

Lonten N-channel 40V, 120A, 2.5mΩ Power MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using split gate trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- ◆ 40V, 120A, $R_{DS(on),max} = 2.5m\Omega @ V_{GS} = 10V$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green device available

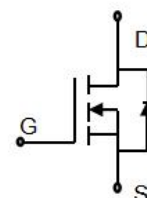
Applications

- ◆ Motor Drives
- ◆ UPS
- ◆ DC-DC Converter

Product Summary

V_{DSS}	40V
$R_{DS(on),max} @ V_{GS}=10V$	2.5mΩ
I_D	120A

Pin Configuration



N-Channel MOSFET



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	40	V
Continuous drain current ($T_C = 25^\circ C$) ¹⁾	I_D	120	A
Continuous drain current ($T_C = 100^\circ C$)		81	A
Pulsed drain current ²⁾	I_{DM}	360	A
Gate-Source voltage	V_{GSS}	±18	V
Avalanche energy ³⁾	E_{AS}	225	mJ
Power Dissipation ($T_C = 25^\circ C$)	P_D	57.6	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.67	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
LSGN04R025	PPAK5X6	LSGN04R025
LSGC04R025	TO-220	LSGC04R025

Electrical Characteristics
 $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0 V, I _D =250uA	40	---	---	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	---	2.2	V
Drain-source leakage current	I _{DSS}	V _{DS} =40 V, V _{GS} =0V, T _J = 25°C	---	---	1	μA
Gate leakage current, Forward	I _{GSSF}	V _{GS} =18 V, V _{DS} =0 V	---	---	100	nA
Gate leakage current, Reverse	I _{GSSR}	V _{GS} =-18 V, V _{DS} =0 V	---	---	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =50 A	---	---	2.5	mΩ
		V _{GS} =4.5 V, I _D =20 A	---	---	5	mΩ
Forward transconductance	g _{fs}	V _{DS} =10V , I _D =20A	---	131	---	S
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, F = 1MHz	---	3210	---	pF
Output capacitance	C _{oss}		---	2130	---	
Reverse transfer capacitance	C _{rss}		---	343	---	
Turn-on delay time	t _{d(on)}	V _{DD} = 15V,V _{GS} =10V, I _D = 20A R _G =1.6Ω	---	9	---	ns
Rise time	t _r		---	4	---	
Turn-off delay time	t _{d(off)}		---	45	---	
Fall time	t _f		---	7	---	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DS} =15V, I _D =15A, V _{GS} = 10 V	---	7	---	nC
Gate to drain charge	Q _{gd}		---	17.5	---	
Gate charge total	Q _g		---	67	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I _S		---	---	120	A
Pulsed Source Current ⁴⁾	I _{SM}		---	---	360	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =40A, T _J =25°C	---	0.85	1.2	V
Reverse Recovery Time	t _{rr}	I _S =I _F , di/dt=100A/us, T _J =25°C ⁵⁾	---	---	26	ns
Reverse Recovery Charge	Q _{rr}		---	---	95	nC

Notes:

- 1: The maximum junction current rating is package limited.
- 2: Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3: $V_{DD}=23\text{ V}, V_{GS}=10\text{ V}, L=0.5\text{ mH}, I_{AS}=30\text{ A}, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
- 4: Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.
- 5: Guaranteed by design, not subject to production.

