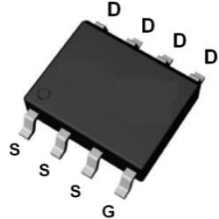
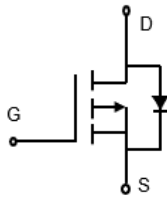



Lonten P-channel -30V, -6.5A, 46mΩ Power MOSFET

<p>Description These P-Channel enhancement mode power field effect transistors are using 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.</p> <p>Features</p> <ul style="list-style-type: none"> ◆ -30V,-6.5A,$R_{DS(ON).max}=46m\Omega@V_{GS}=-10V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ Green device available <p>Applications</p> <ul style="list-style-type: none"> ◆ PWM applications ◆ Load switch ◆ Portable Equipment 	<p>Product Summary</p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;">V_{DSS}</td> <td style="padding: 2px;">-30V</td> </tr> <tr> <td style="padding: 2px;">$R_{DS(on).max}@ V_{GS}=-10V$</td> <td style="padding: 2px;">46mΩ</td> </tr> <tr> <td style="padding: 2px;">I_D</td> <td style="padding: 2px;">-6.5A</td> </tr> </table> <p>Pin Configuration</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">SOP-8</p> <p style="text-align: center;">P-Channel MOSFET</p> <div style="text-align: right;">  </div>	V_{DSS}	-30V	$R_{DS(on).max}@ V_{GS}=-10V$	46mΩ	I_D	-6.5A
V_{DSS}	-30V						
$R_{DS(on).max}@ V_{GS}=-10V$	46mΩ						
I_D	-6.5A						

Absolute Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-30	V
Continuous drain current ($T_A = 25^\circ C$)	I_D	-6.5	A
Continuous drain current ($T_A = 100^\circ C$)		-4.1	A
Pulsed drain current ¹⁾	I_{DM}	-26	A
Gate-Source voltage	V_{GSS}	± 20	V
Power Dissipation ($T_A = 25^\circ C$)	P_D	2.9	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	43	$^\circ C/W$

Package Marking and Ordering Information

Device	Device Package	Marking
LPL4459	SOP-8	LPL4459

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}	$V_{GS}=0\text{ V}, I_D=-250\mu\text{A}$	-30	---	---	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.2	-1.7	-2.2	V
Drain-source leakage current	I_{DSS}	$V_{DS}=-30\text{ V}, V_{GS}=0\text{ V}, T_J = 25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-24\text{ V}, V_{GS}=0\text{ V}, T_J = 125^\circ\text{C}$	---	---	-10	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-10\text{ V}, I_D=-6.5\text{ A}$	---	33	46	m Ω
		$V_{GS}=-4.5\text{ V}, I_D=-5\text{ A}$	---	43	72	m Ω
Forward transconductance	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -6.5\text{ A}$	---	17	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{ MHz}$	---	940	---	pF
Output capacitance	C_{oss}		---	103	---	
Reverse transfer capacitance	C_{rss}		---	88	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-15\text{ V}, V_{GS}=-10\text{ V}, I_D=-6.5\text{ A},$ $R_g=3\Omega$	---	3.9	---	ns
Rise time	t_r		---	33.2	---	
Turn-off delay time	$t_{d(off)}$		---	39.3	---	
Fall time	t_f		---	9.2	---	
Gate resistance	R_g	$V_{GS}=0\text{ V}, V_{DS}=0\text{ V}, f=1\text{ MHz}$	---	11	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DS}=-15\text{ V}, I_D=-6.5\text{ A},$ $V_{GS}=-10\text{ V}$	---	2.44	---	nC
Gate to drain charge	Q_{gd}		---	2.92	---	
Gate charge total	Q_g		---	14.6	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	-6.5	A
Pulsed Source Current ²⁾	I_{SM}		---	---	-26	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{ V}, I_S=-1\text{ A}, T_J=25^\circ\text{C}$	---	---	-1.2	V

