

# GSM1024

## 20V N-Channel Enhancement Mode MOSFET

### Product Description

GSM1024, 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.

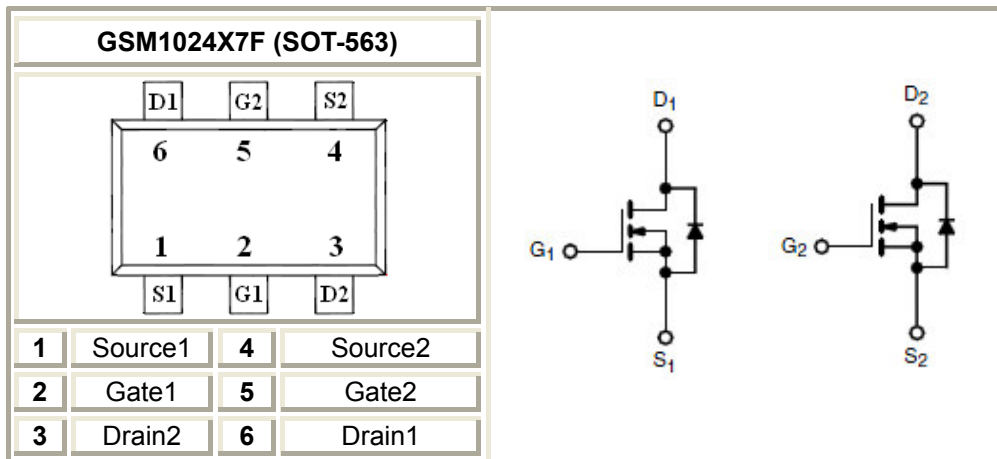
### Features

- 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
- SOT-563 package design

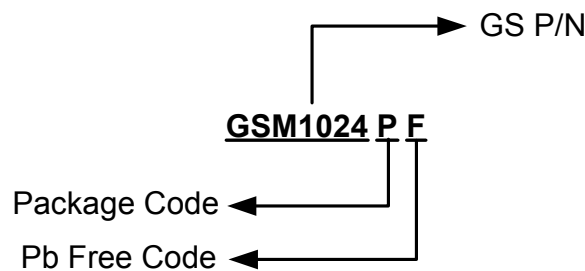
### Applications

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

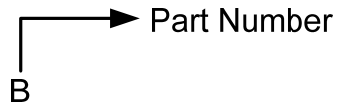
### Packages & Pin Assignments



### Ordering Information



## Marking Information



Part Number	Package	Part Marking
GSM1024X7F	SOT-563	B

## Absolute Maximum Ratings

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

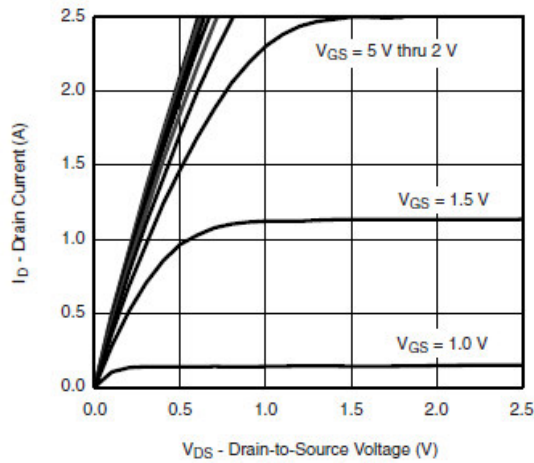
Symbol	Parameter	Typical	Unit	
$V_{DSS}$	Drain-Source Voltage	20	V	
$V_{GSS}$	Gate –Source Voltage	$\pm 12$	V	
$I_D$	Continuous Drain Current( $T_J=150^\circ\text{C}$ )	$T_A=25^\circ\text{C}$	0.7	A
		$T_A=70^\circ\text{C}$	0.4	
$I_{DM}$	Pulsed Drain Current	1.0	A	
$I_S$	Continuous Source Current(Diode Conduction)	0.3	A	
$P_D$	Power Dissipation	$T_A=25^\circ\text{C}$	0.27	W
		$T_A=70^\circ\text{C}$	0.16	
$T_J$	Operating Junction Temperature	-55/150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55/150	$^\circ\text{C}$	

