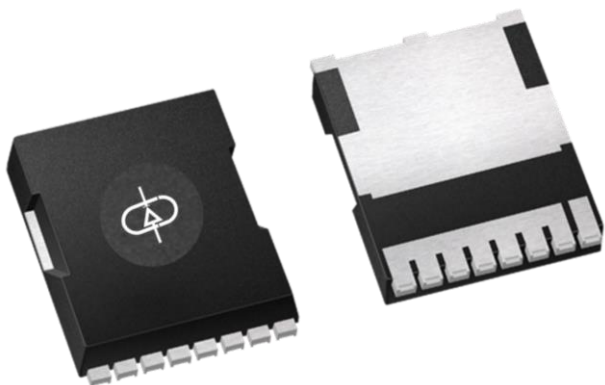


395A, 100V N-CHANNEL MOSFET

DESCRIPTION:



The ALP395N10 is an 395A, 100V N-Channel enhanced mode power MOSFET and it has fast switched speed

FEATURES:

- $V_{DS}=100V$, $I_D = 395A$
- $R_{DS(ON)} \leq 1.3m\Omega$ @ $V_{GS}=10V$, $I_D=30A$.
- Surface-mounted package.
- Advanced trench cell design.
- 100% UIS and R tested.
- Lead-free parts meet RoHS requirements.
- Suffix “-H” indicated Halogen Free part, ex. ALP395N10-H

APPLICATIONS:

- Battery management system.
- Machine tool.
- High power inverter system.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, TOLL-8L (MO-299A).
- Mounting Position: Any.

MAXIMUM RATINGS

MAXIMUM RATINGS @ $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified			
PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current $T_C = 25^{\circ}\text{C}$ (Note 1) $T_C = 100^{\circ}\text{C}$ (Note 1)	I_D	395 250	A
Pulsed Drain Current	I_{DM}	987	A
Avalanche current, Single pulse ($L=0.5\text{mH}$) (Note 3)	I_{AS}	55	mJ
Single pulse avalanche energy ($L=0.5\text{mH}$) (Note 3)	E_{AS}	152	mJ
Power Dissipation (Note 2)	P_D	313	W
Thermal Resistance Junction to Ambient (Note 2)	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.4	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Note: 1. Max. current is limited by max. junction temperature. 2. Surface Mounted on 1in2 FR-4 board with 1oz. 3. UIS tested and pulse width are limited by maximum junction temperature 150°C .			

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250 \mu A$	BV_{DSS}	100			V
Drain-source leakage current	$V_{DS} = 80V, V_{GS} = 0V$	I_{DSS}			1.0	μA
Gate-source leakage current	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}			± 100	nA
On Characteristics						
Gate-Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	$V_{GS(TH)}$	2.0		4.0	V
Static Drain-to-Source On-Resistance (Note 4)	$V_{GS} = 10V, I_D = 30A$	$R_{DS(ON)}$		1.05	1.3	m Ω
Forward Trans Conductance	$V_{GS} = 5V, I_D = 50A$	g_{fs}		108		S

DYNAMIC CHARACTERISTICS (Note 5)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	$V_{DS} = 50V, V_{GS} = 0V, F_{req} = 1.0 \text{ MHz}$	C_{iss}		13000		pF
Output Capacitance	$V_{DS} = 50V, V_{GS} = 0V, F_{req} = 1.0 \text{ MHz}$	C_{oss}		2147		pF
Reverse Transfer Capacitance	$V_{DS} = 50V, V_{GS} = 0V, F_{req} = 1.0 \text{ MHz}$	C_{rss}		398		pF
Gate Resistance	$V_{DS} = 0V, V_{GS} = 0V, F_{req} = 1.0 \text{ MHz}$	R_G		1.7		Ω