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

 2: Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

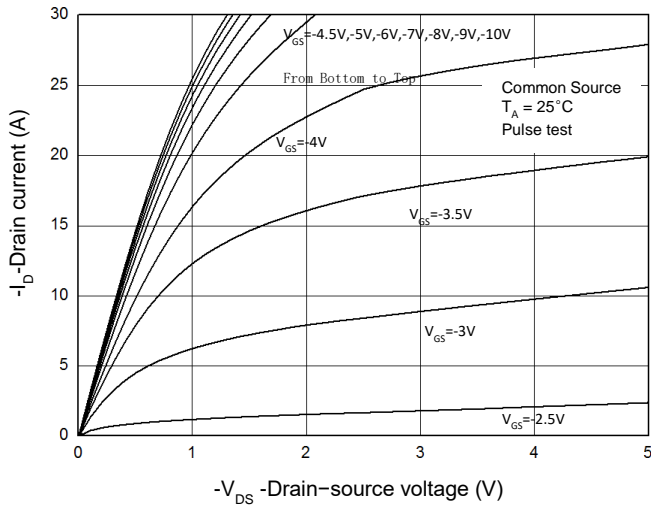


Figure 2. Transfer Characteristics

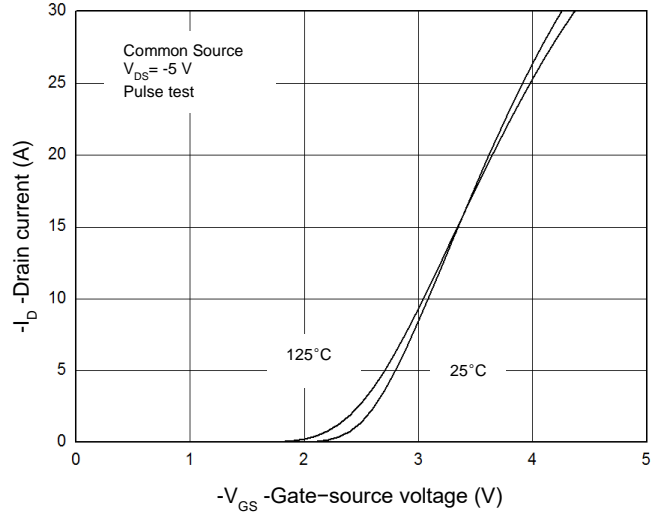


Figure 3. Capacitance Characteristics

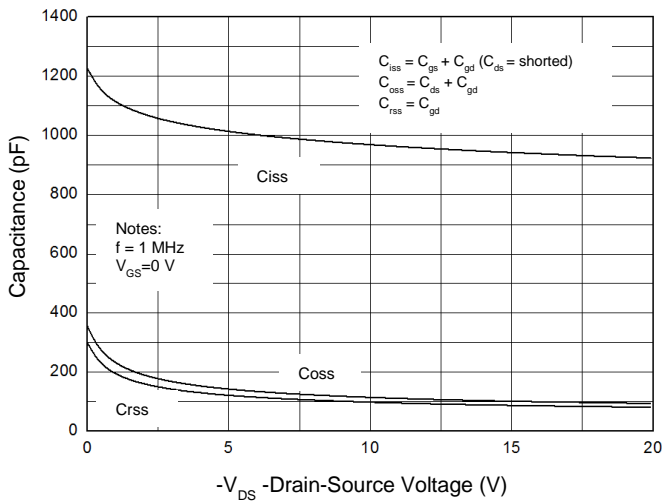