## Electrical Characteristics

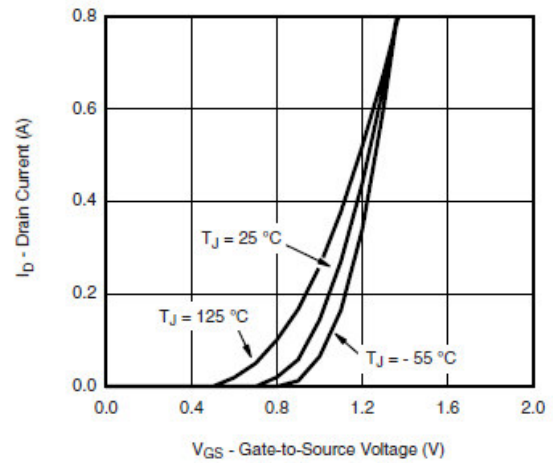
( $T_A=25^\circ\text{C}$  unless otherwise noted)

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	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4		1.0	
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	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	$V_{DS}\geq 5V, V_{GS}=4.5V$	0.7			A
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=0.6A$		240	360	m $\Omega$
		$V_{GS}=2.5V, I_D=0.5A$		300	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	$I_S=0.15A, V_{GS}=0V$		0.8	1.2	V
<b>Dynamic</b>						
$C_{iss}$	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	

