GSMDC3801R

30V N-Channel MOSFETs

Product Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

Features

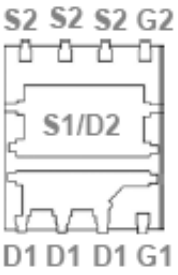
- 30V, 55A, $R_{DS(ON)}$=9mΩ@V_{GS}=10V (Q1)
- 30V, 80A, $R_{DS(ON)}$=6mΩ@V_{GS}=10V (Q2)
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- Green Device Available
- DFN5X6-8L package design

Applications

- MB / VGA / Vcore
- POL Buck Applications
- SMPS 2nd SR

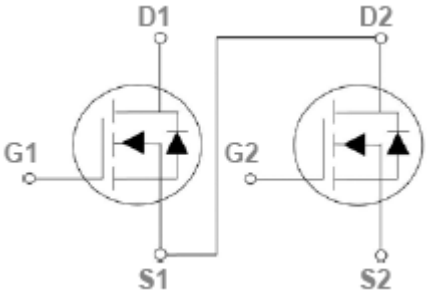
Packages & Pin Assignments

GSMDC3801RFF (DFN5X6-8L)

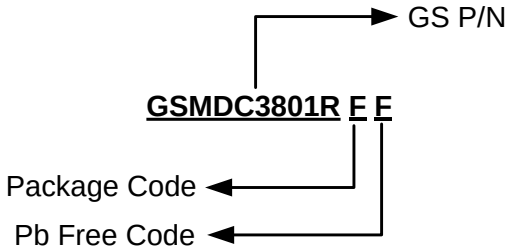


Bottom View

Pin	Description
1	Gate 1
2	Drain 1
3	Drain 1
4	Drain 1
5	Source 2
6	Source 2
7	Source 2
8	Gate 2

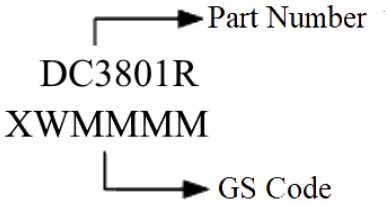


Ordering Information



Part Number	Package	Quantity
GSMDC3801RFF	DFN5x6-8L	3000pcs

Marking Information



Absolute Maximum Ratings

T_C=25ºC Unless otherwise noted

Symbol	Parameter		Q1	Q2	Unit
V_{DS}	Drain-Source Voltage		30	30	V
V_{GS}	Gate-Source Voltage		±20	±20	V
I_D	Continuous Drain Current, Chip/Package Limit	T_C=25℃	55/10	80/15	A
		T_C=100℃	35/6	51/9	
I_{DM}	Pulsed Drain Current, Chip/Package Limit[1]		220/40	320/60	A
EAS	Single Pulse Avalanche Energy[2]		45	88	mJ
IAS	Single Pulse Avalanche Current[2]		30	42	A
P_D	Power Dissipation (T_C=25℃)		40	54	W
	Power Dissipation (Derate above 25℃)		0.32	0.43	W/℃
T_J	Operating Junction Temperature Range		-55 to +150		℃
T_{STG}	Storage Temperature Range		-55 to +150		℃
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62	62	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		3.1	2.3	℃/W

Electrical Characteristics (Q1)

T_J=25℃ 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
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		0.04		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1	1.6	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-4		mV/℃
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V,V_{GS}=±20V			±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V,V_{GS}=0V			1	uA
		V_{DS}=24V,V_{GS}=0V, T_J=125℃			10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			55	A
I_{SM}	Pulsed Source Current				220	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V,I_D=8A		7.5	9	mΩ
		V_{GS}=4.5V,I_D=5A		10	13	
g_{FS}	Forward Transconductance	V_{DS}=10V,I_D=8A		14		S
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=1A			1	V
EAS	Single Pulse Avalanche Energy	V_{DD}=25V,L=0.1mH, IAS=15A	12			mJ
Dynamic						
Q_g	Total Gate Charge[3,4]	V_{DS}=15V,V_{GS}=4.5V, I_D=20A		7.5		nC
Q_{gs}	Gate-Source Charge[3,4]			1.3		
Q_{gd}	Gate-Drain Charge[3,4]			4.5		
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz		750		pF
C_{oss}	Output Capacitance			150		
C_{rss}	Reverse Transfer Capacitance			110		
$t_{d(on)}$	Turn-On Time[3,4]	V_{DD}=15V,I_D=15A, V_{GS}=10V,R_G=3.3Ω		4.8		ns
t_r				12.5		
$t_{d(off)}$	Turn-Off Time[3,4]			27.6		
t_f				8.2		
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V, f=1MHz		2.7		Ω