Figure 4. Gate Charge Waveform

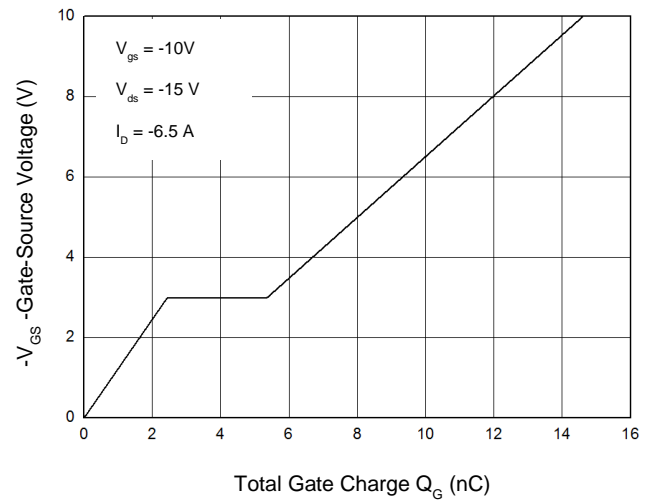


Figure 5. Body-Diode Characteristics

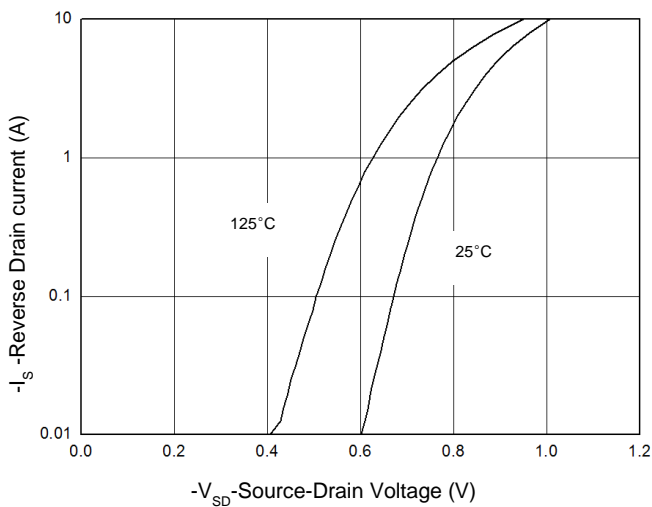


Figure 6. Rds(on)-Drain Current

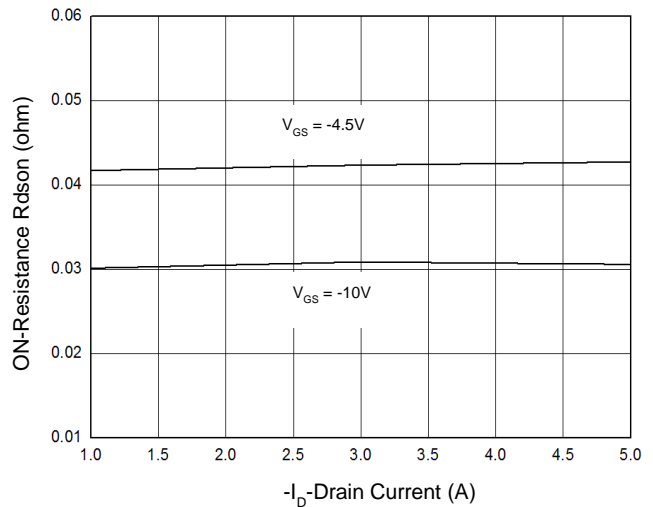


Figure 7. R_{ds(on)}-Junction Temperature(°C)

