MOSFET

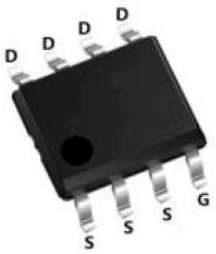
-15A,-30V, 13mΩ, P-CHANNEL MOSFET

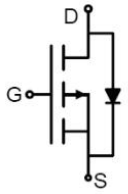
Description and Applications

- Trench Power MOSFET technology
- RoHS and Halogen Free Complaint
- Excellent $R_{DS(ON)}$
- Load switch orother general applications

View and Internal Schematic Diagram

SOP-8L





Parameter	Values	Unit
BV_{DSS}	-30	V
I_D	-15	A
R_{Dson}(max)	13	mΩ
$V_{GS(th)}$(Typ)	-1.5	V

Ordering Code	Marking	Package	Packaging
X21357IA	X21357IA	SOP-8L	Tape & Reel

Absolute Maximum Ratings(T_A=25℃,unless otherwise noted)

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Voltage	V_{DSS}	-	-	-30	V	V_{GS}=0V
Gate-Source Voltage	V_{GS}	-20	-	20	V	V_{DS}=0V
Continuous Drain Current(Note 1)	I_D	-	-	-15	A	T_A=25℃
		-	-	-10	A	T_A=70℃
Pulsed Drain Current(Note 2)	I_{DM}	-	-	-44	A	-
Maximum Power Dissipation	P_D	-	-	3.1	W	T_A=25℃
		-	-	2	W	T_A=70℃
Operating Junction and Storage Temperature Range	T_j,T_{STG}	-55	-	150	℃	-

Thermal Characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Junction to Case	$R_{th(J-c)}$		16	24	℃/W	-
Thermal resistance , Junction to Ambient	$R_{th(J-a)}$	-	59	75	℃/W	-

Electrical Characteristics (T_j=25℃,unless otherwise noted)

Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	V_{GS}=0V,I_D=-250μA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	-1	μA	V_{DS}=-30V,V_{GS}=0V
Gate-Body Leakage Current,Forward	I_{GSSF}	-	-	100	nA	V_{GS}=20V,V_{DS}=0V
Gate-Body Leakage Current,Reverse	I_{GSSR}	-	-	-100	nA	V_{GS}=-20V,V_{DS}=0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	-1	-	-2	V	V_{DS}=V_{GS},I_D=-250μA
Drain-Source On-State Resistance	$R_{DS(on)}$	-	8	13	mΩ	V_{GS}=-10V,I_D=-12A
		-	11.8	18.5	mΩ	V_{GS}=-4.5V,I_D=-7A
Gate resistance	Rg	-	2.4	-	Ω	V_{GS}=0V, V_{DS}=0V,f=1MHz
Forward Transconductance	g_{fs}	-	38.7	-	S	V_{DS}=-5V,I_D=-10.5A

Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	C_{iss}	-	1781	-	pF	V_{DS}=-15V,V_{GS}=0V,f=1.0MHZ
Output Capacitance	C_{oss}	-	237	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	201	-	pF	
Turn-On Delay Time	$t_{d(on)}$	-	8	-	ns	V_{DD}=-15V,R_G=3Ω, V_{GS}=-10V,R_L=1Ω,
Turn-On Rise Time	t_r	-	27	-	ns	
Turn-Off Delay Time	$t_{d(off)}$	-	68	-	ns	
Turn-Off Fall Time	t_f	-	39	-	ns	

Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	Q_g	-	46	-	nC	V_{DS}=-15V,I_D=-15A,V_{GS}=-10V
Gate-Source Charge	Q_{gs}	-	1	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.4	-	nC	