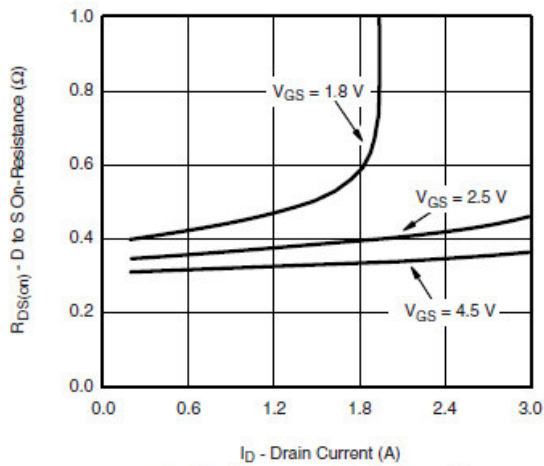
## Typical Performance Characteristics



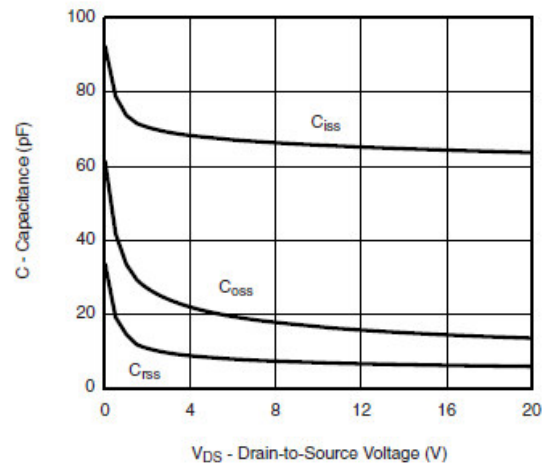
Output Characteristics



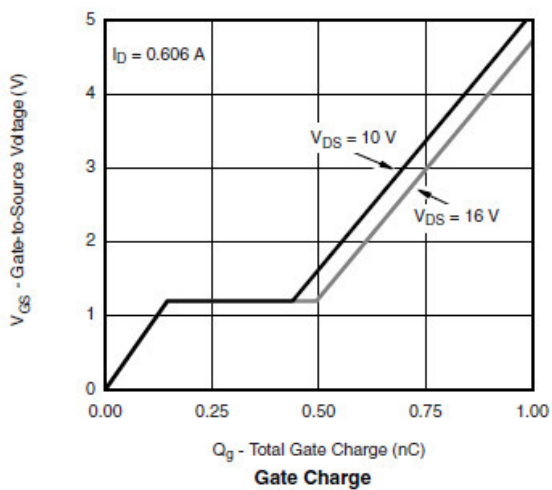
Transfer Characteristics



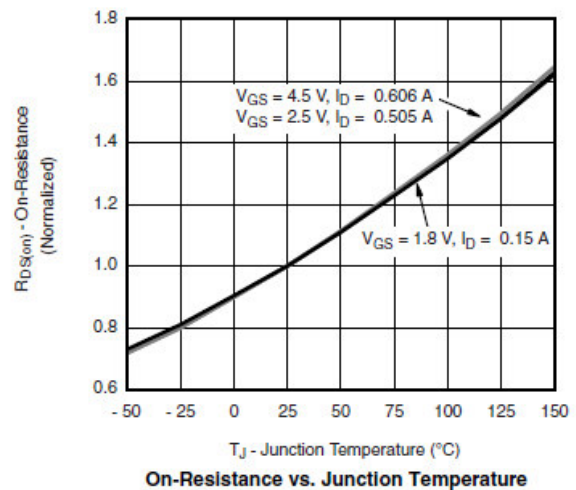
