ShinDengen

P38LF6QL

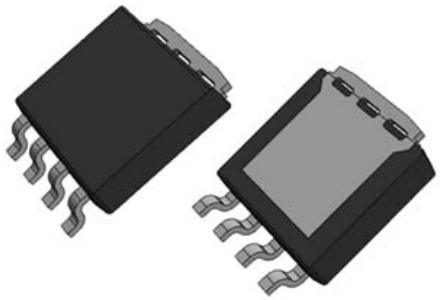
Power MOSFETs
60V, 38A, N-channel

Feature

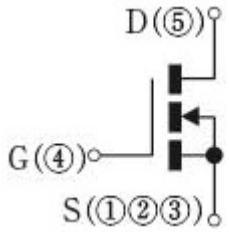
- N-channel
- Small SMD
- Low Ron
- 4.5V Gate Drive
- Low Capacitance
- Halogen free
- Pb free terminal
- RoHS:Yes

OUTLINE

Package (House Name): LF
Package (JEDEC Code): MO-235B similar



Equivalent circuit



Absolute Maximum Ratings (unless otherwise specified : Tc=25℃)

Item	Symbol	Conditions	Ratings	Unit
Storage temperature	Tstg		-55 to 175	℃
Channel tempertature	Tch		-55 to 175	℃
Drain-source voltage	V_{DSS}		60	V
Gate-source voltage	V_{GSS}		±20	V
Continuous drain current(DC)	I_D		38	A
Continuous drain current(Peak)	I_{DP}	Pulse width 10μs, duty=1/100	114	A
Total power dissipation	P_T		123	W
Single avalanche current	I_{AS}	Starting Tch=25℃ Tch≦150℃	22	A
Single avalanche energy	E_{AS}	Starting Tch=25℃ Tch≦150℃	57	mJ