Reverse diode

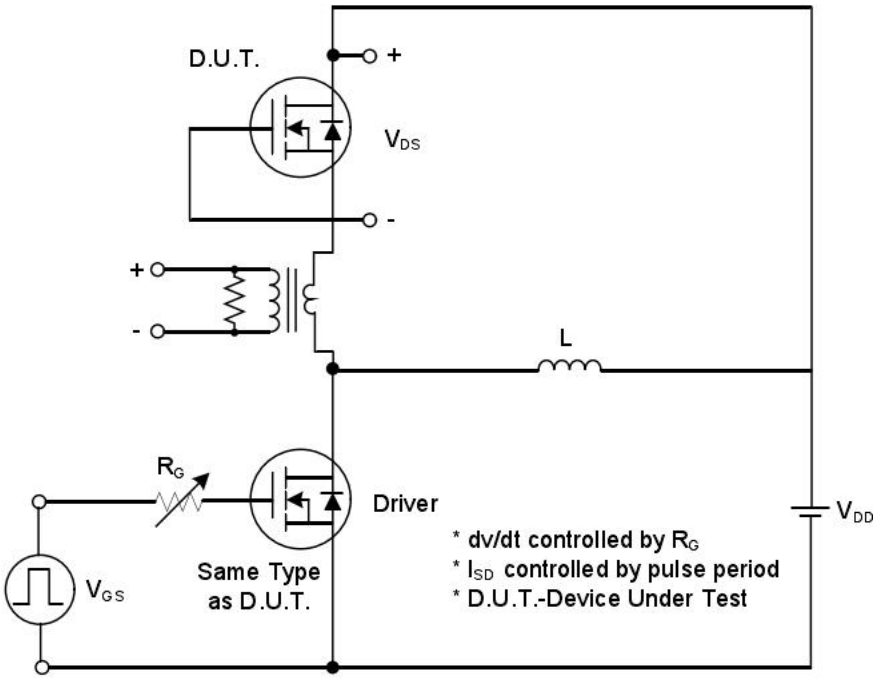
Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	I_S	-	-	-15	A	-
Diode Forward Voltage	V_{SD}	-	-	-1	V	I_S=-4.1A,V_{GS}=0V
Body Diode Reverse Recovery Time	t_{rr}	-	13.5	-	ns	V_{GS}=0VI_S=-4.0A, dI/dt=-100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	3.7	-	nC	

Notes

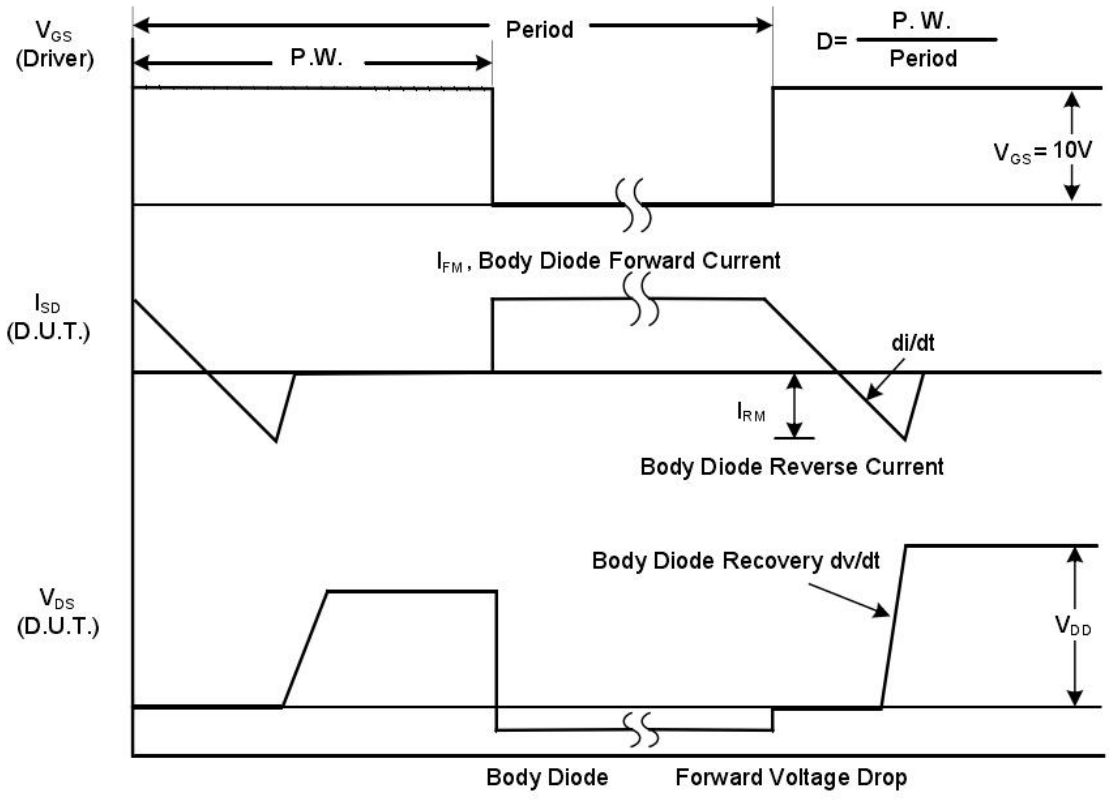
1. Computed continuous current assumes the condition of T_{j_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.

