GSM1306

30V N-Channel Enhancement Mode MOSFET

Product Description

GSM1306, 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 other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

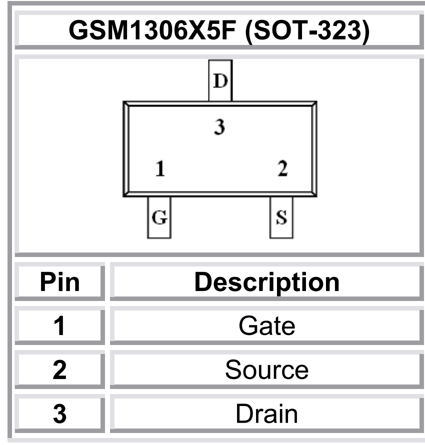
- 30V/1.5A , $R_{DS(ON)}$= 430mΩ@V_{GS}=4.5V
- 30V/1.2A , $R_{DS(ON)}$= 580mΩ@V_{GS}=2.5V
- 30V/0.6A , $R_{DS(ON)}$= 860mΩ@V_{GS}=1.8V
- Super high density cell design for extremely low $R_{DS (ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-323(SC-70) package design

Applications

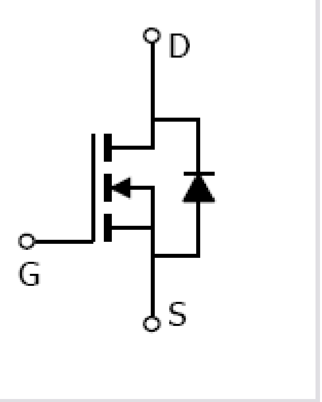
- Net Working System
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Smart Phones, Pagers

Packages & Pin Assignments

GSM1306X5F (SOT-323)

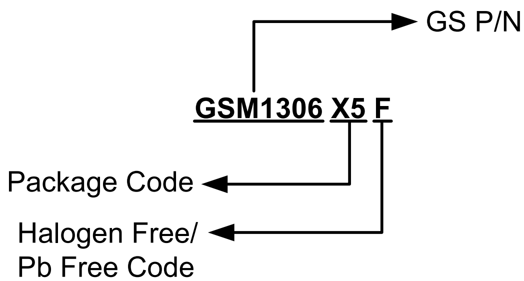


Pin	Description
1	Gate
2	Source
3	Drain



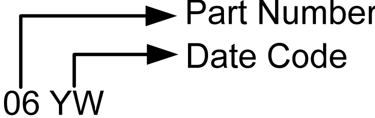
GSM1306

Ordering Information



Part Number	Package	Quantity
GSM1306X5F	SOT-323	3000 PCS

Marking Information



Absolute Maximum Ratings

T_A=25ºC Unless otherwise noted

Symbol	Parameter		Typical	Unit
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current(T_J=150℃)	T_A=25ºC	1.0	A
		T_A=70ºC	0.6	
I_{DM}	Pulsed Drain Current		6	A
I_S	Continuous Source Current(Diode Conduction)		1	A
P_D	Power Dissipation	T_A=25ºC	0.35	W
		T_A=70ºC	0.22	
T_J	Operating Junction Temperature		150	ºC
T_{STG}	Storage Temperature Range		-55/150	ºC
$R_{θJA}$	Thermal Resistance-Junction to Ambient		120	ºC/ W

Electrical Characteristics

T_A=25ºC unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	30			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	0.5		1.0	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V,V_{GS}=±12V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 24V,V_{GS}=0V			1	uA
		V_{DS}= 24V, V_{GS}=0V,T_J=85ºC			5	uA
$I_{D(on)}$	On-State Drain Current	V_{DS}≧5V,V_{GS}=4.5V	1.8			A
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V,I_D=1.5A		380	430	mΩ
		V_{GS}=2.5V,I_D=1.2A		500	580	mΩ
		V_{GS}=1.8V,I_D=0.6A		760	860	mΩ
g_{fs}	Forward Transconductance	V_{DS}=10V,I_D=1.0A		1		S
V_{SD}	Diode Forward Voltage	I_S=1.0A,V_{GS}=0V		0.65	1.2	V
Dynamic						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V,f=1MHz		85		pF
C_{oss}	Output Capacitance			25		pF
C_{rss}	Reverse Transfer Capacitance			15		pF
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=4.5V, I_D=1.2A		1.4	1.8	nC
Q_{gs}	Gate-Source Charge			0.3		nC
Q_{gd}	Gate-Drain Charge			0.6		nC
$t_{d(on)}$	Turn-On Time	V_{DD}=15V, R_L=20Ω ,I_D=1.2A, V_{GEN}=4.5V,R_G=1Ω		15	25	ns
t_r				25	45	ns
$t_{d(off)}$	Turn-Off Time			15	25	ns
t_f				10	20	ns