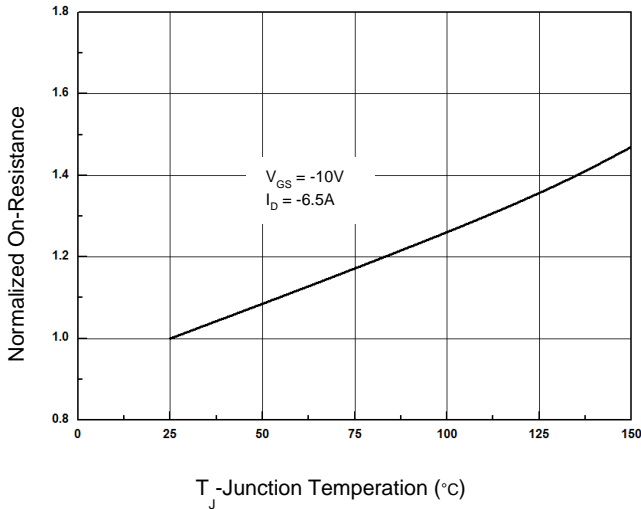


Figure 8. R_{ds(on)} vs Gate Voltage

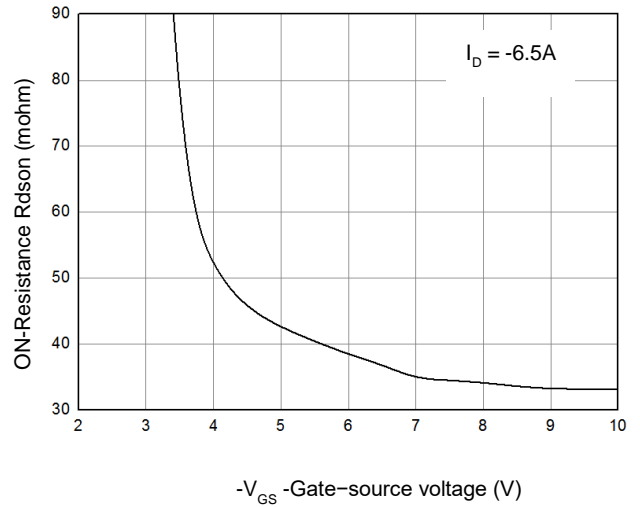


Figure 9. BV_{dss} vs. Junction temperature(°C)