2.This single-pulse measurement was taken under T_{j_Max} = 150°C.

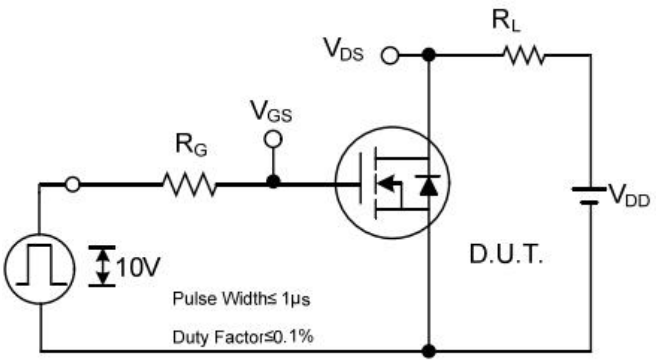
RATING AND CHARACTERISTIC CURVES



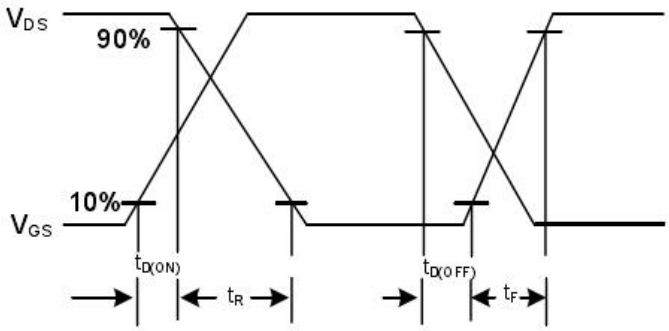
Peak Diode Recovery dv/dt Test Circuit



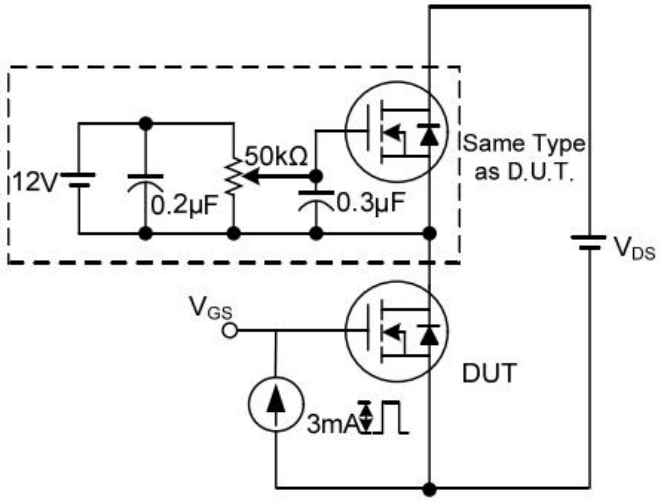