SWITCHING CHARACTERISTICS (Note 5)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Total Gate Charge	$V_{DS} = 50V, V_{GS} = 10V, I_D = 100A$	Q_g		231		nC
Gate to Source Charge	$V_{DS} = 50V, V_{GS} = 10V, I_D = 100A$	Q_{gs}		70.2		nC
Gate to Drain Charge	$V_{DS} = 50V, V_{GS} = 10V, I_D = 100A$	Q_{gd}		65.7		nC
Turn-On Delay Time	$V_{DS} = 50V, I_D = 100A, V_{GS} = 10V, R_G = 1.0 \Omega$	$t_{d(on)}$		27.7		nS
Rise time	$V_{DS} = 50V, I_D = 100A, V_{GS} = 10V, R_G = 1.0 \Omega$	t_r		21.5		nS
Turn-Off Delay Time	$V_{DS} = 50V, I_D = 100A, V_{GS} = 10V, R_G = 1.0 \Omega$	$t_{d(off)}$		89.6		nS
Fall time	$V_{DS} = 50V, I_D = 100A, V_{GS} = 10V, R_G = 1.0 \Omega$	t_f		96.8		nS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Drain-source diode forward voltage (Note 4)	$I_S = 30A, V_{GS} = 0V$	V_{SD}		0.75	1.1	V
Body diode reverse recovery time	$V_{GS} = 0V, I_{DS} = 30A, di/dt = 100A/\mu s$	t_{rr}		120		ns
Body diode reverse recovery charge	$V_{GS} = 0V, I_{DS} = 30A, di/dt = 100A/\mu s$	Q_{rr}		400		nC

Note:

- Pulse test (pulse width $\leq 300 \mu s$, Duty cycle $\leq 2\%$).
- Guaranteed by design, not subject to production testing.

TYPICAL DEVICE RATING AND CHARACTERISTICS CURVES ($T_A = 25^\circ\text{C}$ unless otherwise noted)