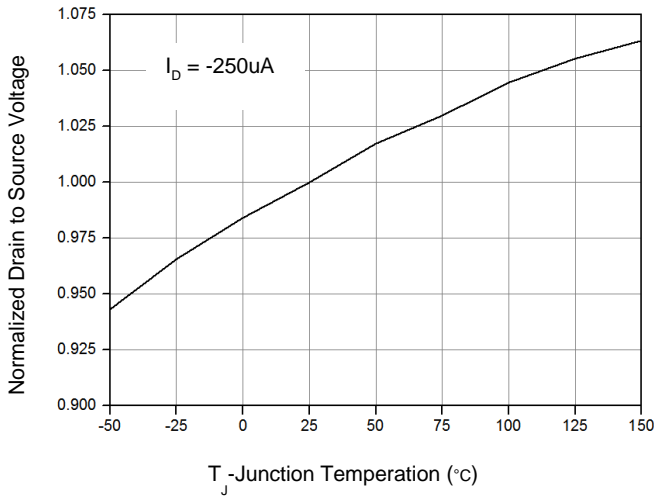


Figure 10. Maximum Safe Operating Area

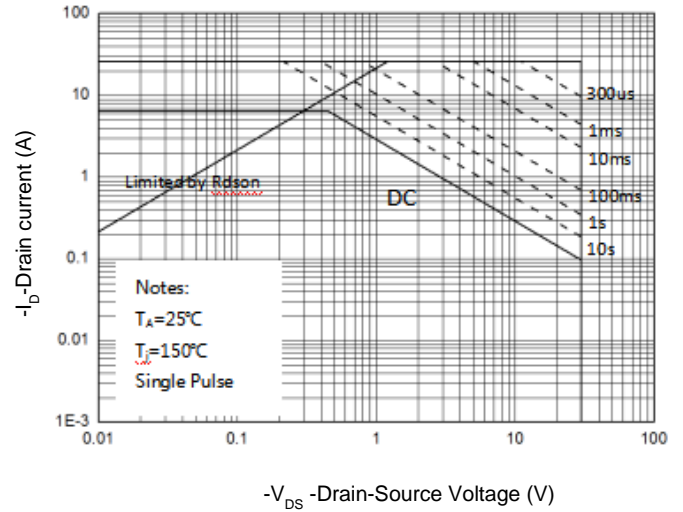
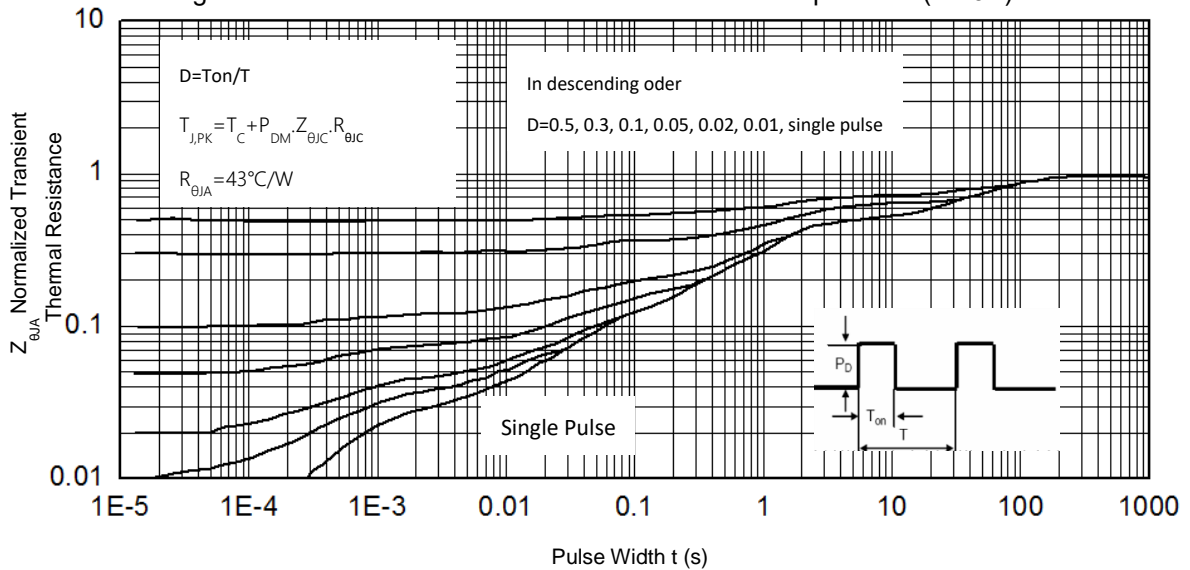


Figure 11. Normalized Maximum Transient Thermal Impedance (R_{thJA})



