MLSM
MICROELECTRONICS

MLSMGC05P

-20V/-4.5A Dual P-Channel MOSFET

Features

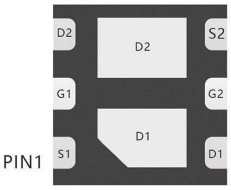
- Trench Power LV MOSFET technology
- High Density Cell Design for Low $R_{DS(ON)}$
- High Speed switching

Product Summary

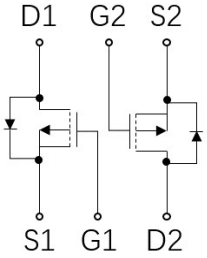
V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
-20V	59mΩ@-4.5V	-4.5A
	98mΩ@-2.5V	

Application

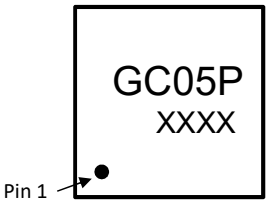
- Battery protection
- Load switch
- Power management



DFN2X2-6L view



Schematic diagram



GC05P: Device code
XXXX: Code
Solid dot: Pin1 indicator

Marking and pin assignment

Pb-Free RoHS Halogen-Free

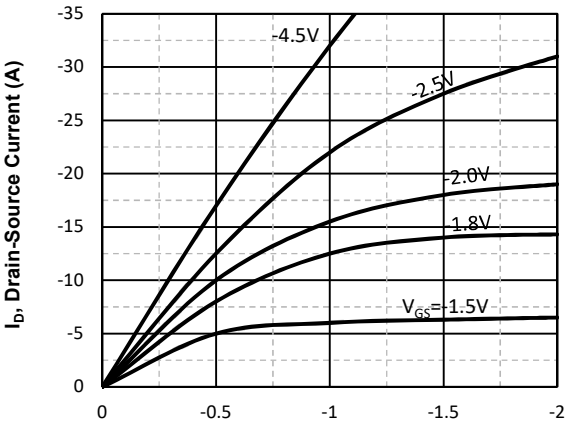
Absolute Maximum Ratings (TA=25℃unless otherwise noted)				
Symbol	**Parameter**		**Rating**	**Unit**
Common Ratings (TC=25°C Unless Otherwise Noted)				
V_{DS}	Drain-Source Breakdown Voltage		-20	V
V_{GS}	Gate-Source Voltage		±10	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	Tc=25°C	-4.5	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	-18	A
I_D	Continuous Drain Current	Tc=25°C	-4.5	A
P_D	Maximum Power Dissipation	Tc=25°C	1.5	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient		85	°C/W

Ordering Information (Example)

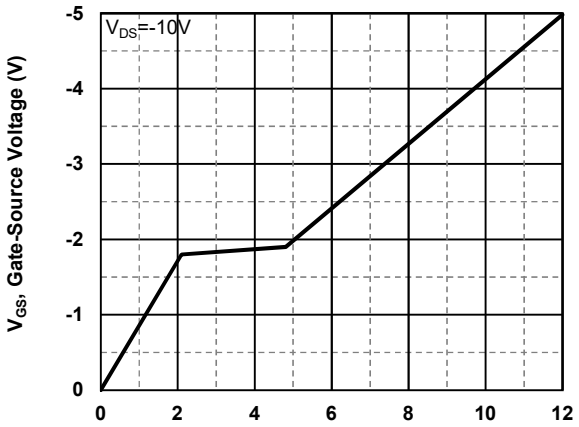
Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MLSMGC05A	DFN2X2-6L	GC05A	3,000	45,000	180,000	7"reel

Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$BV_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V, V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.6	-1.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-3.6A	--	33	59	mΩ
		V_{GS}=-2.5V, I_D=-1.5A	--	45	98	mΩ
		V_{GS}=-1.8V, I_D=-1.0A	--	65	120	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=-10V, V_{GS}=0V, f=1MHz	--	1010	--	pF
C_{OSS}	Output Capacitance		--	130	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	105	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-10V, I_D=-4A, V_{GS}=-4.5V	--	11	--	nC
Q_{gs}	Gate Source Charge		--	2.3	--	nC
Q_{gd}	Gate Drain Charge		--	2.4	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-10V, I_D=-1A, V_{GS}=-4.5V, R_G=2.5Ω	--	8.5	--	nS
t_r	Turn-on Rise Time		--	35.5	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	78	--	nS
t_f	Turn-Off Fall Time		--	58	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃, Is=-3.6A	--	--	-1.2	V

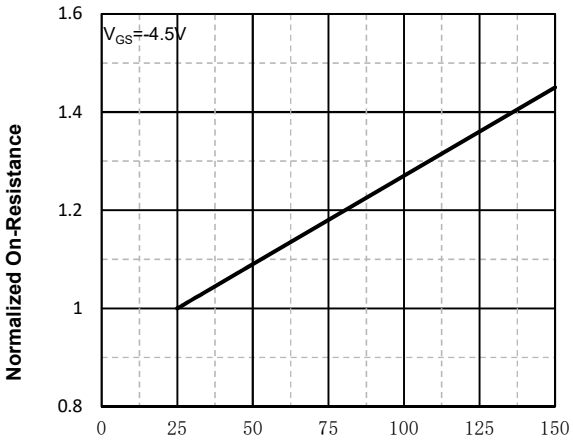
Typical Operating Characteristics



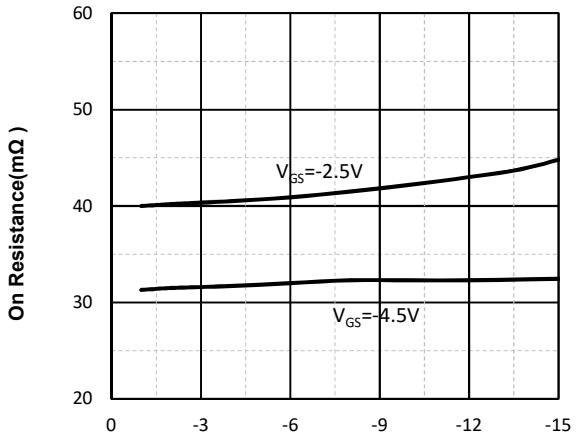
V_{DS}, Drain -Source Voltage (V)
Fig1. Typical Output Characteristics



