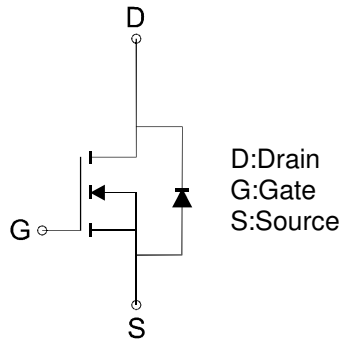
N-Channel 100V Enhancement Mode Power MOSFET

General Description

GPF5N10 use advanced LSFGMOS technology to provide low $R_{DS(ON)}$,low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable to use in Synchronous-rectification application.

B_{VDSS}=100V
$R_{DS(ON)}$ ≦5mΩ@V_{GS}=10V
$I_{D,pulse}$= 390A



N-Channel MOSFET

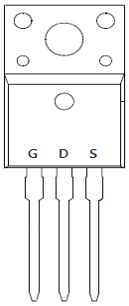
Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Easy to drive
- Marking: GPF5N10
- Qualified according to AEC-Q101
- Weight: 2070mg
- RoHS Compliant

Application

- Lighting
- Hard switching PWM
- Server power supply
- Charger

(ITO-220AB)
Top View



Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

PARAMETER		SYMBOL	VALUE	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_c=25°C	I_D	130	A
Pulsed Drain Current[2]		I_{DM}	390	A
Power Dissipation[3]		P_D	34	W
Single pulsed avalanche energy[5]		E_{AS}	400	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to150	°C

Thermal Characteristics

PARAMETER	SYMBOL	TYP	UNIT
Thermal Resistance Junction-to-Case	R_{thJC}	0.38	°C /W
Thermal Resistance Junction-to-Ambient[4]	R_{thJA}	62.5	

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Electrical Characteristics (T_A =25°C Unless Otherwise Specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
STATIC						
Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	$V_{(BR)DSS}$	100	--	--	V
Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	$V_{GS(th)}$	2.0	--	4.0	V
Gate-Source Leakage	V_{DS}=0V, V_{GS}=±20V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V	I_{DSS}	--	--	1	uA
Drain-Source On-Resistance	V_{GS}=10V,I_D=20A	$R_{DS(ON)}$	--	4	5	mΩ
DYNAMIC						
Total Gate Charge	V_{GS}=10V,V_{DS}=50V, I_D=22A	Q_g	--	101.6	--	nC
Gate-Source Charge		Q_{gs}	--	20.6	--	
Gate-Drain Charge		Q_{gd}	--	28.7	--	
Gate plateau voltage		$V_{plateau}$	--	4.2	--	V
Input Capacitance	V_{GS}=0V,V_{DS}=50V, F=1MHz	C_{iss}	--	6124.6	--	pF
Output Capacitance		C_{oss}	--	792.3	--	
Reverse Transfer Capacitance		C_{rss}	--	15.1	--	
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 50V, R_G = 2.2Ω, I_D=22A	$t_{d(on)}$	--	28.2	--	nS
Turn-On Rise Time		t_r	--	7.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	81.9	--	
Turn-Off Fall Time		t_f	--	20.1	--	
Source-Drain Diode						
Diode forward current	V_{GS}<V_{th}	I_S	--	--	130	A
Pulsed source current		I_{SP}	--	--	390	
Diode forward voltage	I_S=20A, V_{GS}=0 V	V_{SD}	--	--	1.3	V
Reverse recovery time	I_S=10A, dI/dt=100 A/μs	t_{rr}	--	82.1	--	nS
Reverse recovery charge		Q_{rr}	--	248.4	--	uC
Peak reverse recovery current		I_{rrm}	--	4.9	--	A

Notes:

(1). Calculated continuous current based on maximum allowable junction temperature.
(2). Repetitive rating; pulse width limited by max. junction temperature.
(3). Pd is based on max. junction temperature, using junction-case thermal resistance.
(4). The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
(5). V_{DD}=50 V, R_G=25 Ω, L=0.5 mH, starting T_j=25 °C.
(6). LiteON Semiconductor reserves the right to improve product design, functions and reliability without notice.