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

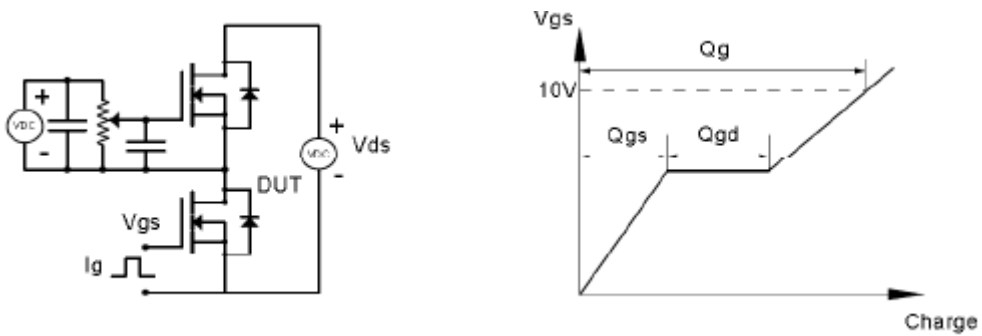


Figure 9. Resistive Switching Test Circuit & Waveforms

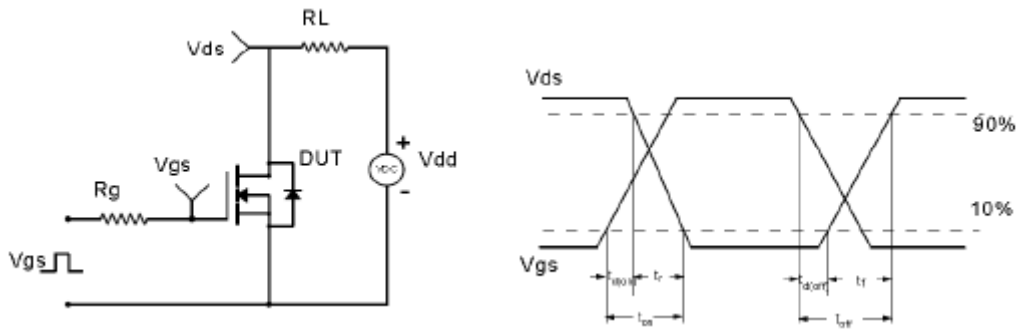


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

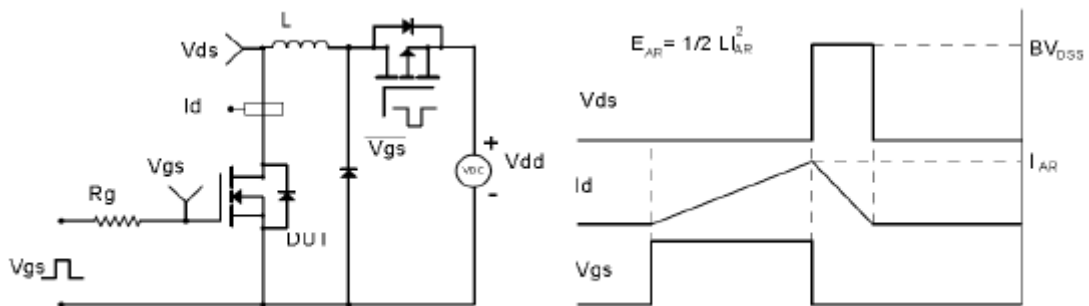
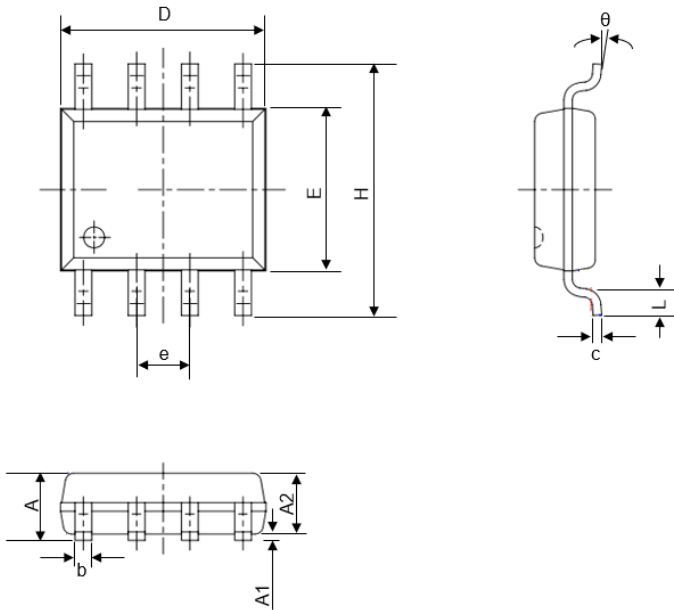


Figure 11. Diode Recovery Circuit & Waveform

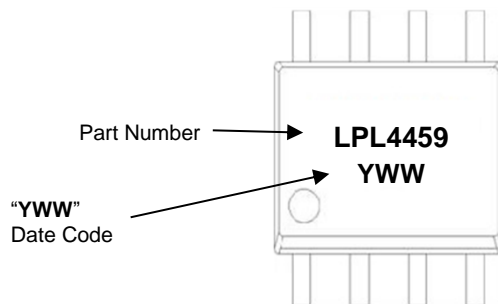


Mechanical Dimensions for SOP-8



COMMON DIMENSIONS				
SYMBOL	MILLIMETERS		INCHS	
	MIN	MAX	MIN	MAX
A	1.45	1.75	0.057	0.069
A1	0.05	0.25	0.002	0.010
A2	1.35	1.55	0.053	0.061
b	0.35	0.45	0.014	0.018
c	0.19	0.27	0.007	0.011
D	4.80	5.00	0.189	0.197
E	3.78	3.98	0.149	0.157
e	1.27 TYP.		0.050 TYP.	
H	5.80	6.20	0.228	0.244
L	0.40	1.00	0.016	0.039
θ	0°	8°	0°	8°

SOP-8 Part Marking Information



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