Electrical Characteristics Diagrams

Fig 1: Output Characteristics

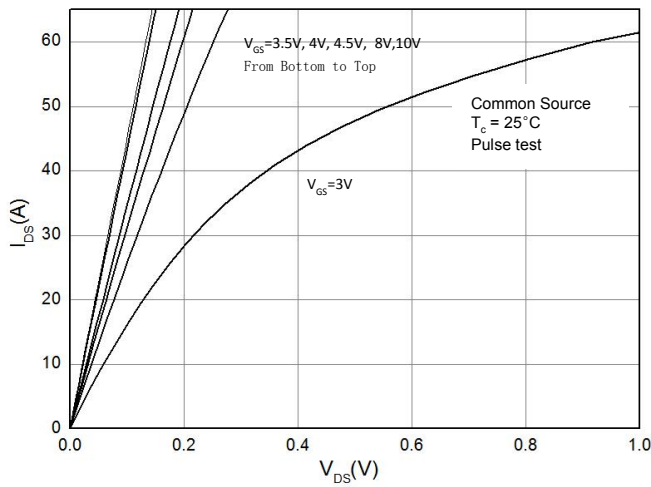


Fig 2: Transfer Characteristics

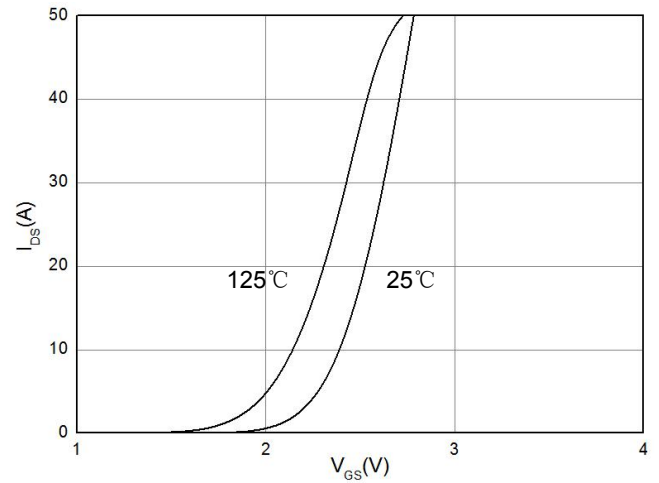


Figure 3. Capacitance Characteristics

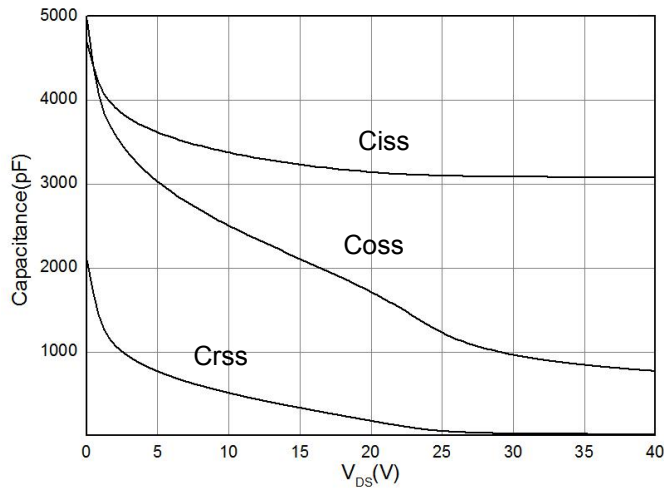


Figure 4. Gate Charge Waveform