N-Channel 100V Enhancement Mode Power MOSFET

Figure 1, Typ. output characteristics

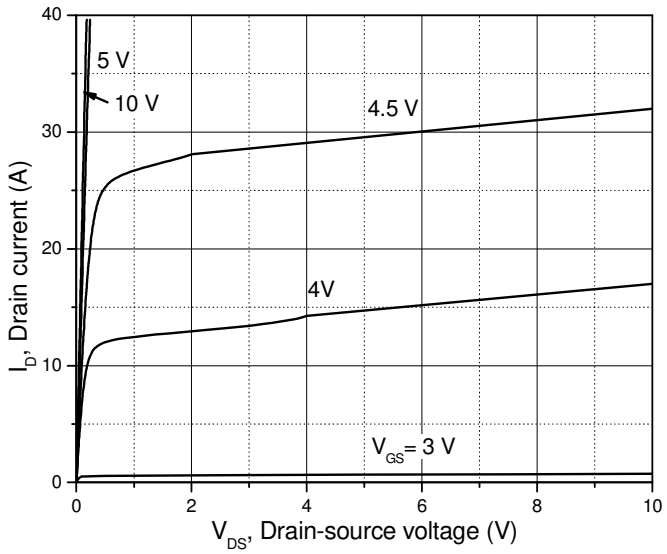


Figure 2, Typ. transfer characteristics

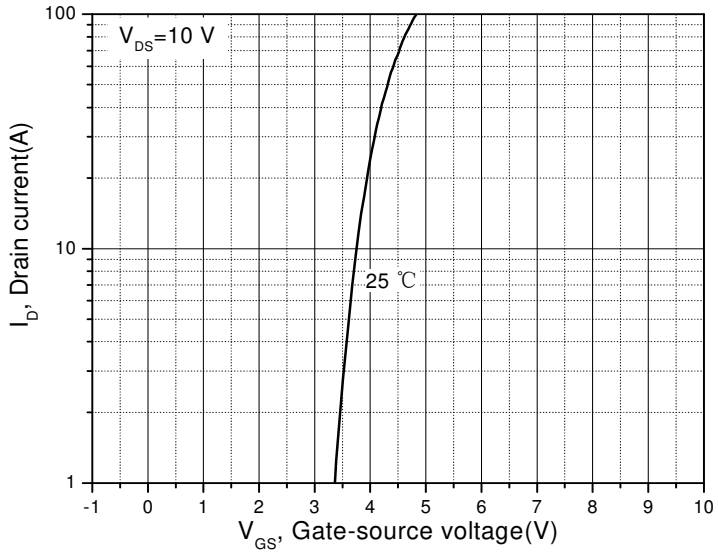


Figure 3, Typ. Capacitances