On-Resistance vs. Drain Current



Capacitance

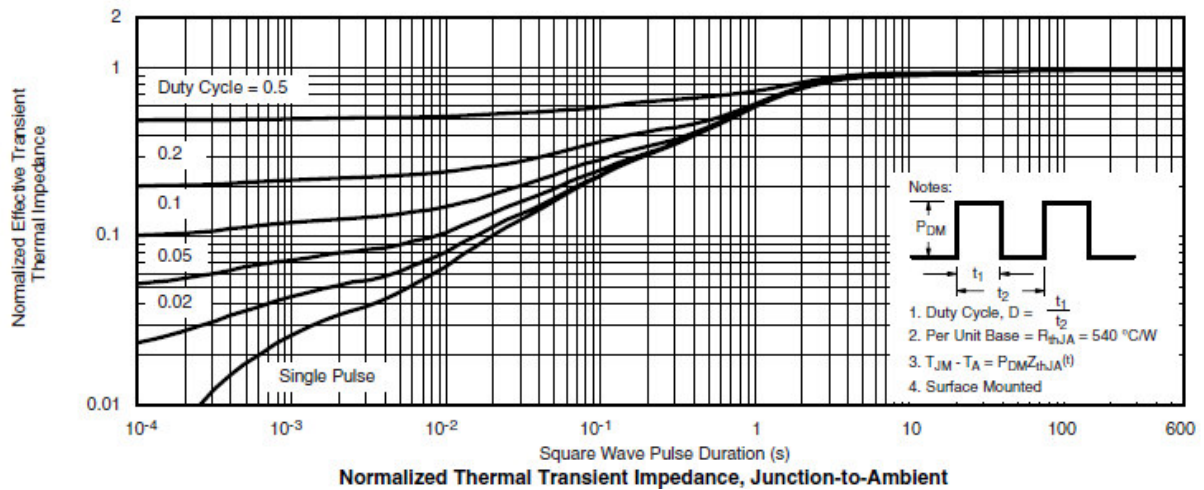
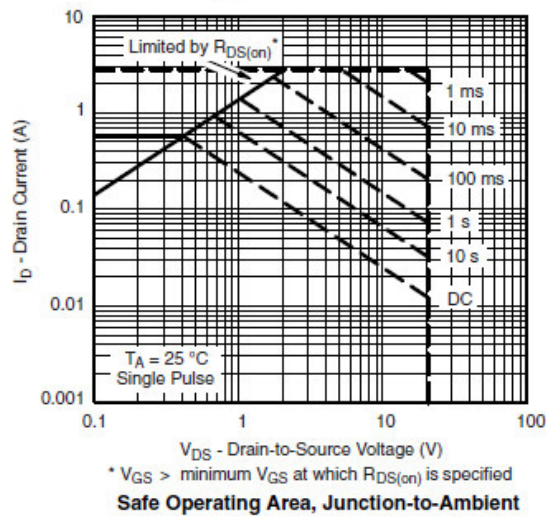
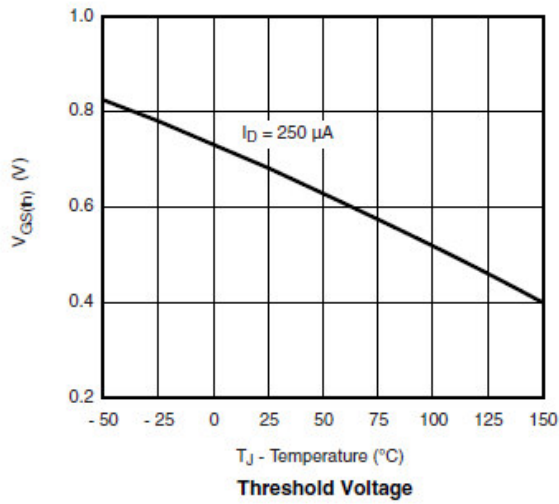
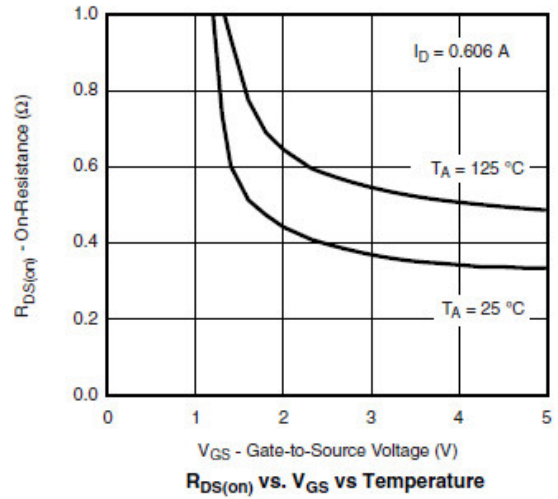
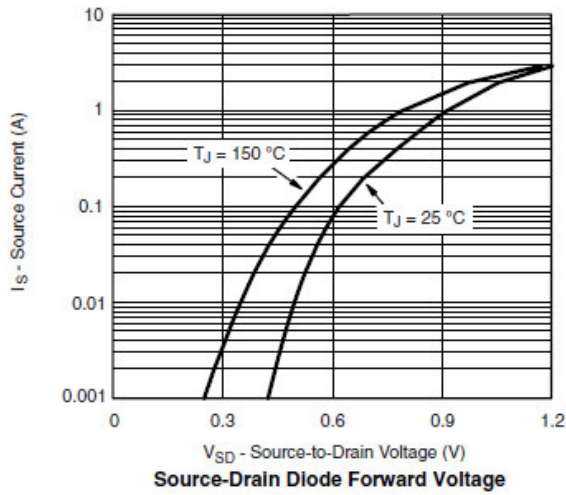