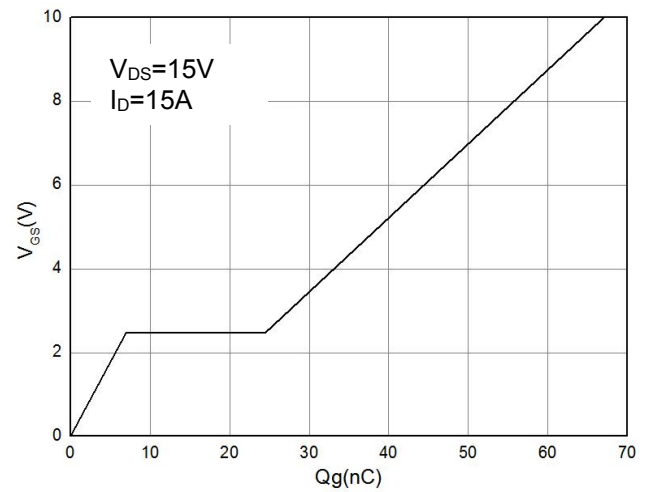


Figure 5. Body-Diode Characteristics

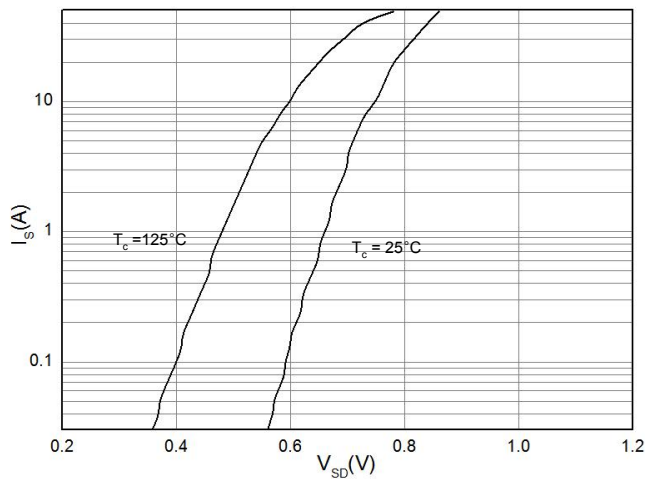


Figure 6. Rdson-Drain Current

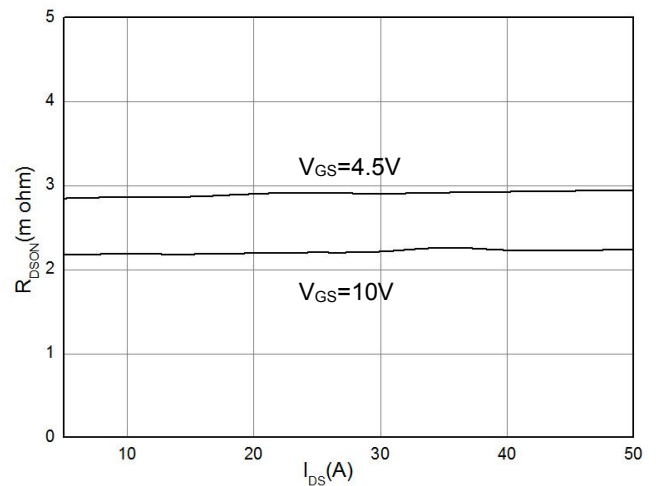


Fig 7: $R_{ds(on)}$ vs Gate Voltage

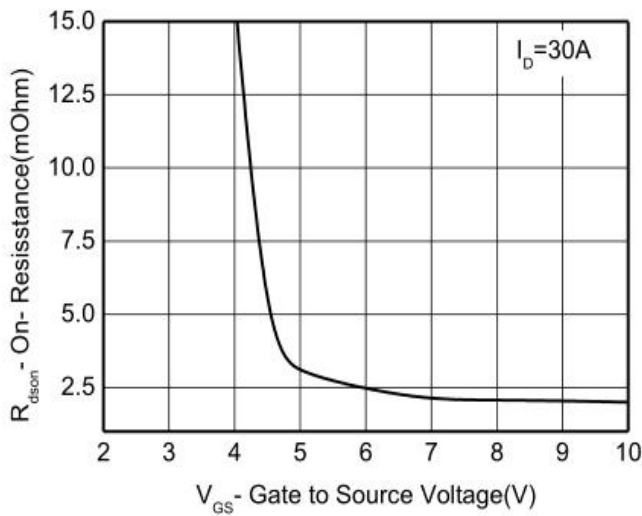


Fig 8: $R_{ds(on)}$ -Junction Temperature($^{\circ}C$)