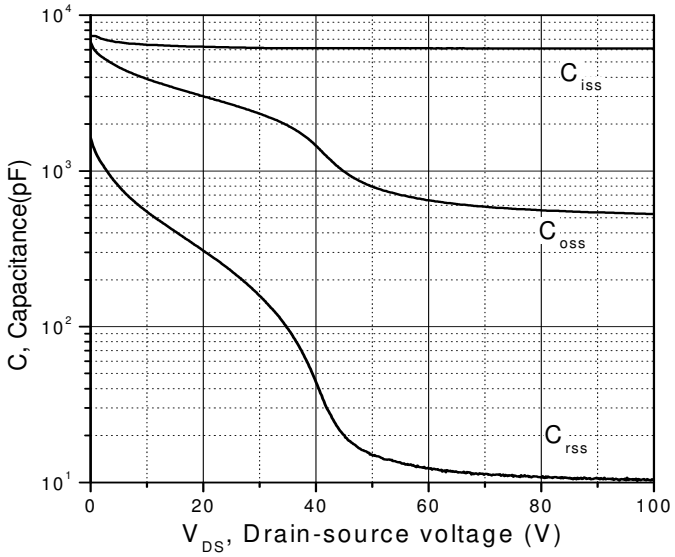


Figure 4, Typ. gate charge

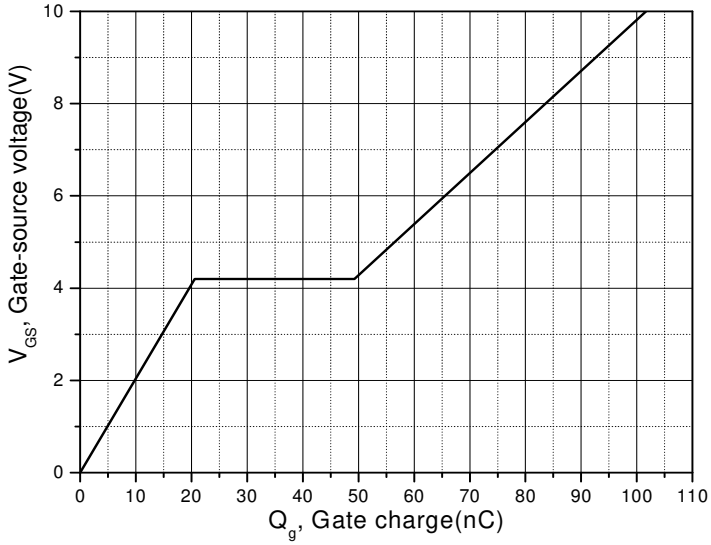


Figure 5, Drain-source breakdown voltage

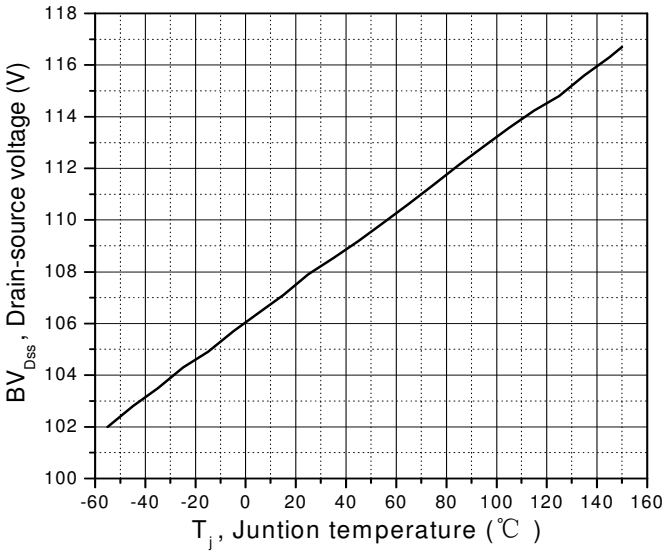
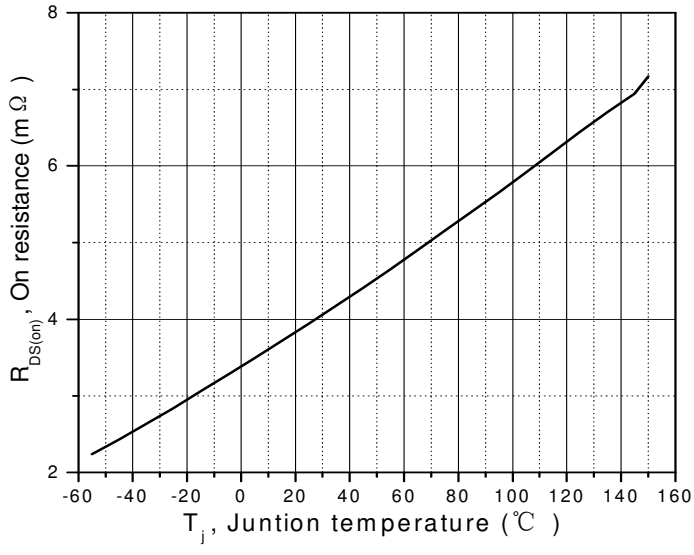