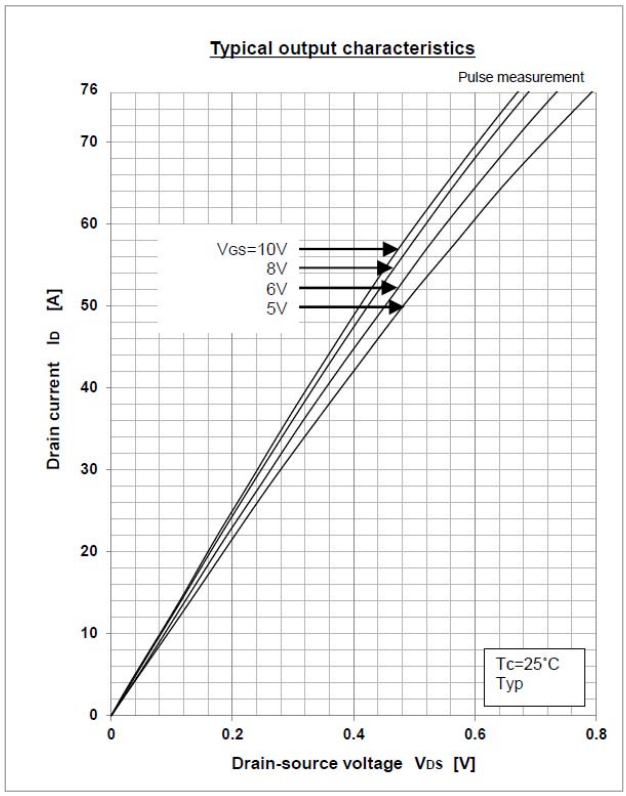
※ ：See the original Specifications

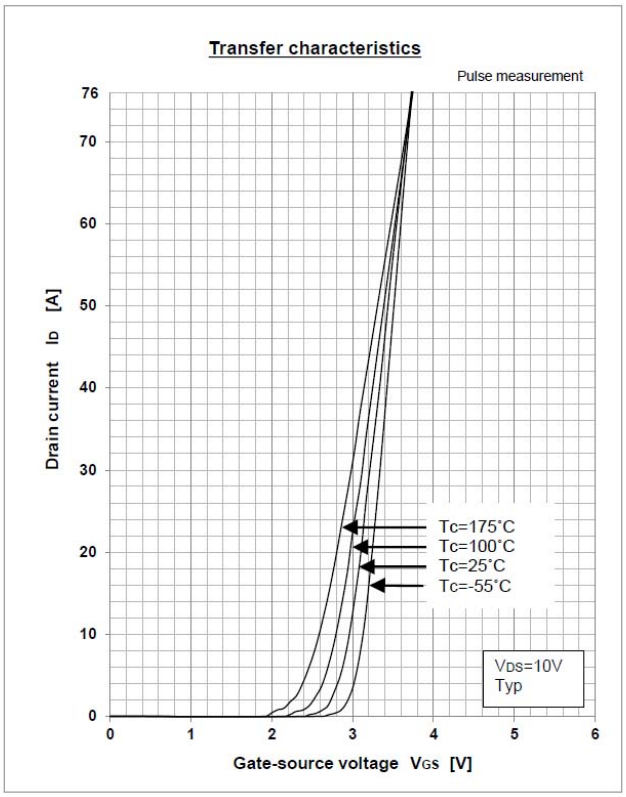
Electrical Characteristics (unless otherwise specified : Tc=25°C)

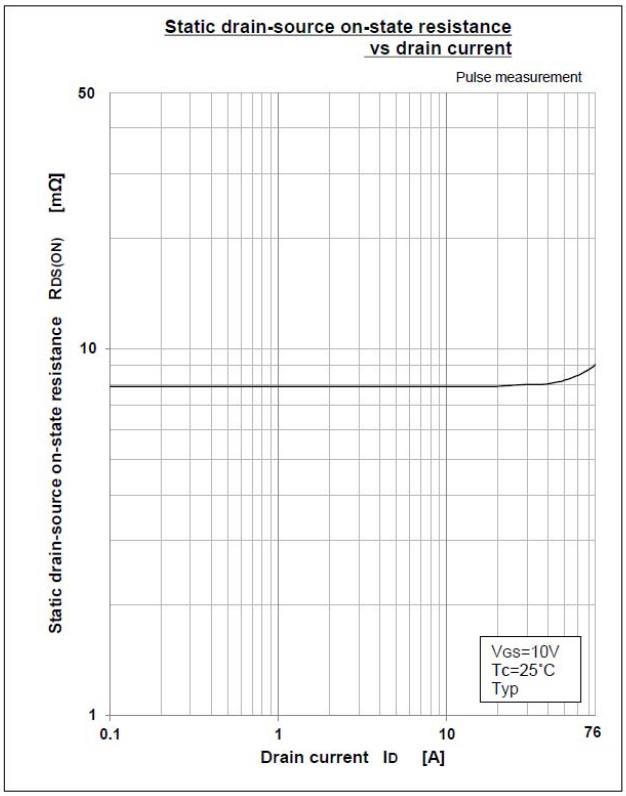
Item	Symbol	Conditions	Ratings			Unit
			MIN	TYP	MAX	
Drain-Source breakdown voltage	$V_{(BR)DSS}$	ID=1mA, VGS=0V	60			V
Zero gate voltage drain current	I_{DSS}	VDS=60V, VGS=0V			1	μA
Gate-source leakage current	I_{GSS}	VGS=±20V, VDS=0V			±0.1	μA
Forward transconductance	g_{fs}	ID=19A, VDS=10V	12			S
Static drain-source on-state resistance	$R_{DS(ON)}$	ID=19A, VGS=10V		0.0079	0.0099	Ω
Static drain-source on-state resistance	$R_{DS(ON)}$	ID=19A, VGS=4.5V		0.0097	0.0122	Ω
Gate threshold voltage	Vth	ID=1mA, VDS=10V	1.5	2	2.5	V
Source-drain diode forward voltage	V_{SD}	IS=38A, VGS=0V			1.5	V
Thermal resistance	Rth(j-c)	Junction to case, with heatsink			1.21	°C/W
Total gate charge	Qg	VDD=48V, VGS=10V, ID=38A		49		nC
Gate to source charge	Qgs	VDD=48V, VGS=10V, ID=38A		9.5		nC
Gate to drain charge	Qgd	VDD=48V, VGS=10V, ID=38A		12		nC
Input capacitance	Ciss	VDS=25V, VGS=0V, f=1MHz		2340		pF
Reverce transfer capacitnce	Crss	VDS=25V, VGS=0V, f=1MHz		105		pF
Output capacitance	Coss	VDS=25V, VGS=0V, f=1MHz		205		pF
Turn-on delay time	td(on)	ID=19A, RL=1.5Ω, VDD=30V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		4.5		ns
Rise time	tr	ID=19A, RL=1.5Ω, VDD=30V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		6		ns
Turn-off delay time	td(off)	ID=19A, RL=1.5Ω, VDD=30V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		28		ns
Fall time	tf	ID=19A, RL=1.5Ω, VDD=30V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		6.5		ns
Diode reverse recovery time	trr	IF=38A, VGS=0V, di/dt=100A/μs		40		ns
Diode reverse recovery charge	Qrr	IF=38A, VGS=0V, di/dt=100A/μs		44		nC