Gate Charge



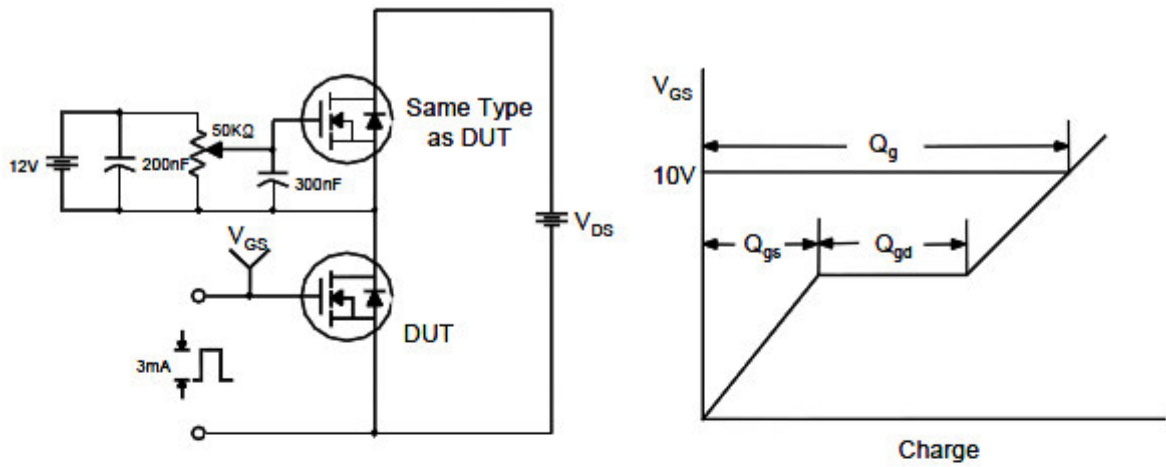
On-Resistance vs. Junction Temperature

## Typical Performance Characteristics (continue)

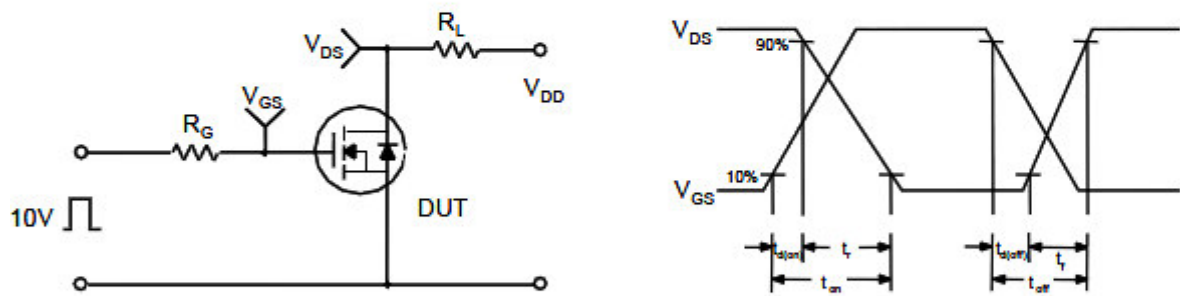


## Typical Characteristics

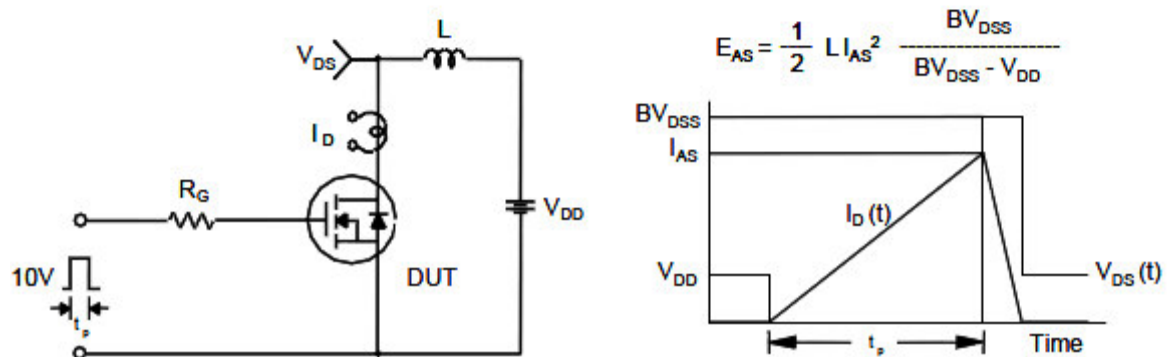
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

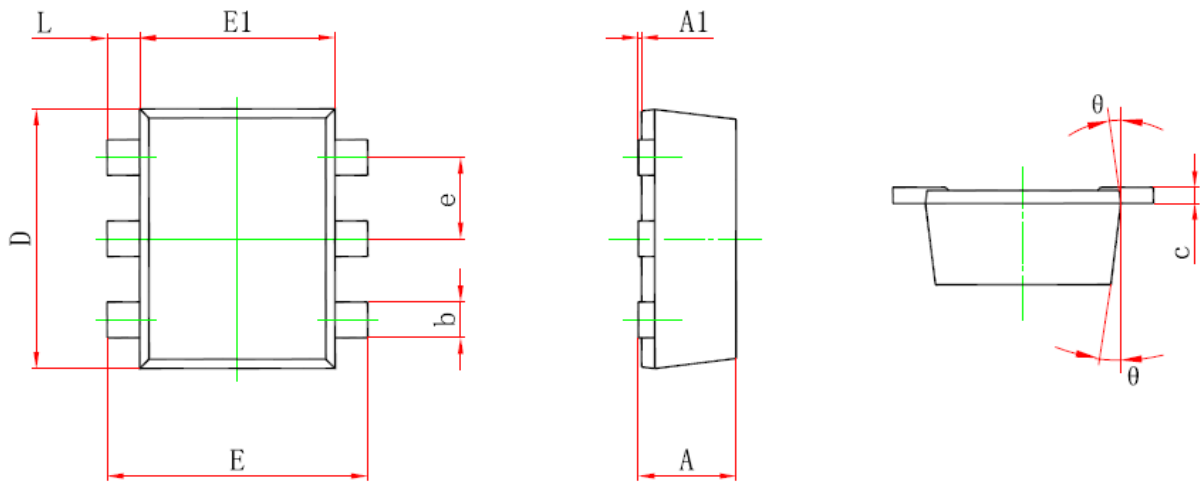


Unclamped Inductive Switching Test Circuit & Waveforms



## Package Dimension

### SOT-563







Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.525	0.600	0.021	0.024
A1	0.000	0.050	0.000	0.002
e	0.450	0.550	0.018	0.022
c	0.090	0.160	0.004	0.006
D	1.500	1.700	0.059	0.067
b	0.170	0.270	0.007	0.011
E1	1.100	1.300	0.043	0.051
E	1.500	1.700	0.059	0.067
L	0.100	0.300	0.004	0.012
θ	7° REF		7° REF	





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