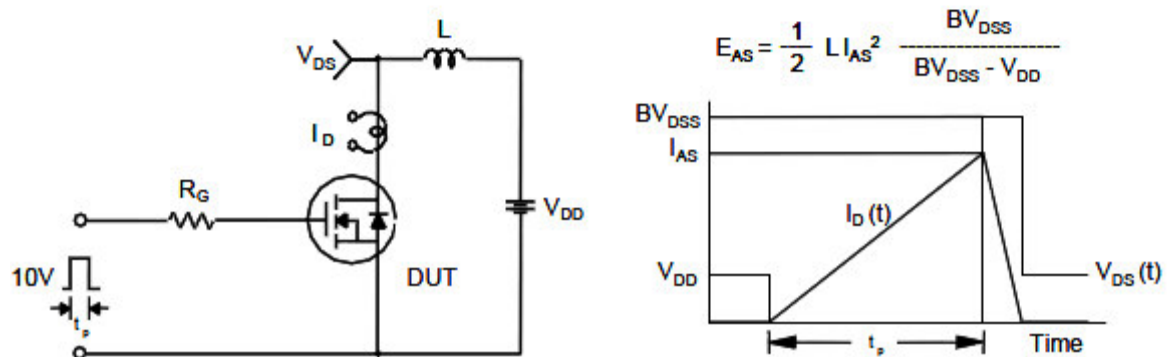
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

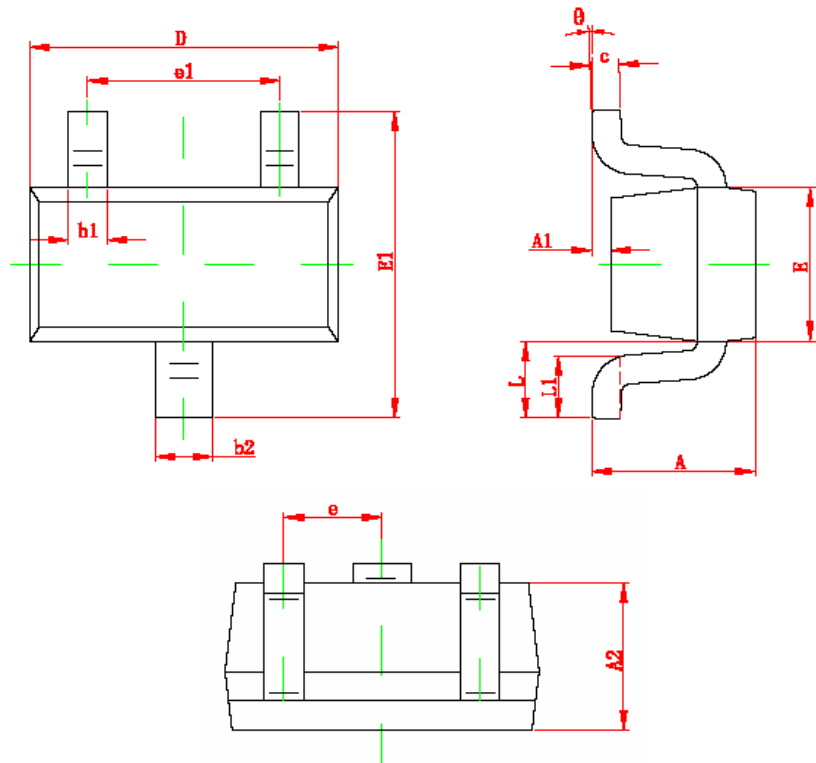


Unclamped Inductive Switching Test Circuit & Waveforms



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
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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CONTACT US

GS Headquarter	
	4F.,No.43-1,Lane11,Sec.6,Minquan E.Rd Neihu District Taipei City 114, Taiwan (R.O.C)
	886-2-2657-9980
	886-2-2657-3630
	sales_twn@gs-power.com

Wu-Xi Branch	
	No.21 Changjiang Rd., WND, Wuxi, Jiangsu, China (INFO. &. TECH. Science Park Building A 210 Room)
	86-510-85217051
	86-510-85211238
	sales_cn@gs-power.com

RD Division	
	824 Bolton Drive Milpitas. CA. 95035
	1-408-457-0587