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,Q1:IAS=30A,Q2:IAS=42A,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Electrical Characteristics (Q2)

T_J=25℃ 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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA		0.04		V/℃
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-4		mV/℃
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V,V_{GS}=±20V			±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V,V_{GS}=0V			1	uA
		V_{DS}=24V,V_{GS}=0V, T_J=125℃			10	
I_S	Continuous Source Current	V_G=V_D=0V, Force Current			80	A
I_{SM}	Pulsed Source Current				320	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V,I_D=12A		4.8	6	mΩ
		V_{GS}=4.5V,I_D=8A		6.5	9	
g_{FS}	Forward Transconductance	V_{DS}=10V,I_D=10A		18		S
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=1A			1	V
EAS	Single Pulse Avalanche Energy	V_{DD}=25V,L=0.1mH, IAS=15A	20			mJ
Dynamic						
Q_g	Total Gate Charge[3,4]	V_{DS}=15V,V_{GS}=4.5V, I_D=20A		11.1		nC
Q_{gs}	Gate-Source Charge[3,4]			1.85		
Q_{gd}	Gate-Drain Charge[3,4]			6.8		
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz		1160		pF
C_{oss}	Output Capacitance			200		
C_{rss}	Reverse Transfer Capacitance			180		
$t_{d(on)}$	Turn-On Time[3,4]	V_{DD}=15V,I_D=15A, V_{GS}=10V,R_G=3.3Ω		7.5		ns
t_r				14.5		
$t_{d(off)}$	Turn-Off Time[3,4]			35.2		
t_f				9.6		
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V, f=1MHz		2.5		Ω

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,Q1:IAS=30A,Q2:IAS=42A,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Performance Characteristics (Q1)

