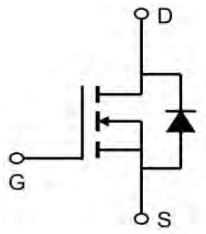
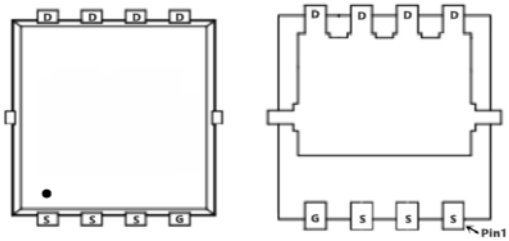
LM5D140N04

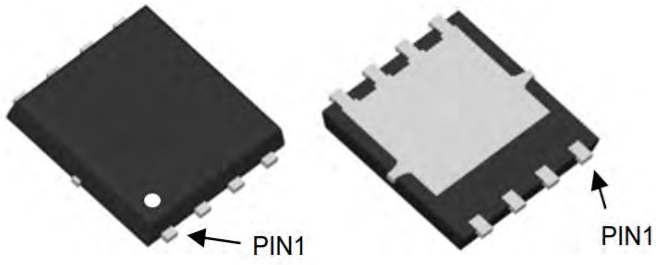
40 V N-Channel Enhancement Mode MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using SGT 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.







General Features

V_{DS}		40V
I_D	(at V_{GS}=10V)	140A
$R_{DS(ON)}$	(at V_{GS}=10V)	2.2mΩ(Max)

Application

DC/DC Converter

LED Backlighting

Power Management Switches

Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LM5D140N04	4996/5092SR	DFN5X6-8	-	-	5000 units

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25°C	I_D	140	A
	TC=100°C	I_D	90	A
Drain Current – Pulsed		I_{DM}	400	A
Maximum Power Dissipation		P_D	73	W
Single pulse avalanche energy		E_{AS}	529	mJ
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics				
Parameter	**Symbol**	**Typ**	**Max**	**Unit**
Thermal Resistance junction-case	$R_{\theta Jc}$		1.3	℃ /W
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		62	℃ /W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.7	3.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=40A		1.6	2.2	mΩ
		V_{GS}=4.5V, I_D=20A		2.3	3.5	mΩ
gfs	Forward Transconductance	V_{DS}=10V , I_D=40A		60		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V, F=1.0MHz		4000		pF
C_{oss}	Output Capacitance			150		pF
C_{rss}	Reverse Transfer Capacitance			2.5		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V,I_D=40A, V_{GS}=10V, R_G=3Ω		15		nS
t_r	Turn-on Rise Time			25		nS
$t_{d(off)}$	Turn-Off Delay Time			68		nS
t_f	Turn-Off Fall Time			26		nS
Q_g	Total Gate Charge	V_{DS}=20V,I_D=40A, V_{GS}=10V		62		nC
Q_{gs}	Gate-Source Charge			12		nC
Q_{gd}	Gate-Drain Charge			10		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A		0.72	1.3	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2		Ω
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Continuous Source Current	V_G=V_D=0V , Force Current			140	A
I_{SM}	Pulsed Source Current				280	A
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=40A , di/dt=100A/μs T_J=25℃		48		nS
Q_{rr}	Reverse Recovery Charge			55		nC

Note:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.5mH,IAS=46A, Starting TJ=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristics

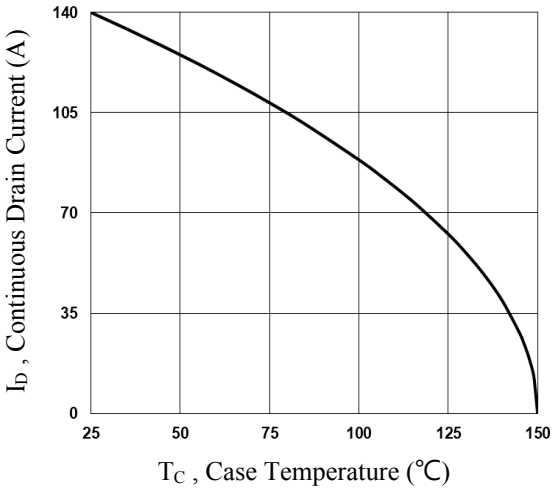


Fig.1 Continuous Drain Current vs. T_C

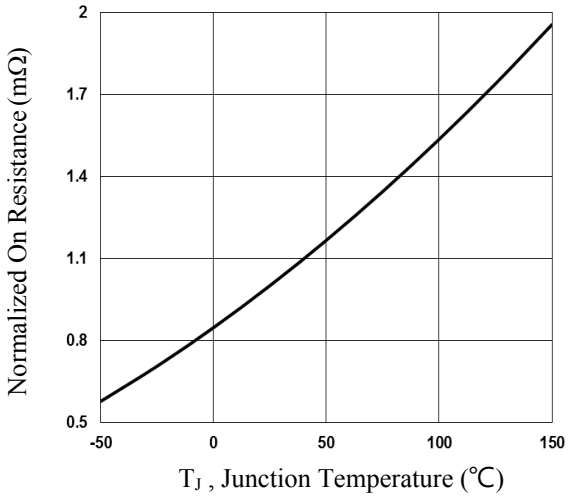


Fig.2 Normalized RDSON vs. T_J

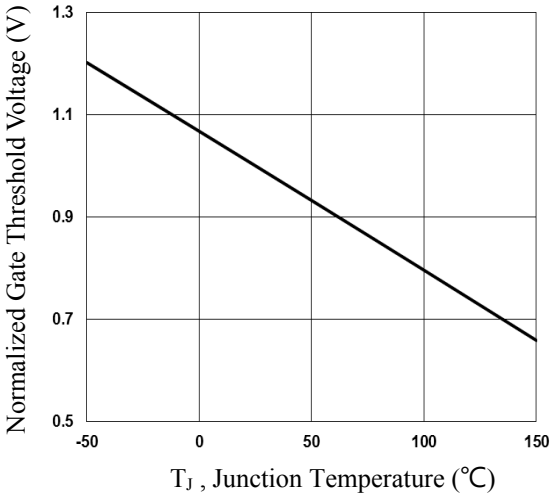


Fig.3 Normalized Vth vs. T_J

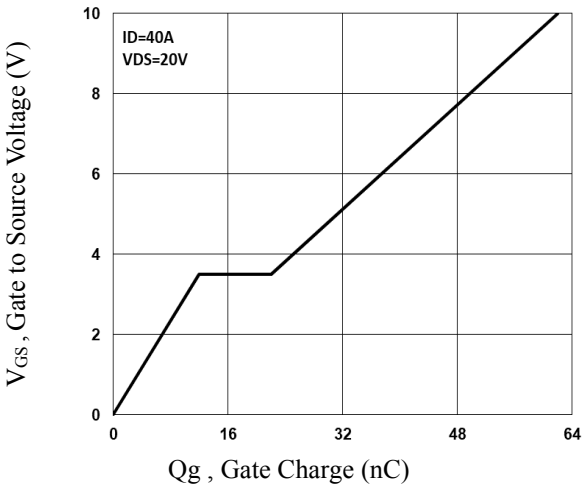


Fig.4 Gate Charge Characteristics

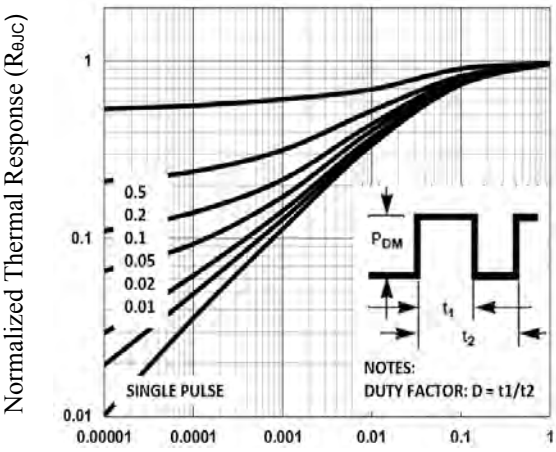


Fig.5 Normalized Transient Impedance