Typical Performance Characteristics

V_{GS} = 5 V thru 3 V
V_{GS} = 2.5 V
V_{GS} = 2.0 V
V_{GS} = 1.5 V

I_D - Drain Current (A)

V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics

T_A = - 55 °C
T_A = 25 °C
T_A = 125 °C

I_D - Drain Current (A)

V_{GS} - Gate-to-Source Voltage (V)

Transfer Characteristics Curves vs. Temperature

V_{GS} = 2.5 V
V_{GS} = 4.5 V

$R_{DS(on)}$ - On-Resistance (Ω)

I_D - Drain Current (A)

On-Resistance vs. Drain Current

C_{iss}
C_{oss}
C_{rss}

C - Capacitance (pF)

V_{DS} - Drain-Source Voltage (V)

Capacitance

I_D = 0.91 A
V_{DS} = 15 V
V_{DS} = 24 V

V_{GS} - Gate-to-Source Voltage (V)

Q_g - Total Gate Charge (nC)

Gate Charge

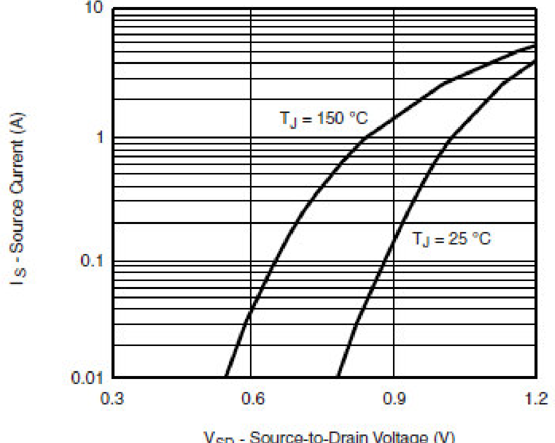
I_D = 0.90 A
V_{GS} = 4.5 V, I_D = 0.9 A
V_{GS} = 2.5 V, I_D = 0.75 A

$R_{DS(on)}$ - On-Resistance (Normalized)

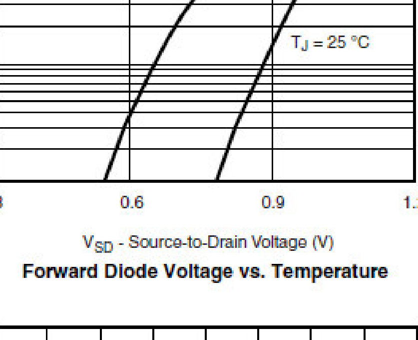
T_J - Junction Temperature (°C)

On-Resistance vs. Junction Temperature

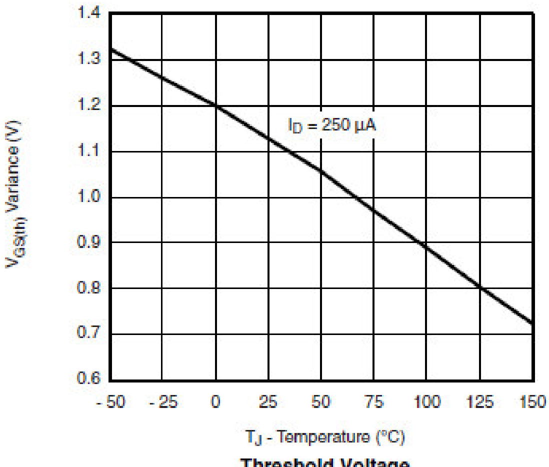
Typical Performance Characteristics (continue)