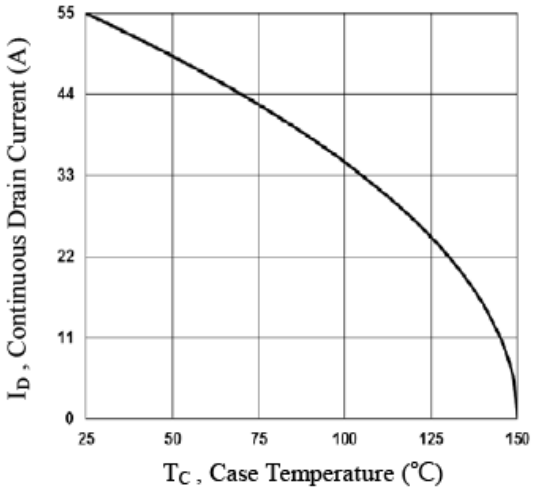


Fig.1 Q1 Continuous Drain Current vs. T_c

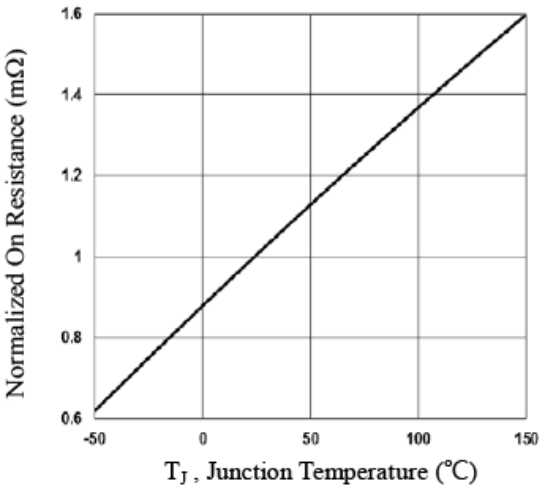


Fig.2 Q1 Normalized RDSON vs. T_J

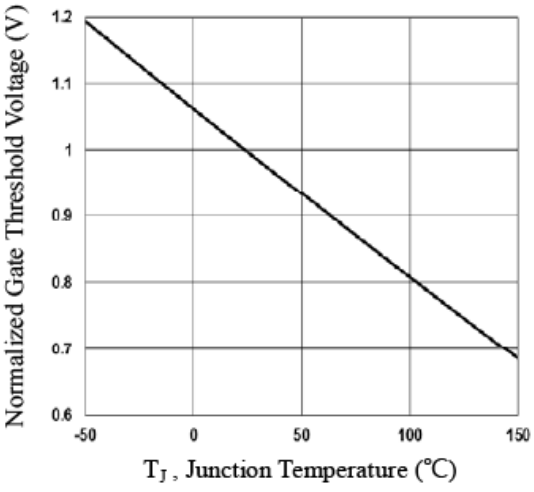


Fig.3 Q1 Normalized V_{th} vs. T_J

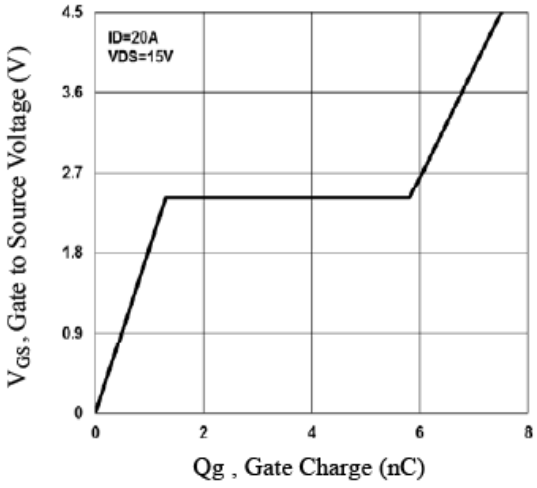


Fig.4 Q1 Gate Charge Waveform

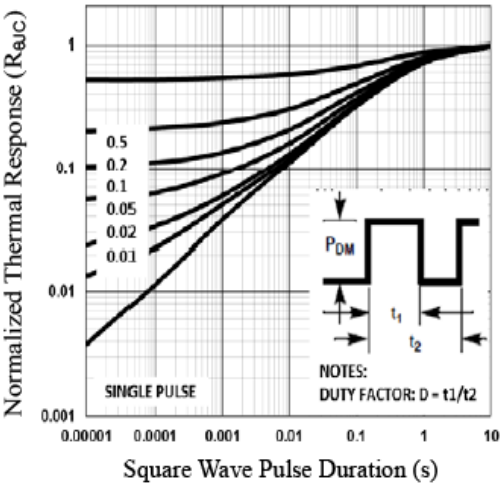


Fig.5 Q1 Normalized Transient Impedance

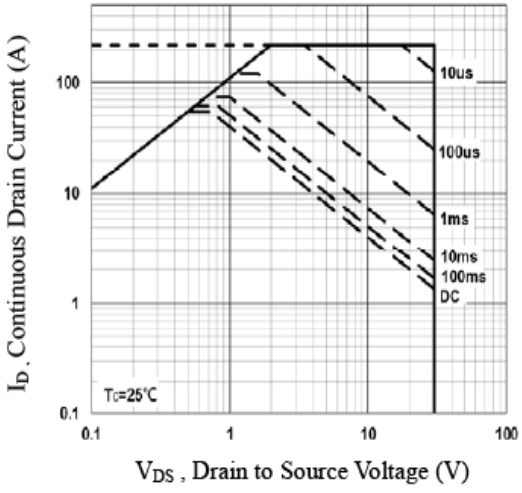


Fig.6 Q1 Maximum Safe Operation Area

Typical Performance Characteristics (Q2)