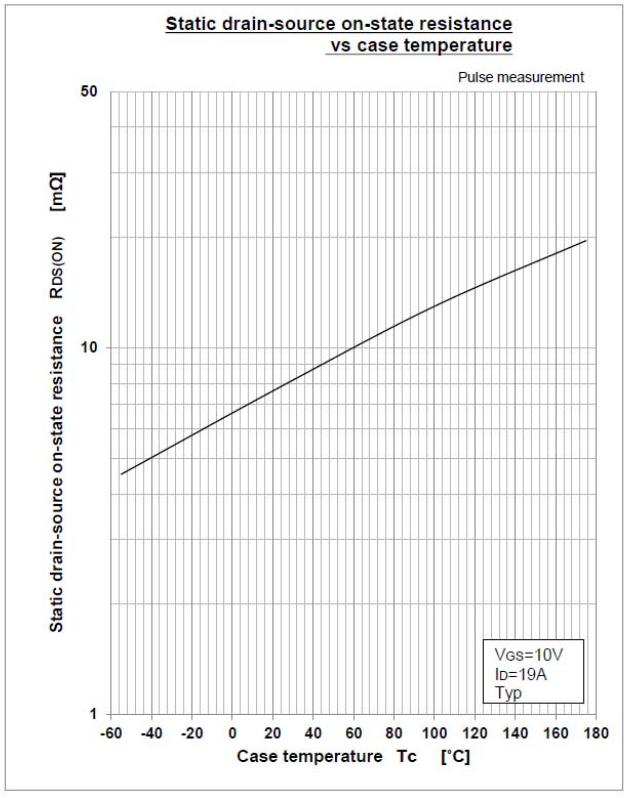
※ ：See the original Specifications

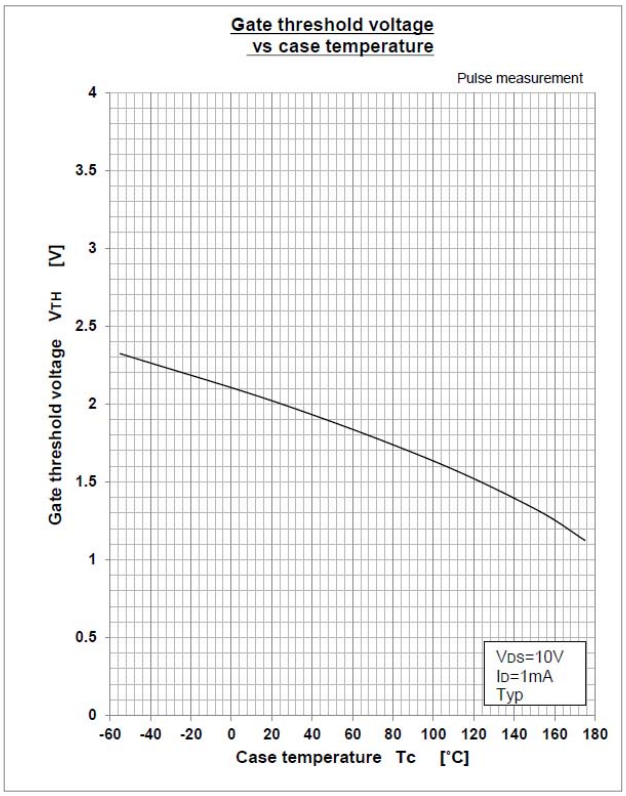
CHARACTERISTIC DIAGRAMS

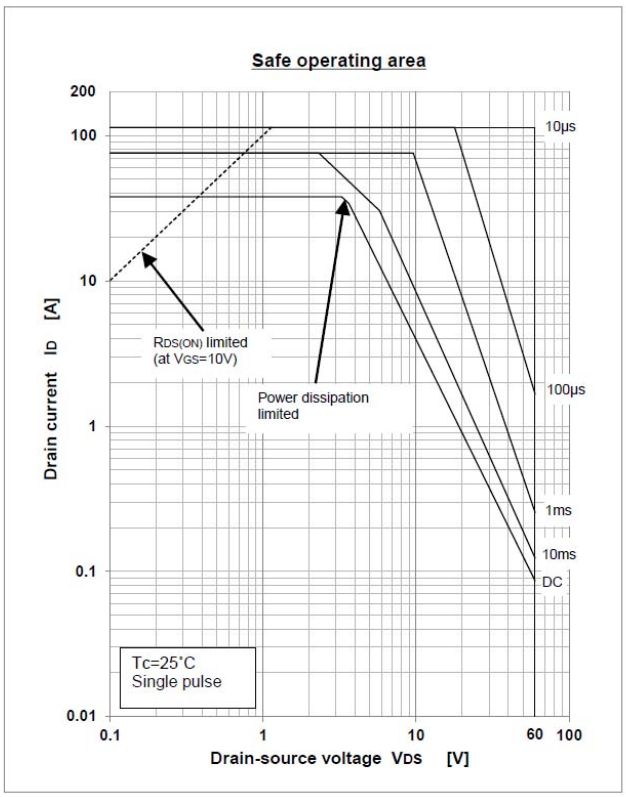


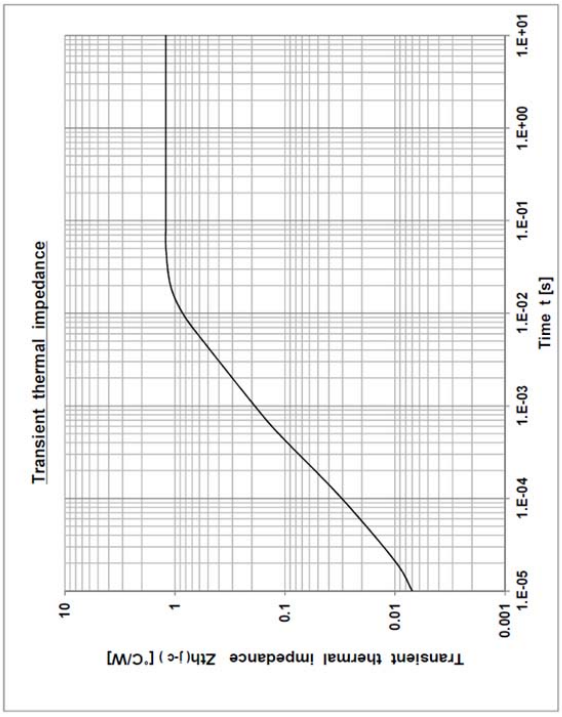