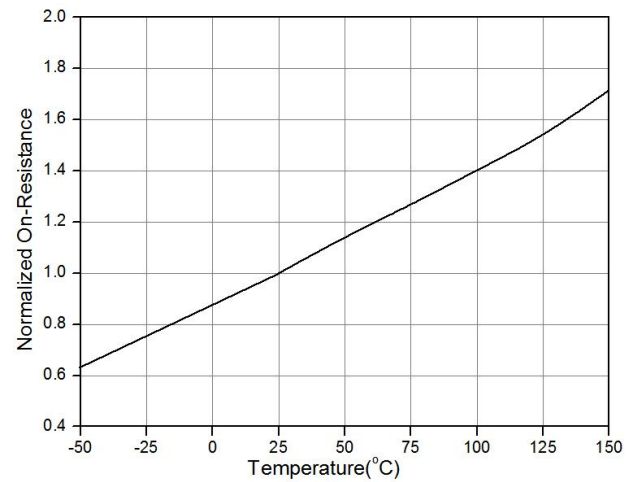


Figure 9. BV_{dss} vs. Junction temperature

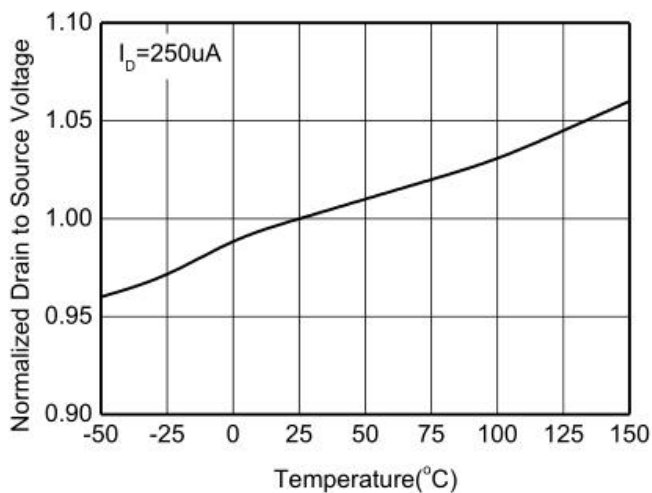


Figure 10. Maximum Safe Operating Area

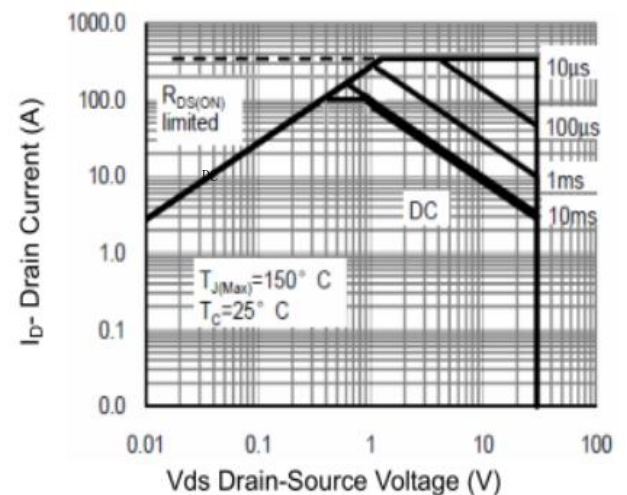
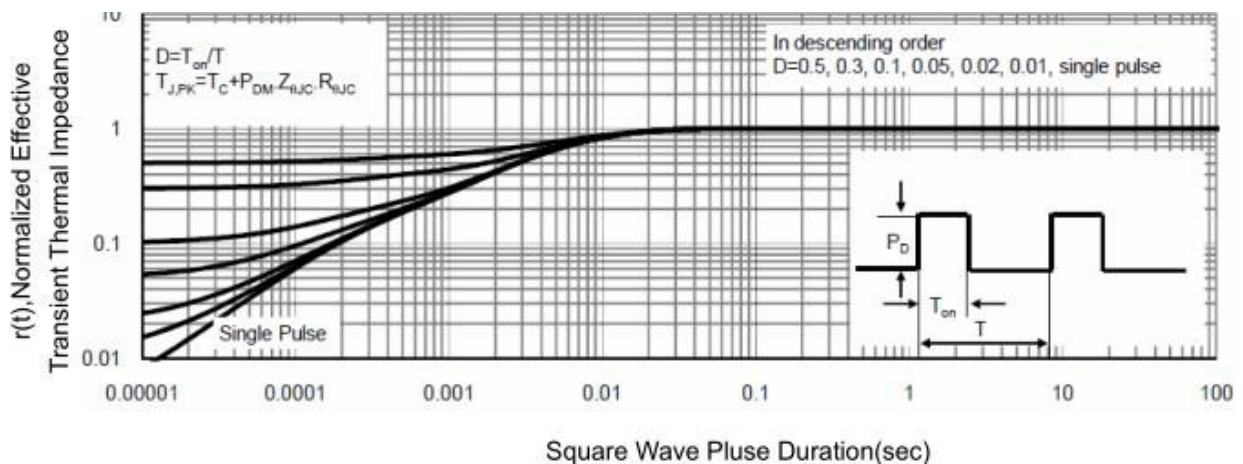


Figure 11. Normalized Maximum Transient Thermal Impedance (R_{thJC})