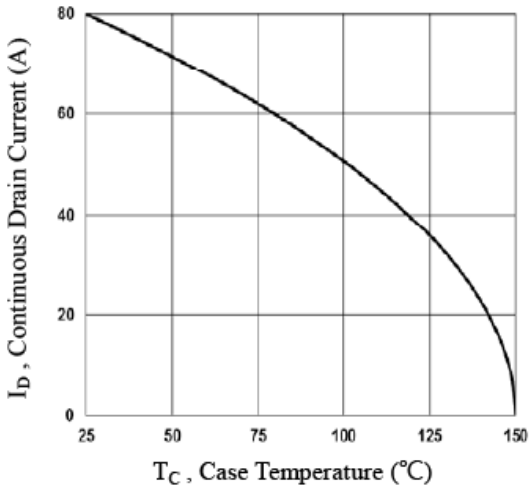


Fig.7 Q2 Continuous Drain Current vs. T_c

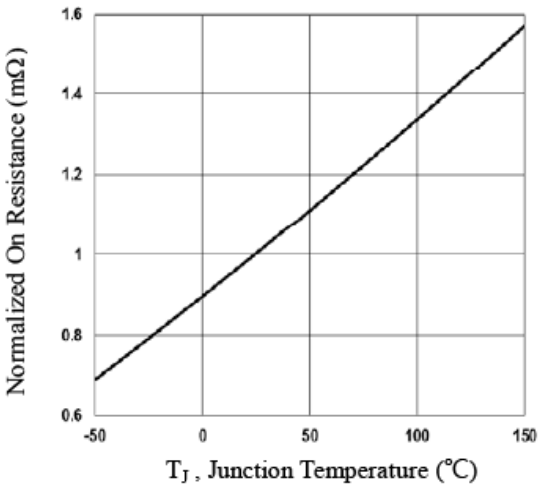


Fig.8 Q2 Normalized RDSON vs. T_J

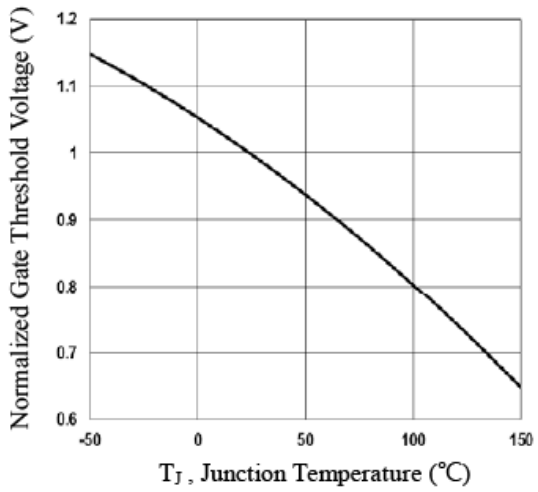


Fig.9 Q2 Normalized V_{th} vs. T_J

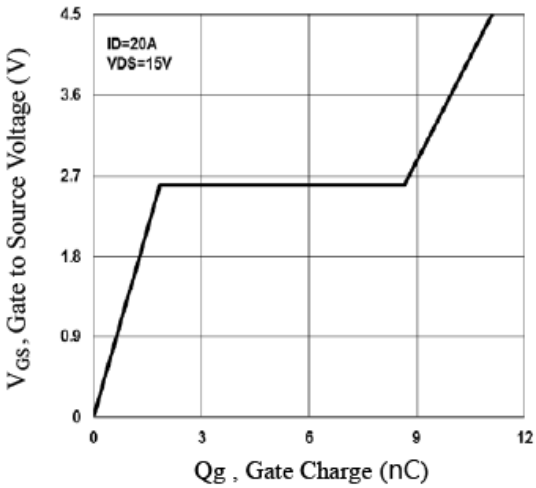