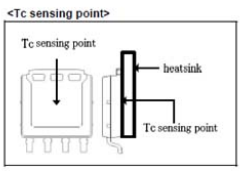


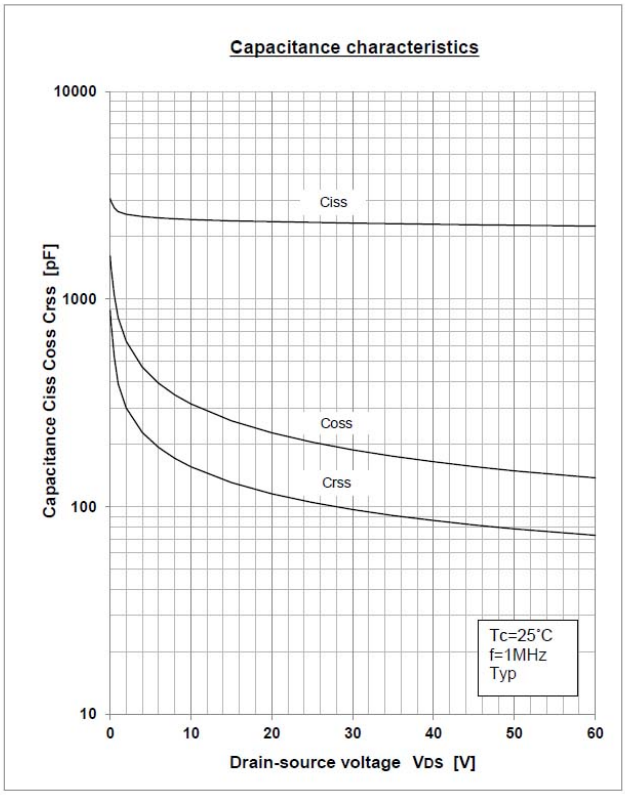


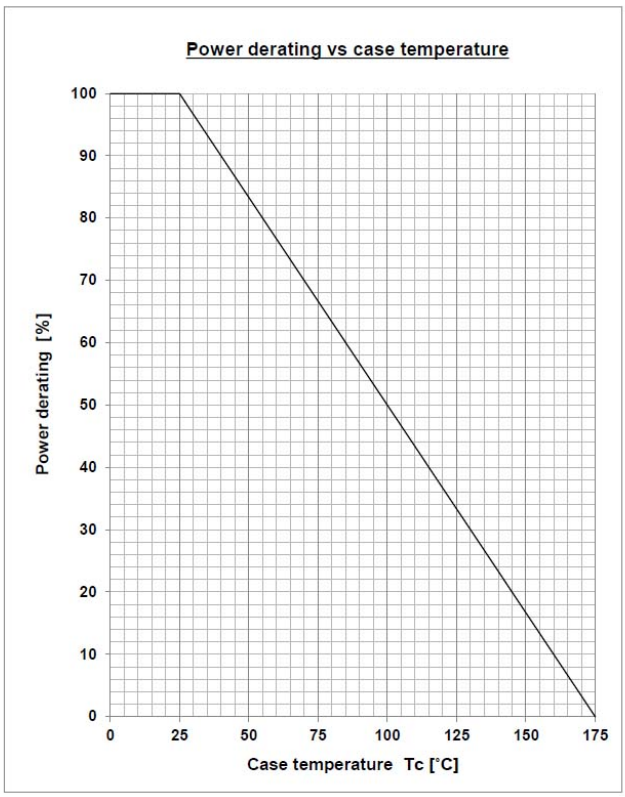

Gate threshold voltage
vs case temperature
Pulse measurement
Gate threshold voltage VTH [V]
Case temperature Tc [°C]
VDS=10V
ID=1mA
Typ