Test Circuit & Waveform

Figure 12. Gate Charge Test Circuit & Waveform

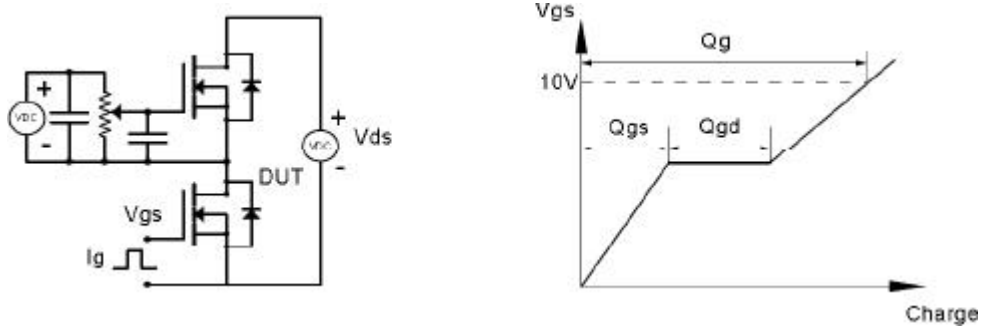


Figure 13. Resistive Switching Test Circuit & Waveforms

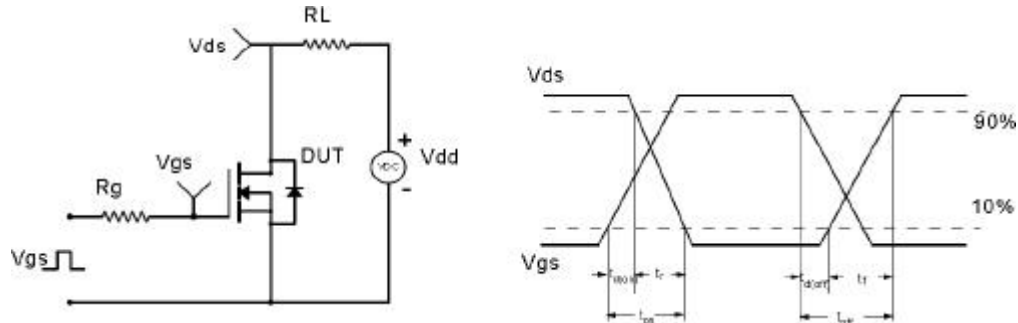


Figure 14. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

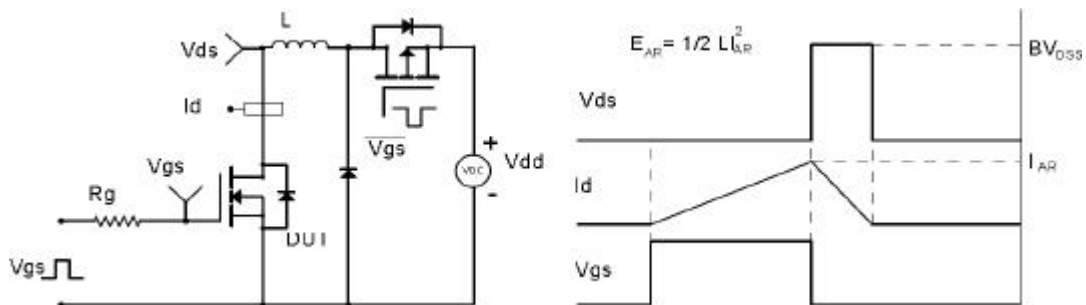
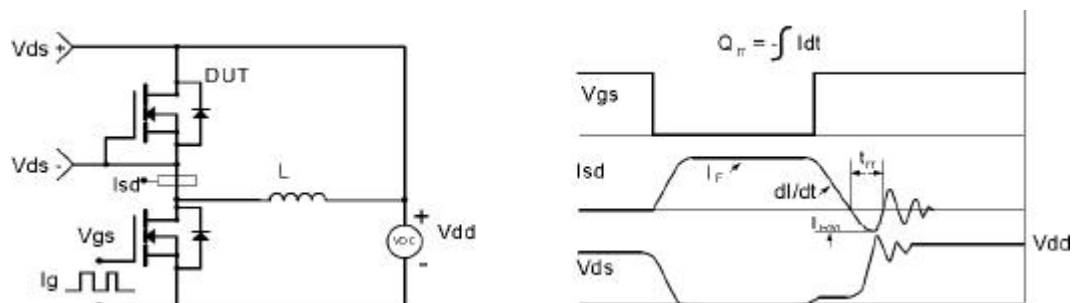
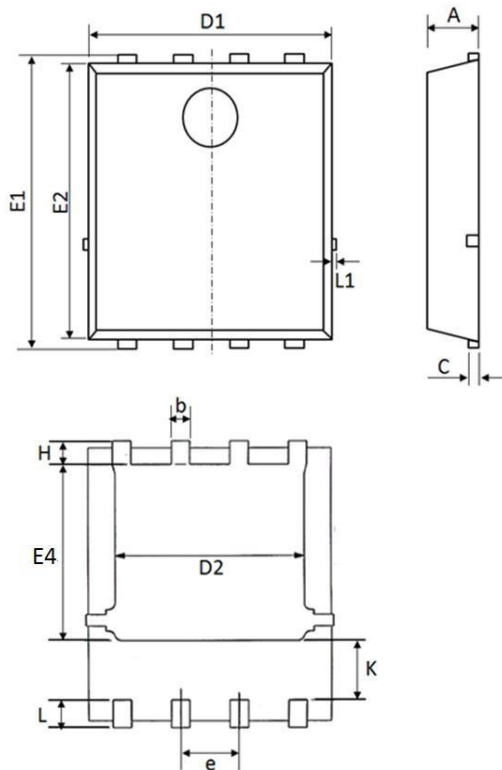