Fig.10 Q2 Gate Charge Waveform

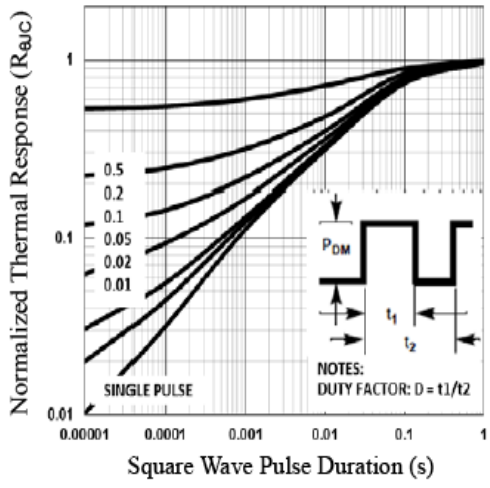


Fig.11 Q2 Normalized Transient Impedance

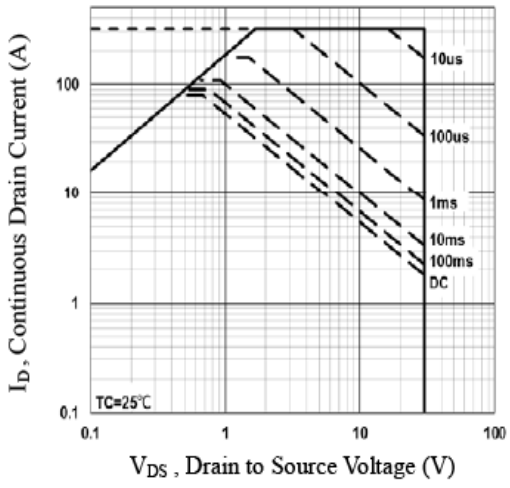
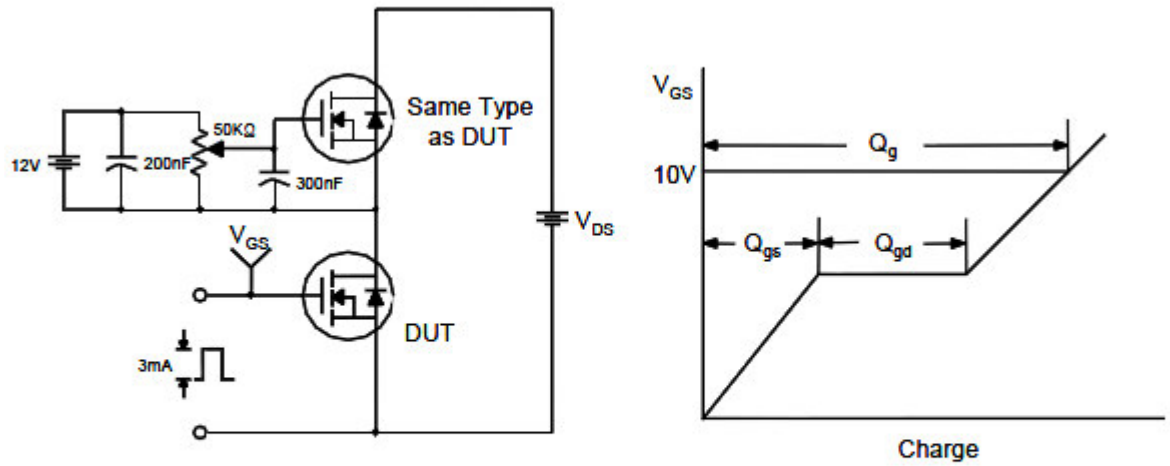


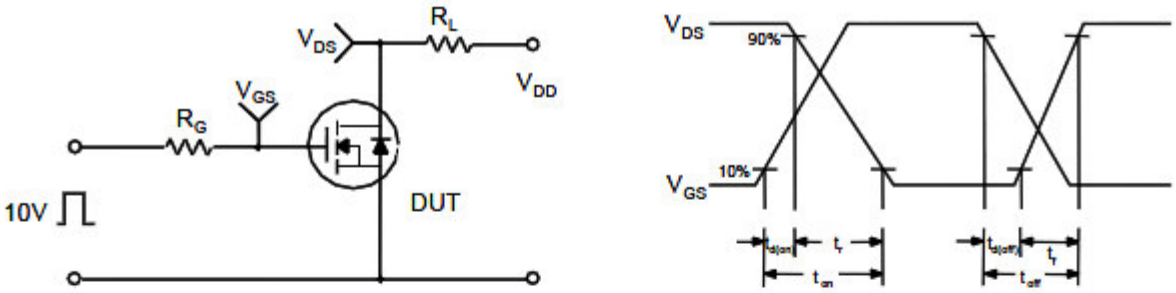
Fig.12 Q2 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