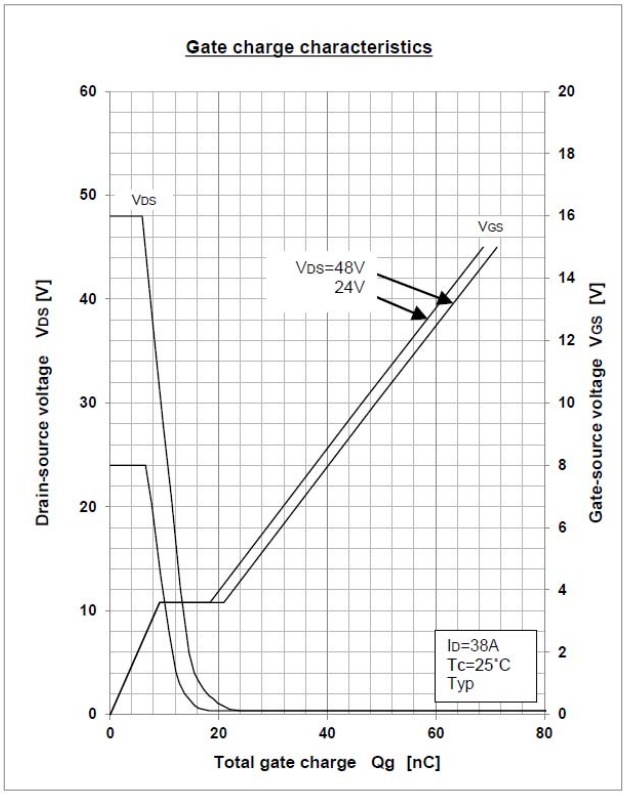

Safe operating area
Drain current ID [A]
Drain-source voltage VDS [V]
RDS(ON) limited
(at VGS=10V)
Power dissipation
limited
10μs
100μs
1ms
10ms
DC
Tc=25°C
Single pulse

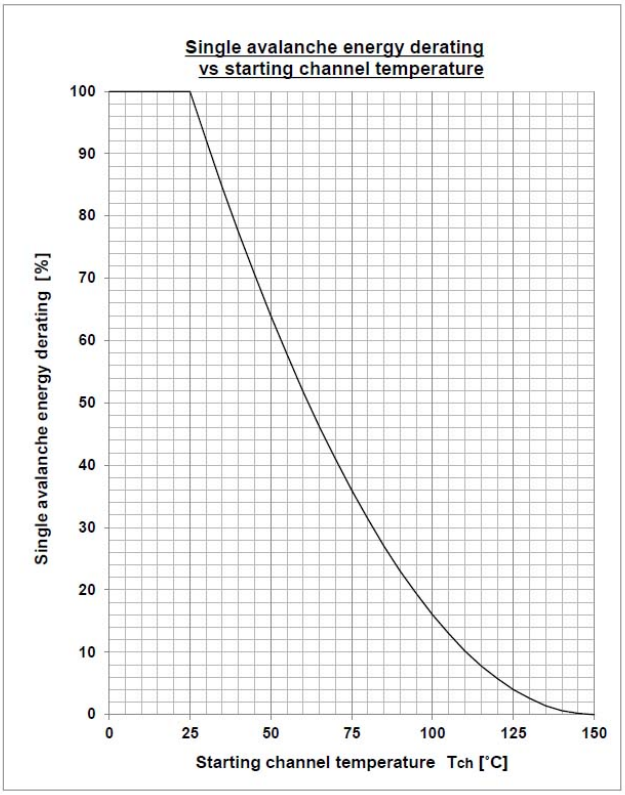

Transient thermal impedance
Transient thermal impedance Zth(j-c) [°C/W]
Time t [s]


<Tc sensing point>
Tc sensing point
heatsink
Tc sensing point


Capacitance characteristics
Capacitance Ciss Coss Crss [pF]
Drain-source voltage VDS [V]
Ciss
Coss
Crss
Tc=25°C
f=1MHz
Typ


Power derating vs case temperature
Power derating [%]
Case temperature Tc [°C]
100
90
80
70
60
50
40
30
20
10
0
0
25
50
75
100
125
150
175


Gate charge characteristics
Drain-source voltage VDS [V]
Gate-source voltage VGS [V]
Total gate charge Qg [nC]
VDS
VGS
VDS=48V
24V
ID=38A
Tc=25°C
Typ
60
50
40
30
20
10
0
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80