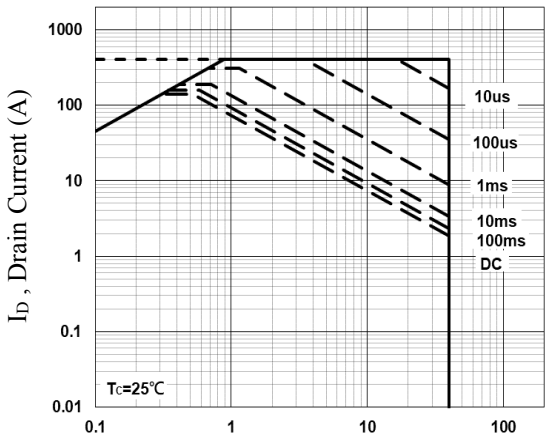


Fig.6 Maximum Safe Operation Area

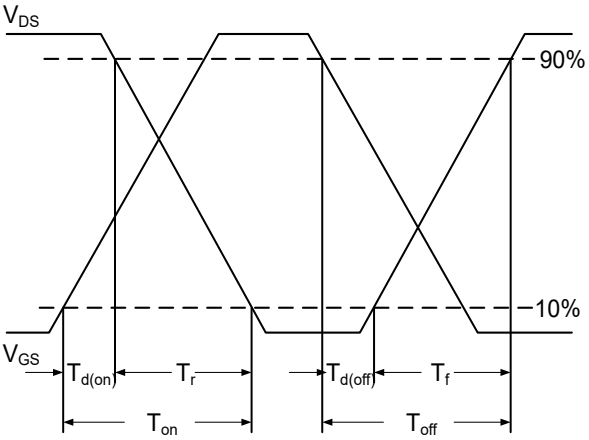


Fig.7 Switching Time Waveform

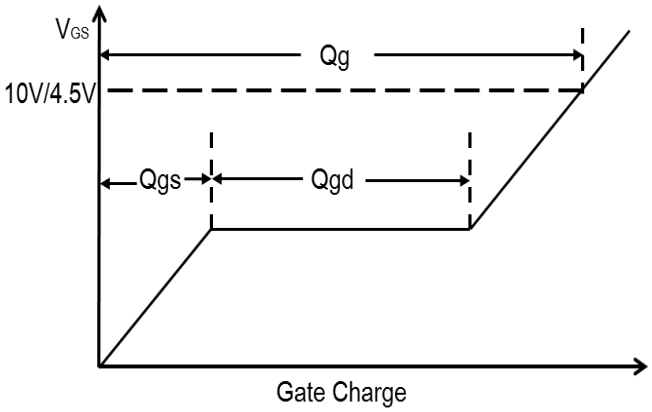
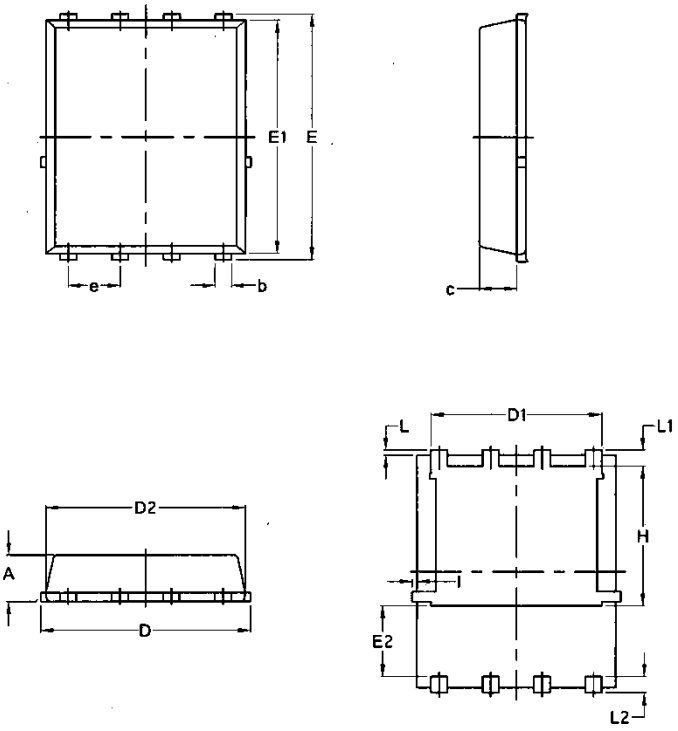


Fig.8 Gate Charge Waveform

Package Mechanical Data-DFN5*6-8-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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