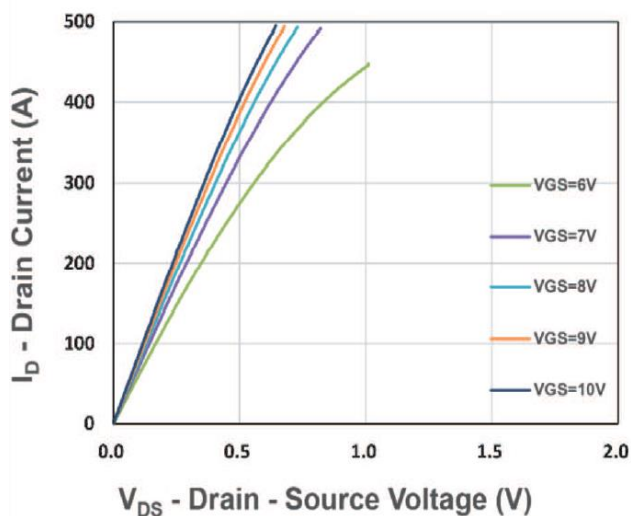


Fig.1 OUTPUT CHARACTERISTICS

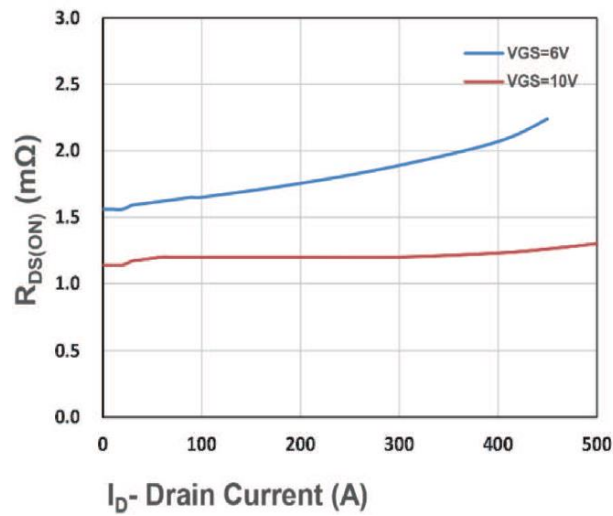


Fig.2 ON-RESISTANCE Vs. I_D

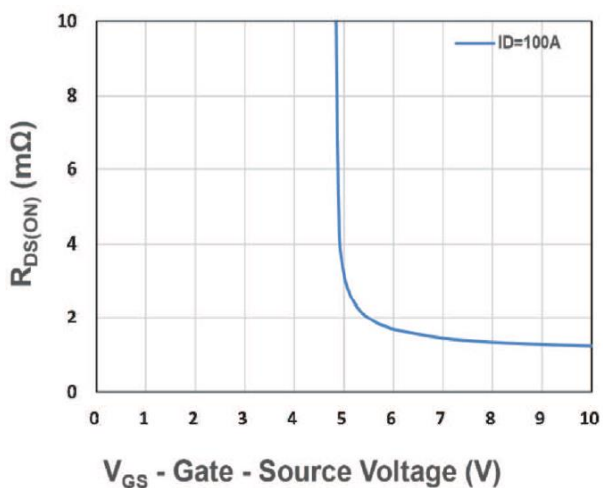


Fig.3 ON-RESISTANCE Vs. V_{GS}