Figure 6, Drain-source on-state resistance



N-Channel 100V Enhancement Mode Power MOSFET

Figure 7, Forward characteristic of body diode

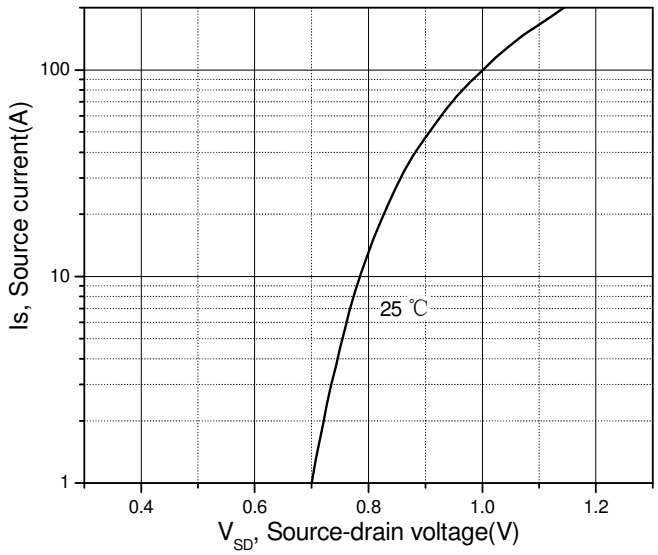


Figure 8, Drain-source on-state resistance

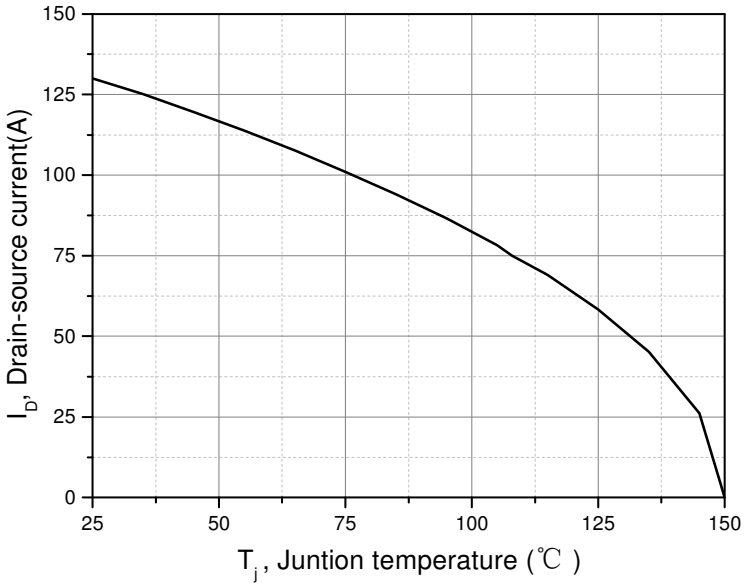
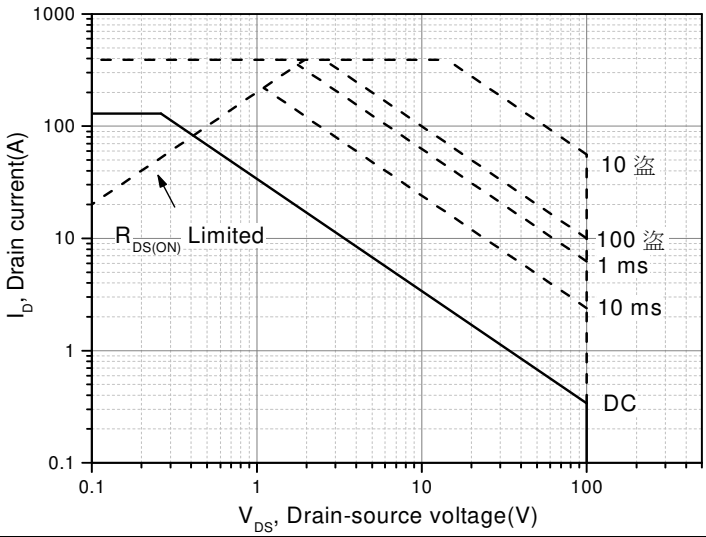