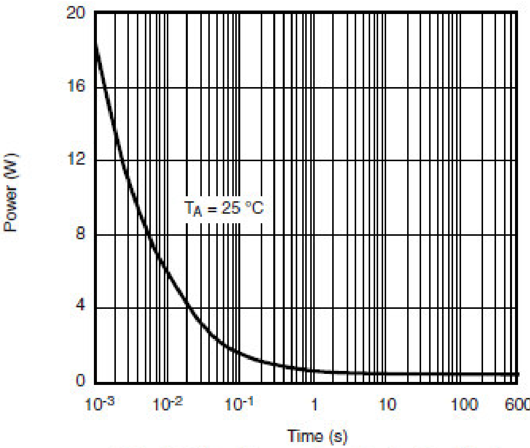
Forward Diode Voltage vs. Temperature



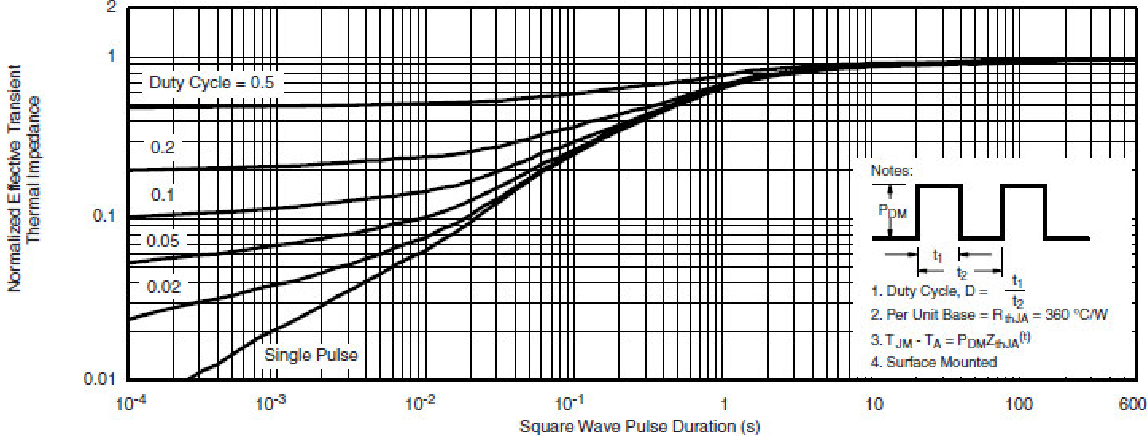
$R_{DS(on)}$ vs. V_{GS} vs. Temperature



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

Typical Characteristics

I_S - Source Current (A)

V_{SD} - Source-to-Drain Voltage (V)

T_J = 150 °C, T_J = 25 °C

Source-Drain Diode Forward Voltage

$R_{DS(on)}$ - On-Resistance (Ω)

V_{GS} - Gate-to-Source Voltage (V)

I_D = 0.606 A, T_A = 125 °C, T_A = 25 °C

$R_{DS(on)}$ vs. V_{GS} vs Temperature

$V_{GS(th)}$ (V)

T_J - Temperature (°C)

Threshold Voltage

I_D - Drain Current (A)

Limited by $R_{DS(on)}$ *

1 ms, 10 ms, 100 ms, 1 s, 10 s, DC

T_A = 25 °C, Single Pulse

V_{DS} - Drain-to-Source Voltage (V)

* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

Normalized Effective Transient Thermal Impedance

Duty Cycle = 0.5, 0.2, 0.1, 0.05, 0.02, Single Pulse

Notes:

P_{DM}, t_1, t_2

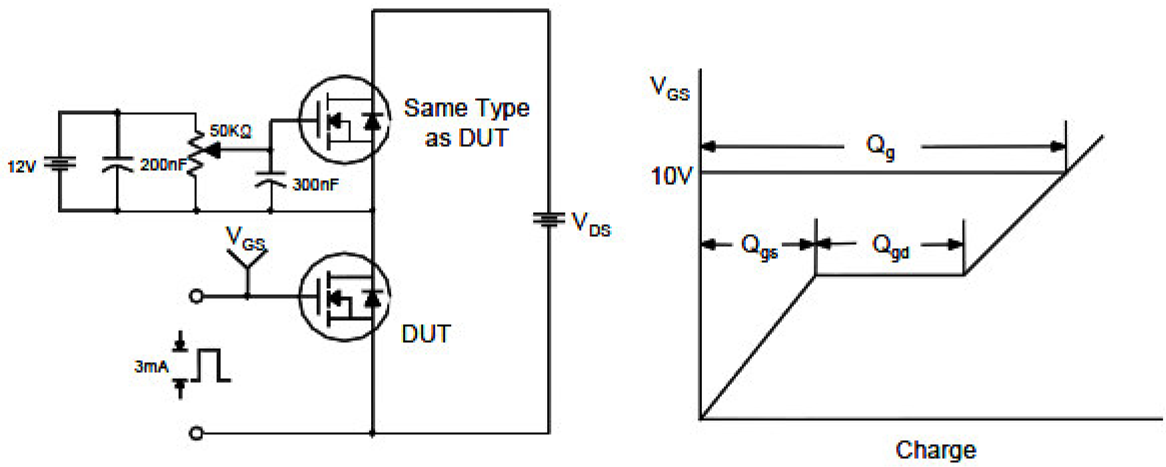
1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 540 °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}(t)$
4. Surface Mounted