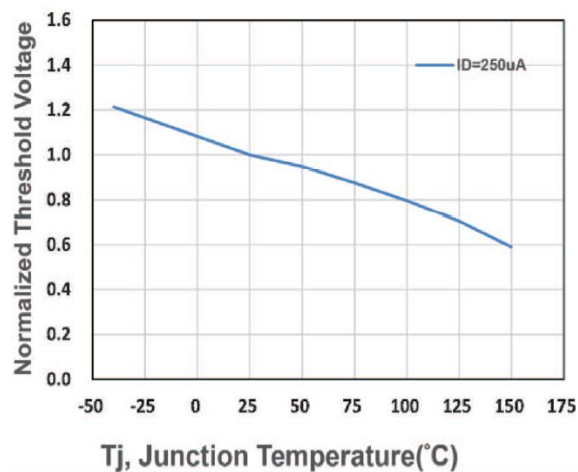


Fig.4 GATE THRESHOLD VOLTAGE

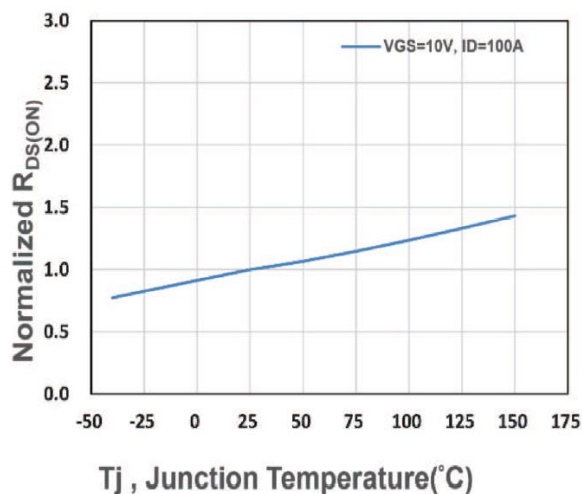


Fig.5 DRAIN-SOURCE ON RESISTANCE

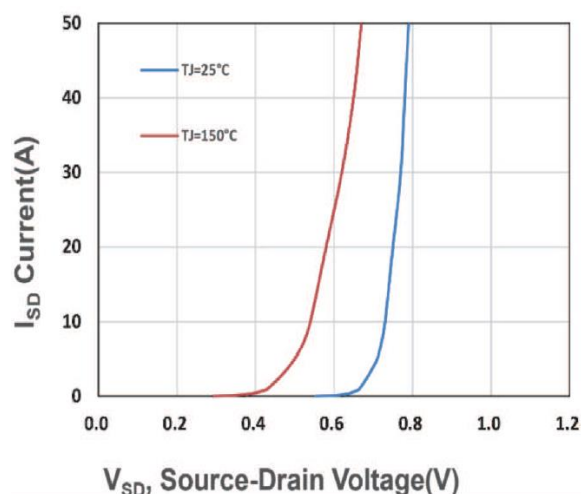
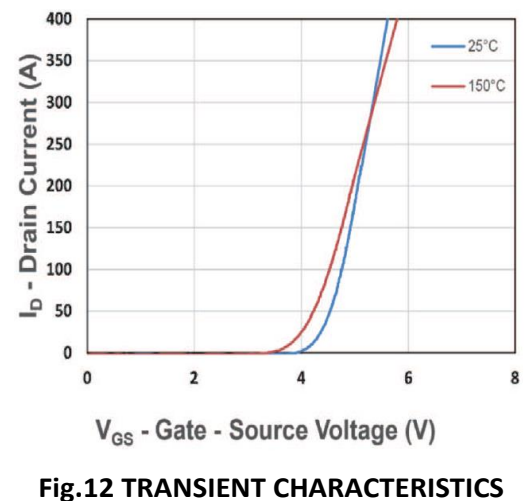