Peak Diode Recovery dv/dt Waveforms



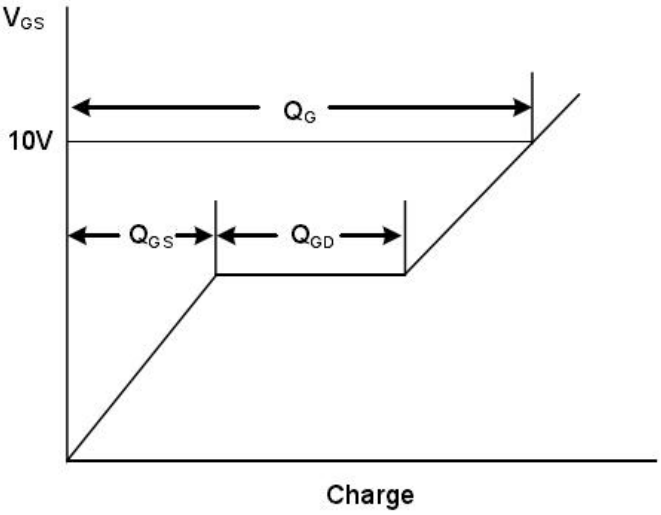
Switching Test Circuit



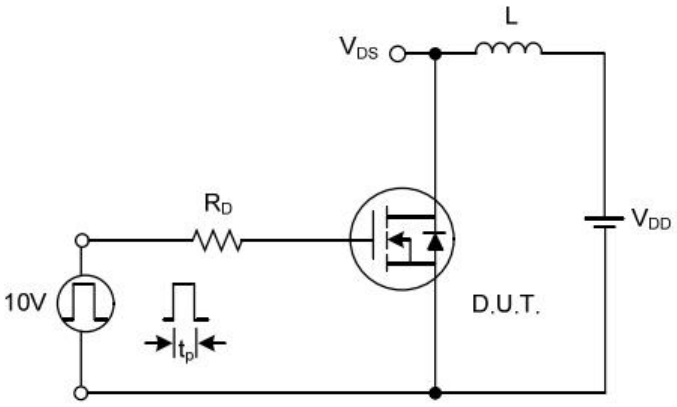
Switching Waveforms



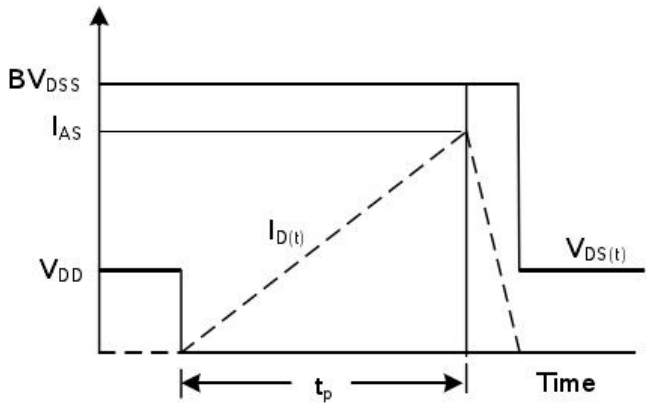
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