Square Wave Pulse Duration (s)

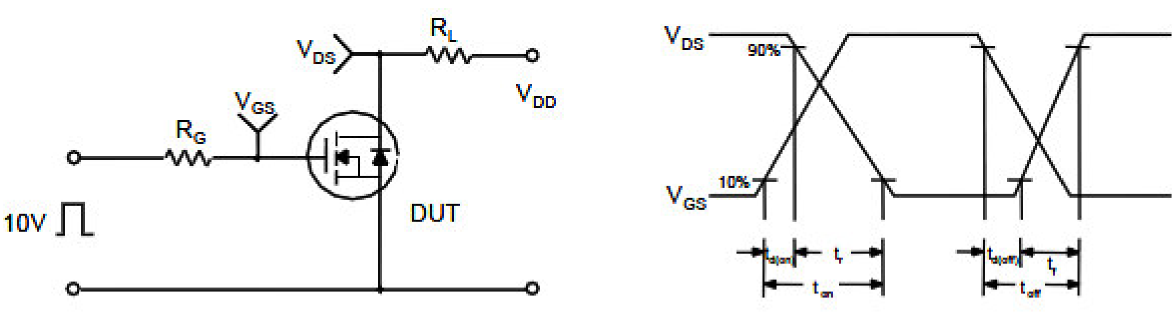
Normalized Thermal Transient Impedance, Junction-to-Ambient

Typical Characteristics (continue)

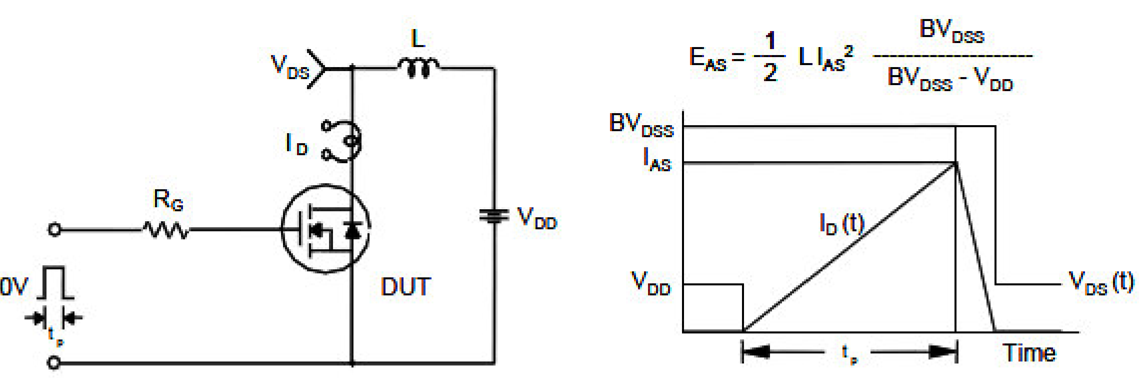
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

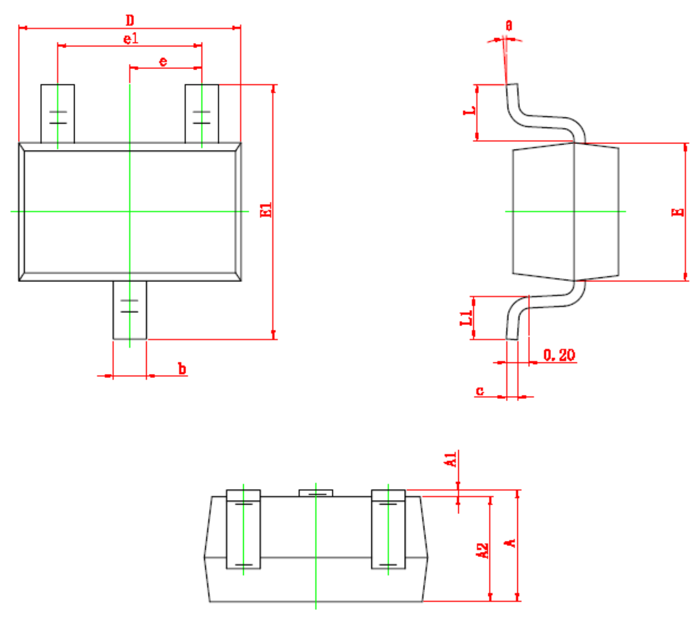


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

SOT-323 PLASTIC PACKAGE



Dimensions				
Symbol	**Millimeters**		**Inches**	
	Min	**Max**	**Min**	**Max**
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0º	8º	0º	8º

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