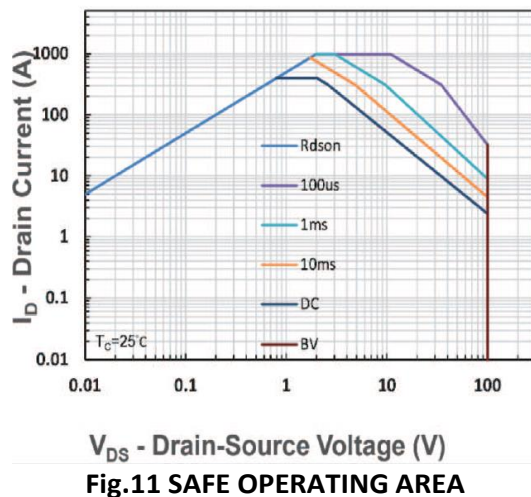
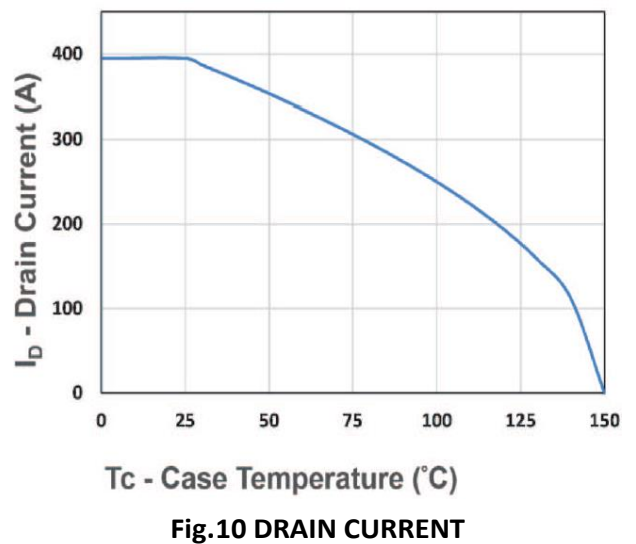
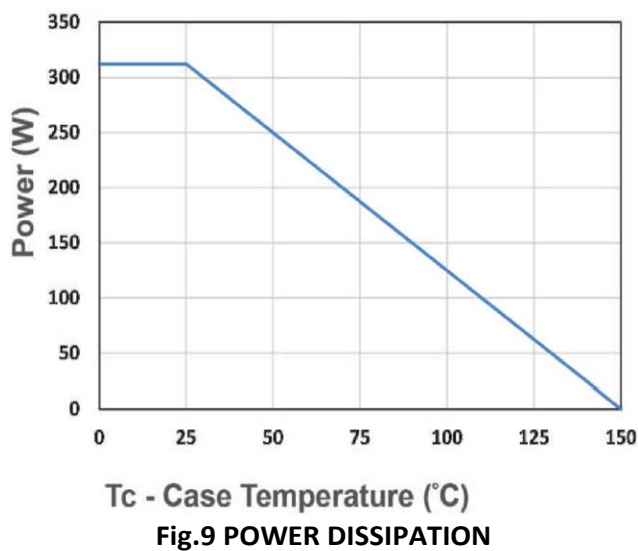
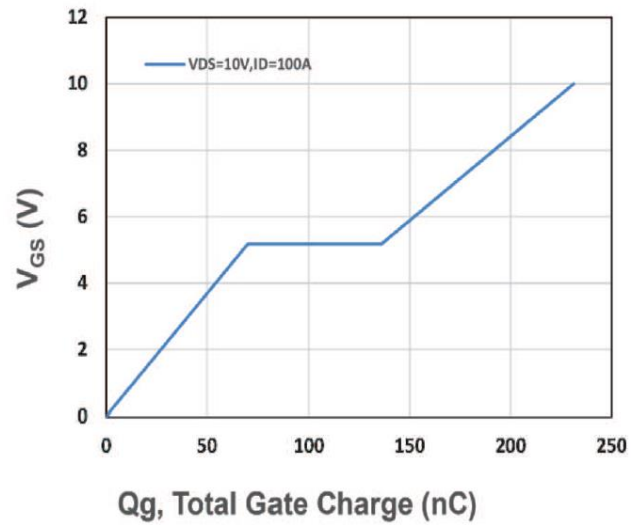
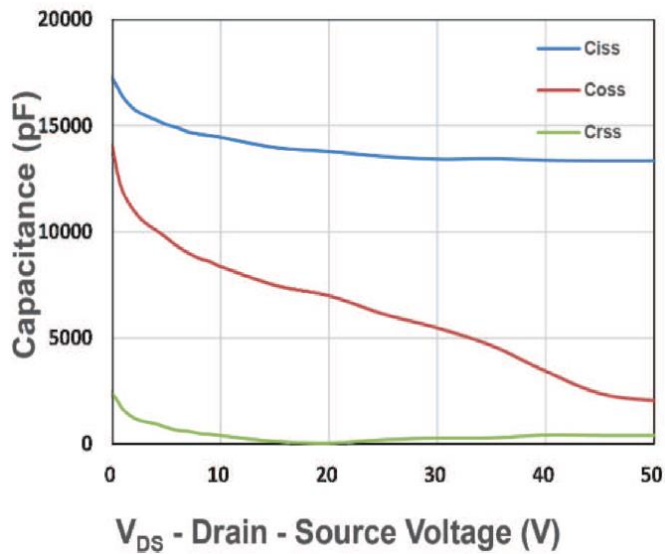