Figure 15. Diode Recovery Circuit & Waveform

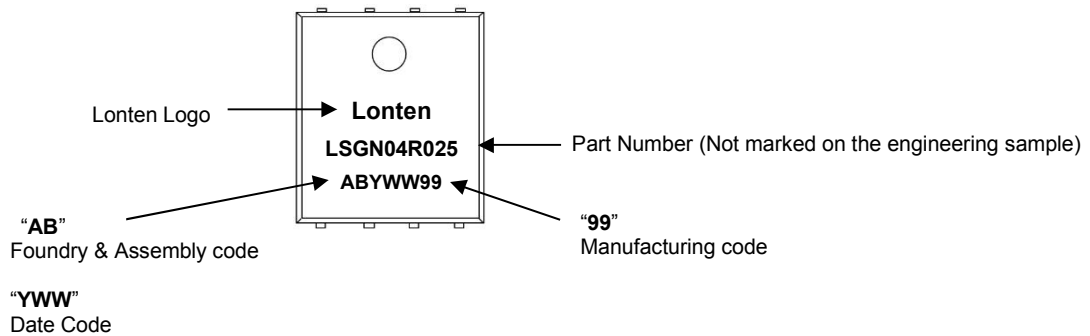


Mechanical Dimensions for PPAK5×6



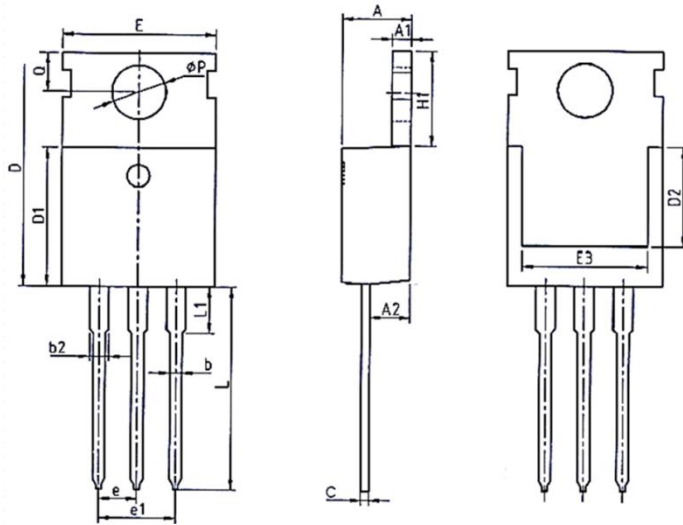
COMMON DIMENSIONS						
SYMBOL	MILLIMETERS			INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1	1.1	1.2	0.039	0.043	0.047
b	0.3	0.4	0.5	0.012	0.016	0.020
C	0.154	0.254	0.354	0.006	0.010	0.014
D1	5	5.2	5.4	0.197	0.205	0.213
D2	3.8	4.1	4.25	0.150	0.161	0.167
E1	5.95	6.15	6.35	0.234	0.242	0.250
E2	5.66	5.86	6.06	0.223	0.231	0.239
E4	3.52	3.72	3.92	0.139	0.146	0.154
e	1.27 BSC			0.050 BSC		
H	0.4	0.5	0.6	0.016	0.020	0.024
L	0.5	0.6	0.7	0.020	0.024	0.028
L1	-	-	0.12	-	-	0.005
K	1.14	1.29	1.44	0.045	0.051	0.057