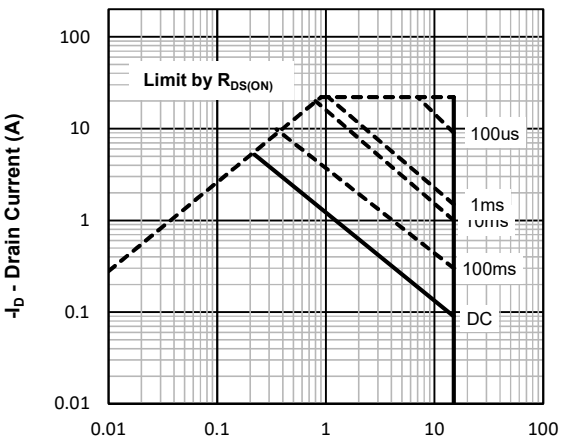
Qg -Total Gate Charge (nC)
Fig2. Typical Gate Charge Vs.Gate-Source Voltage



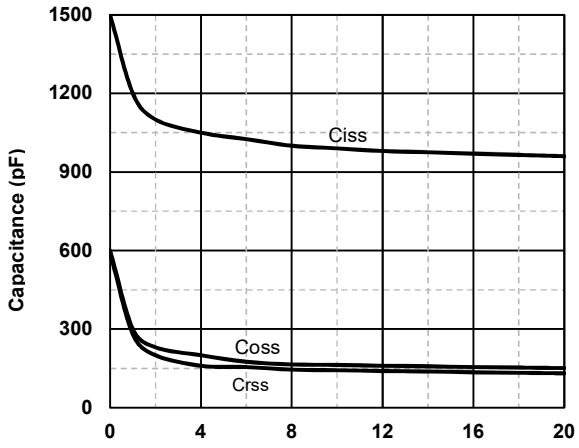
Tj - Junction Temperature (°C)
Fig3. Normalized On-Resistance Vs. Temperature



I_D, Drain-Source Current (A)
Fig4. On Resistance Vs.Drain-Source Current

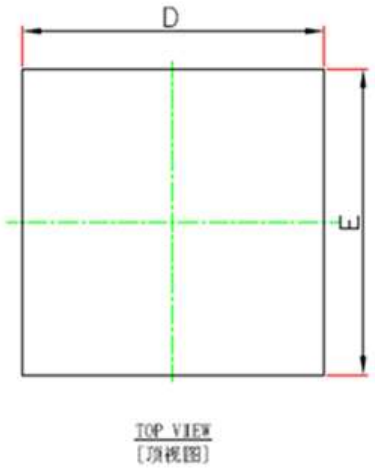


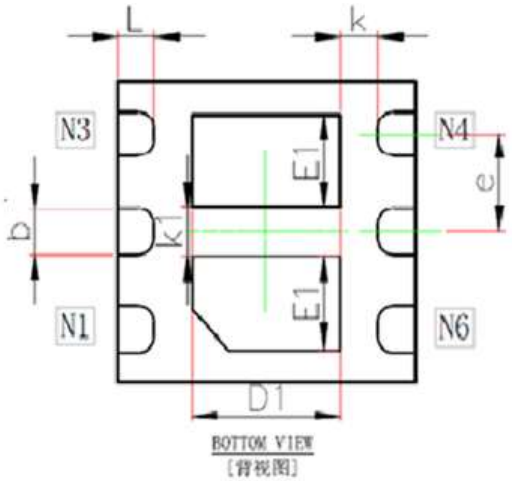
$-V_{DS}$, Drain -Source Voltage (V)
Fig5. Maximum Safe Operating Area

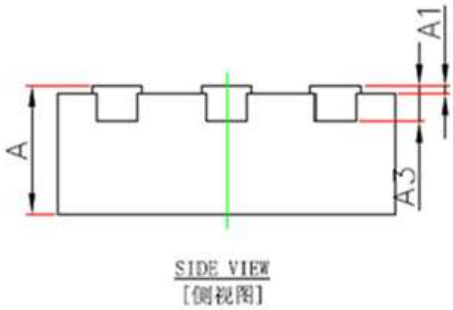


$-V_{DS}$, Drain-Source Voltage (V)
Fig6 Typical Capacitance Vs.Drain-Source Voltage

DFN2X2-6L Package information







Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.600	0.700	0.024	0.027
A1	0.000	0.050	0.000	0.001
A3	0.203REF		0.007REF	
b	0.230	0.330	0.009	0.012
D	1.924	2.076	0.075	0.081
E	1.924	2.076	0.075	0.081
e	0.650TYP		0.025TYP	
L	0.224	0.376	0.008	0.014
k	0.200	-	0.007	-
E1	0.520	0.720	0.020	0.028
D1	0.800	1.000	0.031	0.039
K1	0.320TYP		0.012TYP	