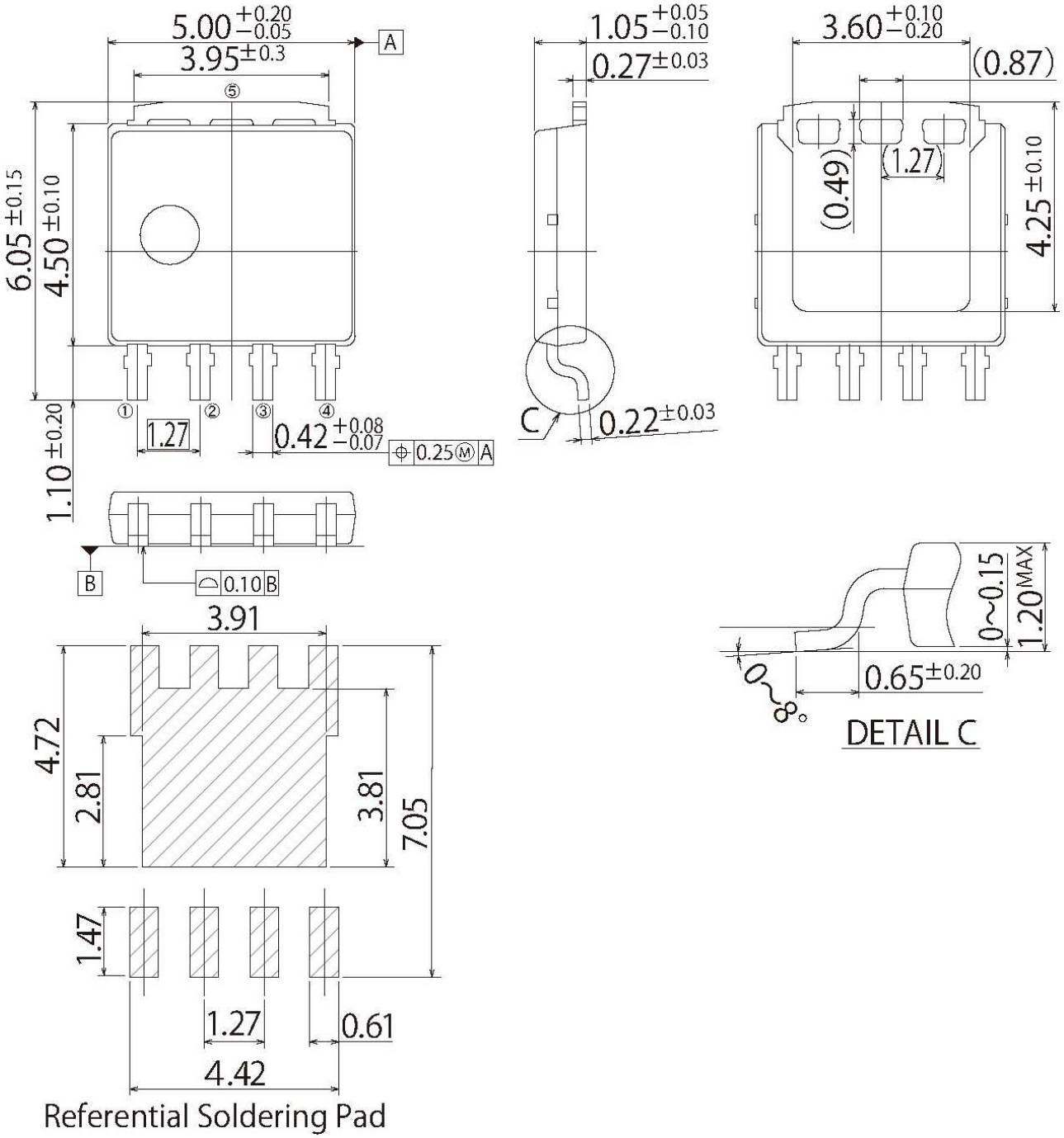

Single avalanche energy derating
vs starting channel temperature
Single avalanche energy derating [%]
Starting channel temperature Tch [°C]
100
90
80
70
60
50
40
30
20
10
0
0
25
50
75
100
125
150

Outline Dimensions

unit:mm

G7

JEDEC Code	MO-235B similar
JEITA Code	–
House Name	LF



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