PPAK5×6 Part Marking Information



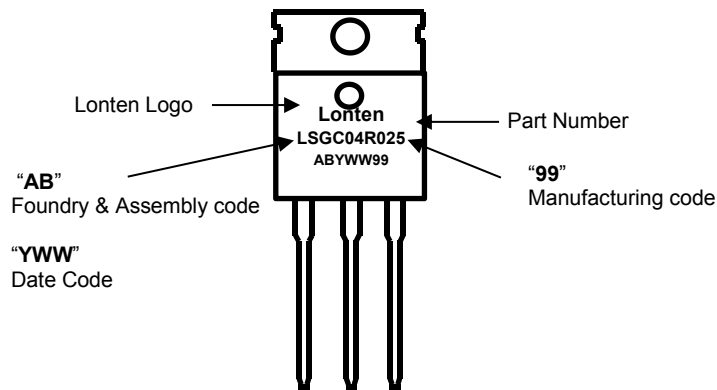
Calendar Year	Year Code	Calendar Week	Week Code
2018	G	Workweek 01	01
2019	H	Workweek 02	02
2020	I	Workweek 03	03
2021	J	Workweek 04	04
2022	K	Workweek 05	05
2023	L	Workweek 06	06
2024	M		

TO-220 PACKAGE INFORMATION



SYMBOL	COMMON DIMENSIONS					
	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.70	0.172	0.180	0.185
A1	1.25	1.30	1.40	0.049	0.051	0.055
A2	2.20	2.40	2.60	0.087	0.094	0.102
b	0.70	0.80	0.95	0.028	0.031	0.037
b2	1.17	1.27	1.47	0.046	0.050	0.058
c	0.45	0.50	0.60	0.018	0.020	0.024
D	15.10	15.60	16.10	0.594	0.614	0.634
D1	8.80	9.10	9.40	0.346	0.358	0.370
D2	5.50	-	-	0.217	-	-
E	9.70	10.00	10.30	0.382	0.394	0.406
E3	7.00	-	-	0.276	-	-
e	2.54BCS			0.1BSC		
e1	5.08BCS			0.2REF		
H1	6.25	6.50	6.85	0.246	0.256	0.270
L	12.75	13.50	13.80	0.502	0.531	0.543
L1	-	3.10	3.40	-	0.122	0.134
ØP	3.40	3.60	3.80	0.134	0.142	0.150
Q	2.60	2.80	3.00	0.102	0.110	0.118

TO-220 Part Marking Information



Calendar Year	Year Code	Calendar Week	Week Code
2018	G	Workweek 01	01
2019	H	Workweek 02	02
2020	I	Workweek 03	03
2021	J	Workweek 04	04
2022	K	Workweek 05	05
2023	L	Workweek 06	06
2024	M		

Disclaimer

The content specified herein is for the purpose of introducing LONTEN's products (hereinafter "Products"). The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

LONTEN does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of the Products or technical information described in this document.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). LONTEN shall bear no responsibility in any way for use of any of the Products for the above special purposes.

Although LONTEN endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a LONTEN product.

The content specified herein is subject to change for improvement without notice. When using a LONTEN product, be sure to obtain the latest specifications.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [LONTEN](#) manufacturer:

Other Similar products are found below :

[614233C](#) [648584F](#) [MCH3443-TL-E](#) [MCH6422-TL-E](#) [FDPF9N50NZ](#) [FW216A-TL-2W](#) [FW231A-TL-E](#) [APT5010JVR](#) [NTNS3A92PZT5G](#)
[IRF100S201](#) [JANTX2N5237](#) [2SK2464-TL-E](#) [2SK3818-DL-E](#) [FCA20N60_F109](#) [FDZ595PZ](#) [STD6600NT4G](#) [FSS804-TL-E](#) [2SJ277-DL-E](#)
[2SK1691-DL-E](#) [2SK2545\(Q,T\)](#) [D2294UK](#) [405094E](#) [423220D](#) [MCH6646-TL-E](#) [TPCC8103,L1Q\(CM](#) [367-8430-0972-503](#) [VN1206L](#)
[424134F](#) [026935X](#) [051075F](#) [SBVS138LT1G](#) [614234A](#) [715780A](#) [NTNS3166NZT5G](#) [751625C](#) [873612G](#) [IRF7380TRHR](#)
[IPS70R2K0CEAKMA1](#) [RJK60S3DPP-E0#T2](#) [RJK60S5DPK-M0#T0](#) [APT5010JVFR](#) [APT12031JFLL](#) [APT12040JVR](#) [DMN3404LQ-7](#)
[NTE6400](#) [JANTX2N6796U](#) [JANTX2N6784U](#) [JANTXV2N5416U4](#) [SQM110N05-06L-GE3](#) [SIHF35N60E-GE3](#)