Figure 9, Safe operation area (T_C=25 ℃)



N-Channel 100V Enhancement Mode Power MOSFET

Test circuit and waveforms

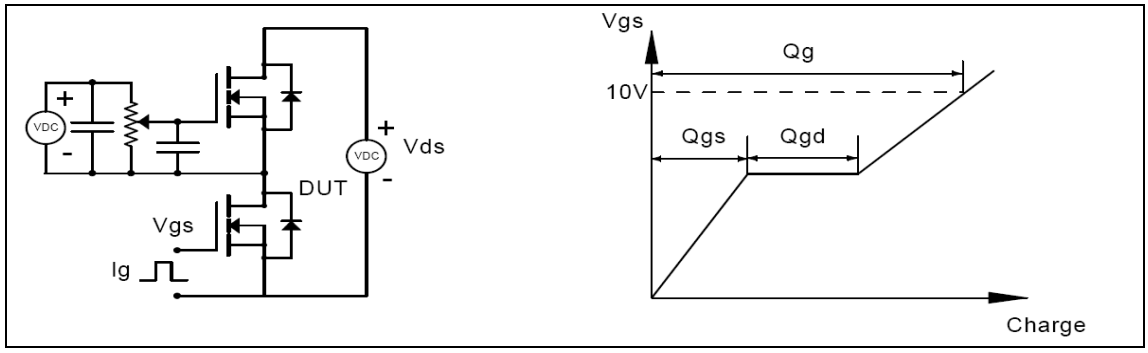


Figure 1, Gate charge test circuit & waveform

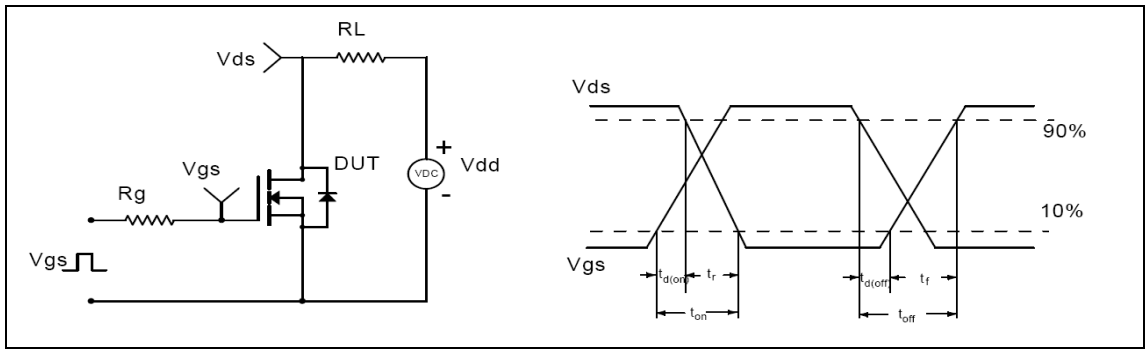