Fig.6 SOURCE-DRAIN DIODE FORWARD



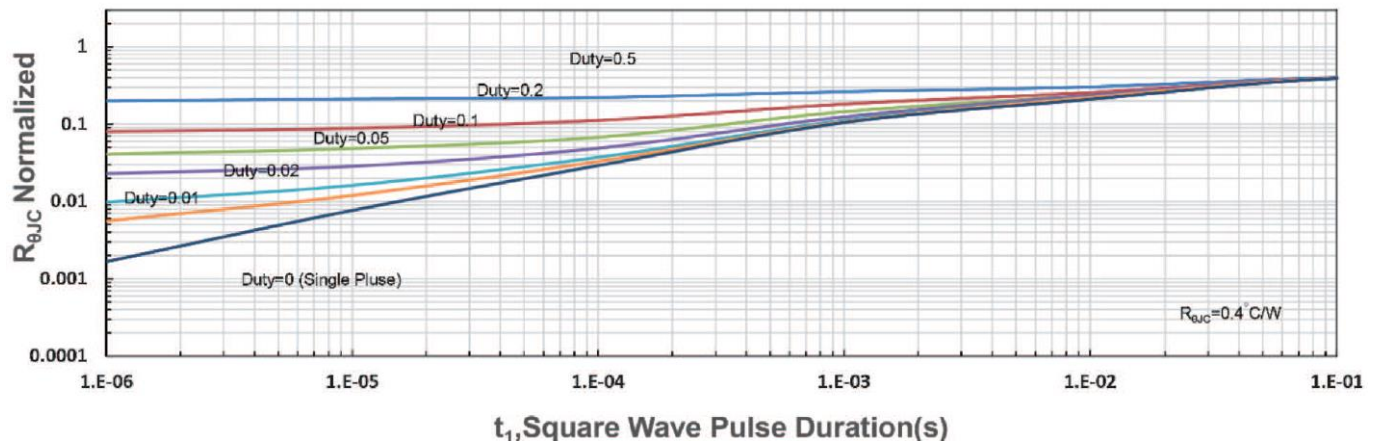
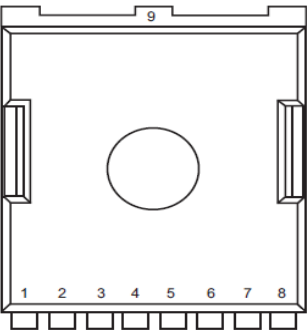
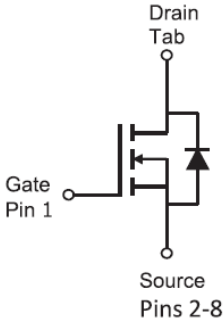
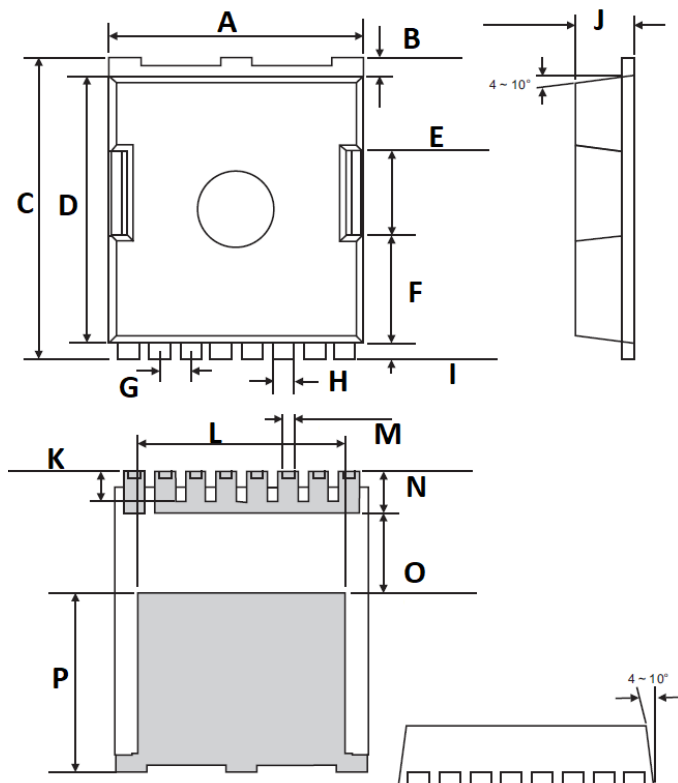


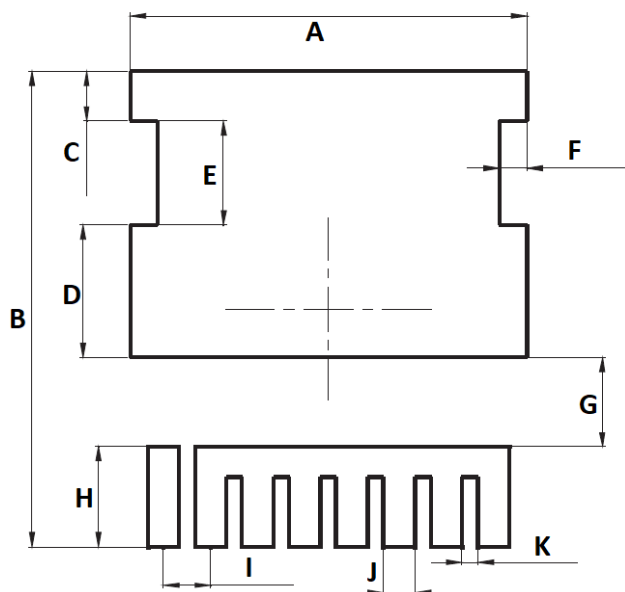
Fig.13 $R_{\theta JC}$ TRANSIENT THERMAL IMPEDANCE