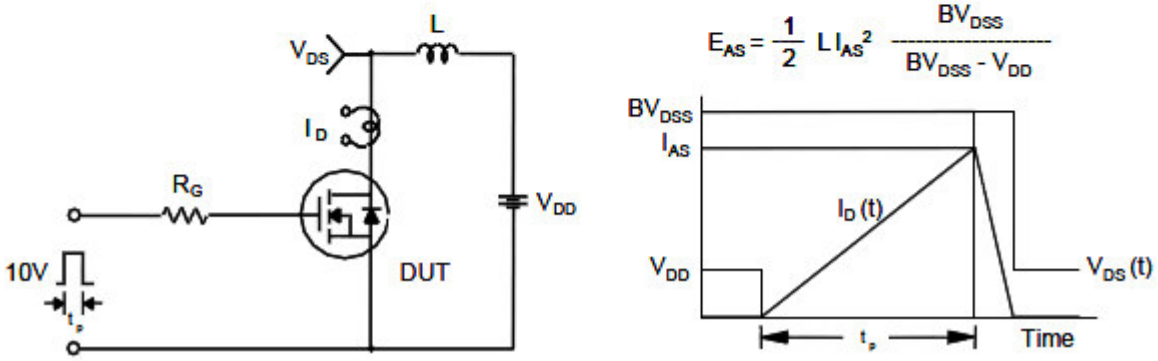
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

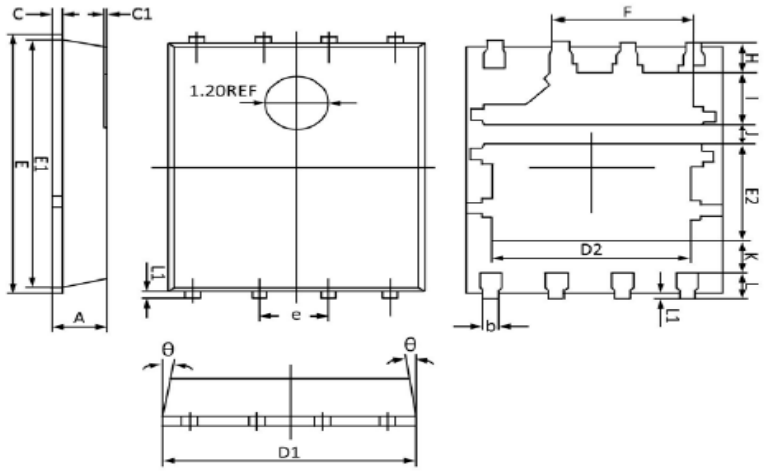


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimension

DFN5X6-8L



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.036	0.043
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.011
C1	0.040 REF		0.002 REF	
D1	4.800	5.000	0.189	0.196
D2	3.610	3.960	0.143	0.155
E	5.900	6.100	0.233	0.240
E1	5.700	5.800	0.225	0.228
E2	2.020	2.420	0.080	0.095
e	1.270 BSC		0.050 BSC	
F	2.550	2.900	0.101	0.114
H	0.610	0.810	0.025	0.031
I	1.100	1.300	0.044	0.051
J	0.400	0.600	0.016	0.023
K	0.500	-	0.020	-
L	0.510	0.710	0.020	0.027
L1	0.060	0.200	0.003	0.007
θ	0°	12°	0°	12°

NOTICE

Information furnished is believed to be accurate and reliable. However Globaltech Semiconductor assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Globaltech Semiconductor. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information without express written approval of Globaltech Semiconductor.

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

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