Figure 2, Switching time test circuit & waveforms

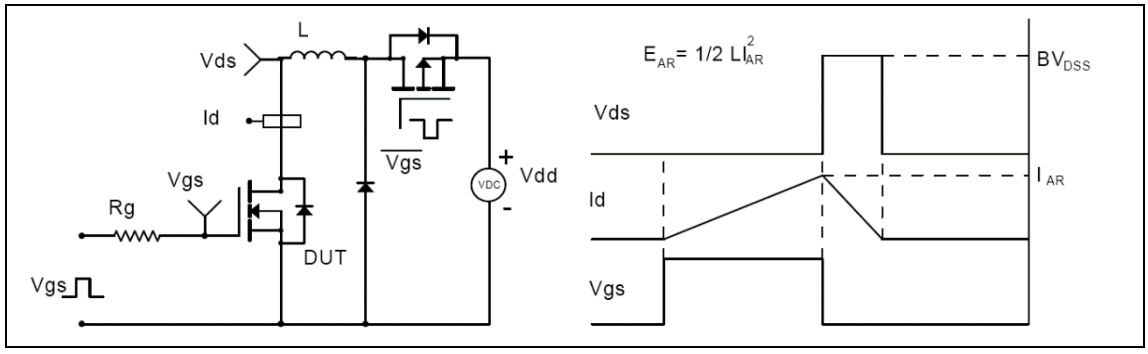


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

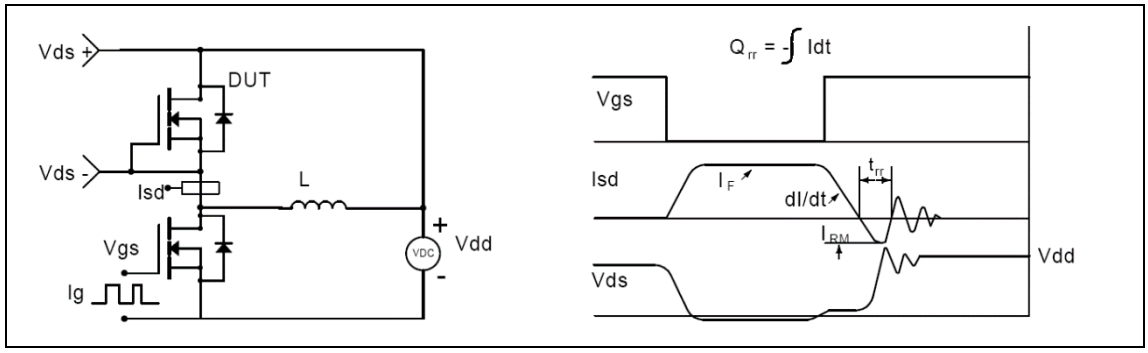
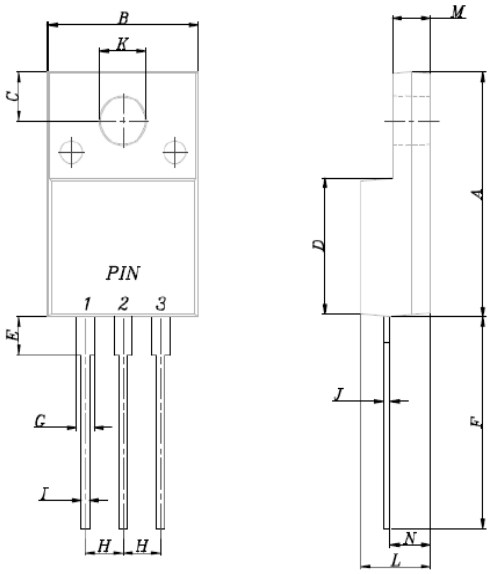