PINNING INFORMATION

PIN	SIMPLIFIED OUTLINE	SYMBOL
Pin 1 Gate Drain Pin 9 Drain Pin 2, 3, 4, 5, 6, 7, 8 Source		

PACKAGE INFORMATION
TOLL-8L (MO-299A)


OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.70	10.10	0.382	0.398
B	0.60	0.80	0.024	0.032
C	11.48	11.88	0.452	0.468
D	10.28	10.58	0.405	0.417
E	3.10	3.50	0.122	0.138
F	3.98	4.38	0.157	0.172
G	1.20 BSC.		0.047 BSC.	
H	0.90 Typ.		0.035 Typ.	
I	0.50	0.70	0.024	0.028
J	2.20	2.40	0.087	0.095
K	1.00	1.30	0.039	0.051
L	7.90	8.30	0.311	0.327
M	0.42	0.50	0.017	0.020
N	1.40	1.80	0.055	0.071
O	3.00	3.30	0.118	0.130
P	6.75	7.15	0.266	0.281

SUGGESTED SOLDER PAD LAYOUT


OUTLINE DIMENSIONS	
SYMBOL	MILLIMETERS
A	10.100
B	13.300
C	1.400
D	3.700
E	2.900
F	0.700
G	2.500
H	2.800
I	1.200
J	0.800
K	0.400

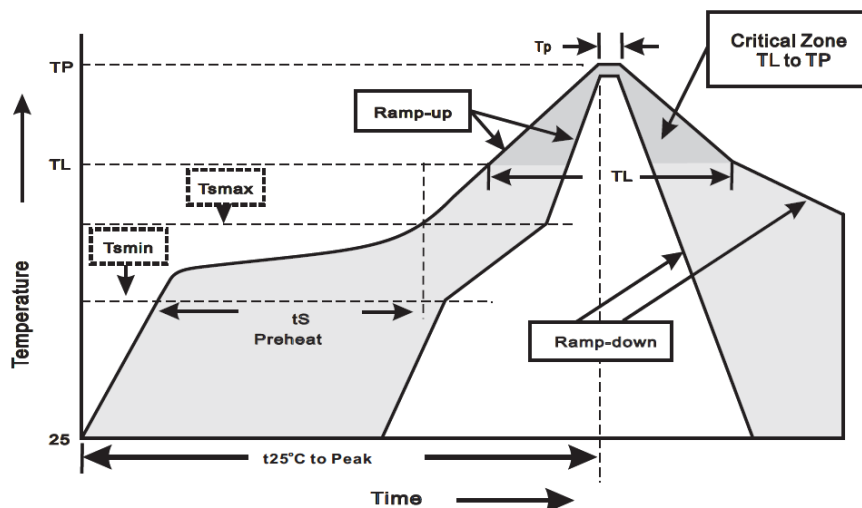
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only.

SOLDERING PARAMETERS

SUGGESTED THERMAL PROFILES FOR SOLDERING PROCESSES

1. Storage environment: Temperature=5 °C~40 °C Humidity=55% ±25%
2. Reflow soldering of surface-mount devices



3. Reflow soldering

PROFILE FEATURE	SOLDERING CONDITION
Average ramp-up rate (T_L to T_P)	<3 °C/sec
Preheat	
- Temperature Min (T_{smin})	150 °C
- Temperature Max (T_{smax})	200 °C
- Time (min to max) (t_s)	60 ~ 120 sec
T_{smax} to T_L	
- Ramp-upRate	<3 °C/sec
Time maintained above:	
- Temperature (T_L)	217 °C
- Time(t_L)	60 ~ 260 sec
Peak Temperature (T_P)	255 °C-0/+5 °C
Time within 5 °C of actual Peak Temperature(t_P)	10 ~ 30 sec
Ramp-down Rate	<6 °C/sec
Time 25 °C to Peak Temperature	<6 minutes



beyond boundaries...

ALP395N10
TOLL-8L (MO-299A)

CUSTOMER NOTE:

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2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).



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