Figure 4, Diode reverse recovery test circuit & waveforms

N-Channel 100V Enhancement Mode Power MOSFET

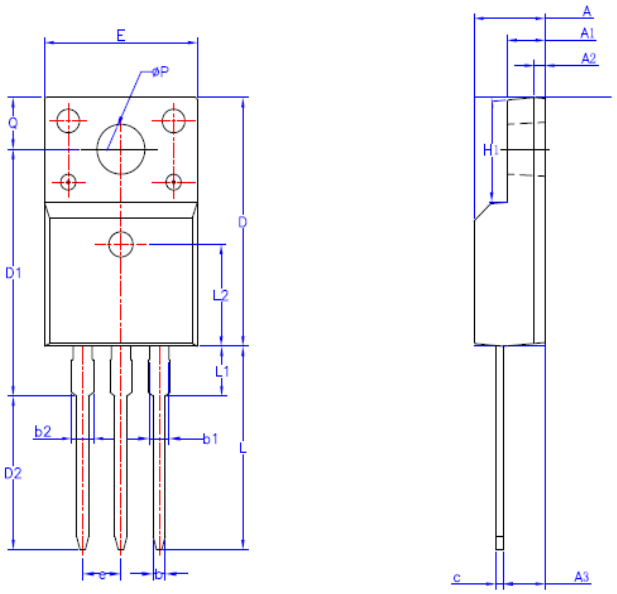
Package Outline Dimension

ITO-220(S)AB



ITO-220(S)AB		
DIM	MIN	MAX
A	14.95	15.95
B	10.00	10.40
C	2.76	3.36
D	8.50	8.80
E	2.10	2.50
F	13.00	13.70
G	1.15	1.37
H	2.40	2.70
I	0.50	0.80
J	0.45	0.70
K	3.00	3.30
L	4.46	4.87
M	2.48	2.80
N	2.50	2.80
All dimension in millimeter		

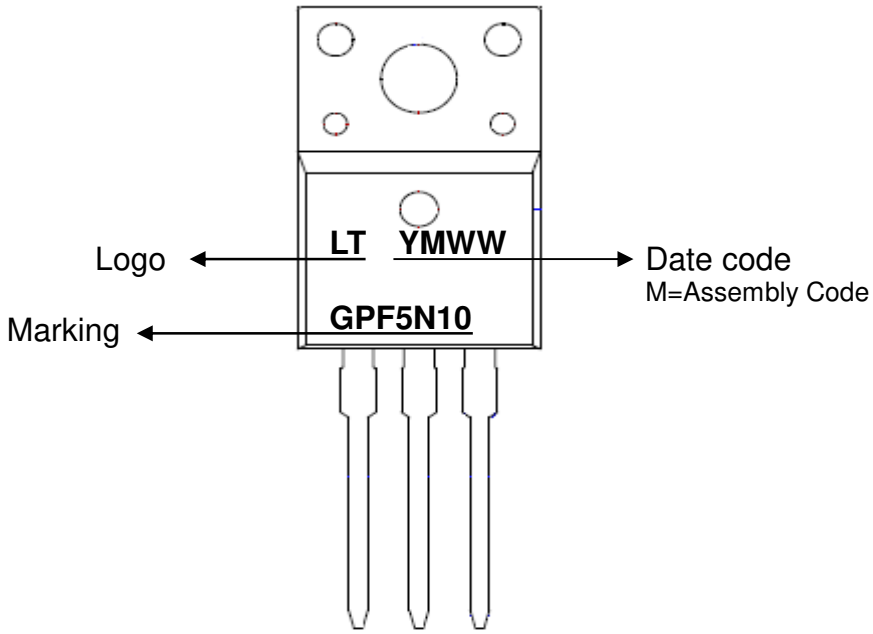
ITO-220AB(Q type)



ITO-220AB (Q type)			
DIM	MIN	MON	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.70 REF		
A3	2.56	2.76	2.93
b	0.70	--	0.90
b1	1.18	--	1.38
b2	--	--	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e	2.54BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	--	--	3.50
L2	6.50REF		
ΦP	3.08	3.18	3.28
Q	3.20	--	3.40
All Dimensions in millimeter			

N-Channel 100V Enhancement Mode Power MOSFET

Marking information



Packaging Information

PACKAGE	Units / Tube	Tubes / Inner Box	Box size (mm)	Units / Inner Box	Inner Box / Carton Box	Carton size (mm)	Units / Carton Box
ITO-220(S)AB	50	40	555X165X95	2K	2	575X179X225	4K
ITO-220AB (Q type)	50	40	570X180X75	2K	4	585X342X203	8K

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