RATING AND CHARACTERISTIC CURVES

Figure.1 On-Region Characteristics

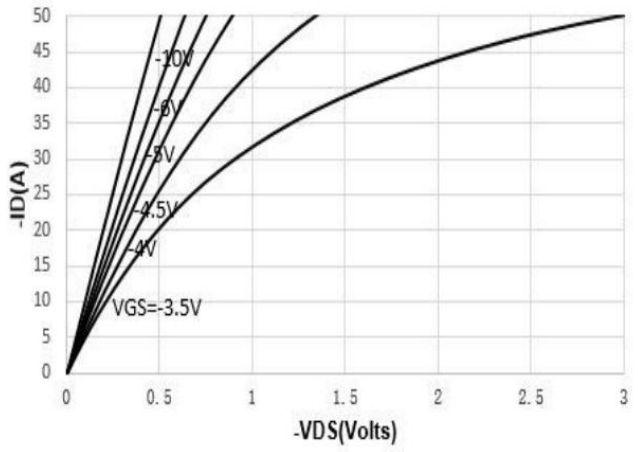


Figure.2 Transfer Characteristics

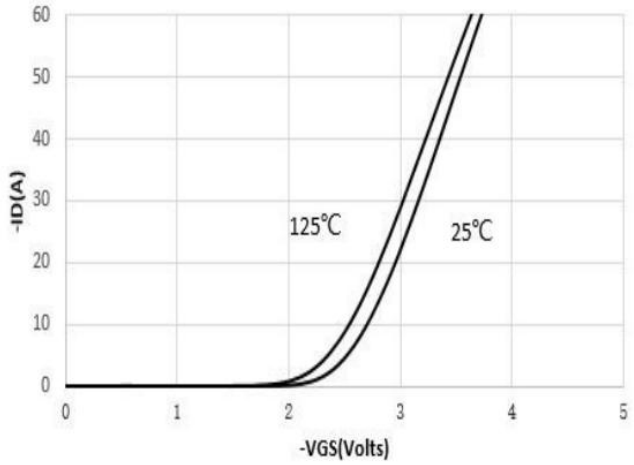


Figure.3 On-Resistance vs. Drain Current and Gate Voltage

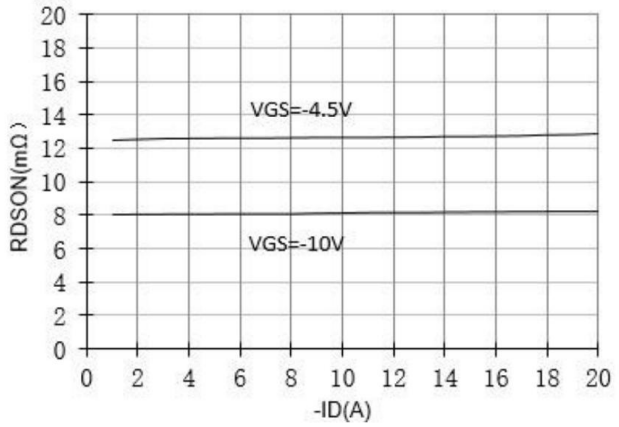


Figure.4 On-Resistance vs. Junction Temperature

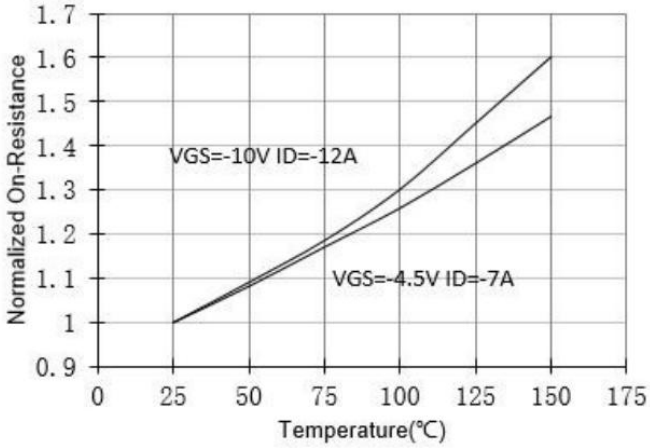


Figure.5 On-Resistance vs. Gate-Source Voltage

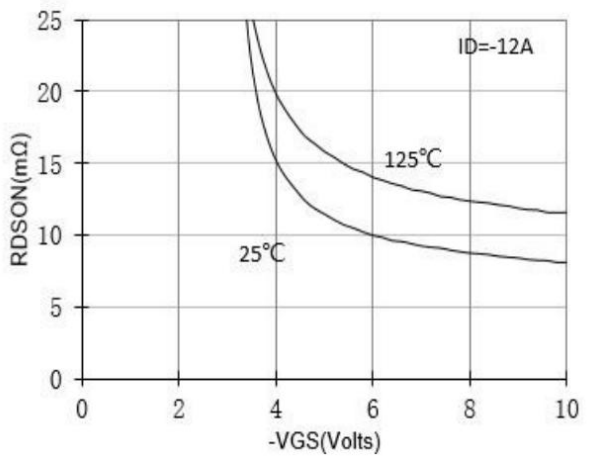


Figure.6 Body-Diode Characteristics

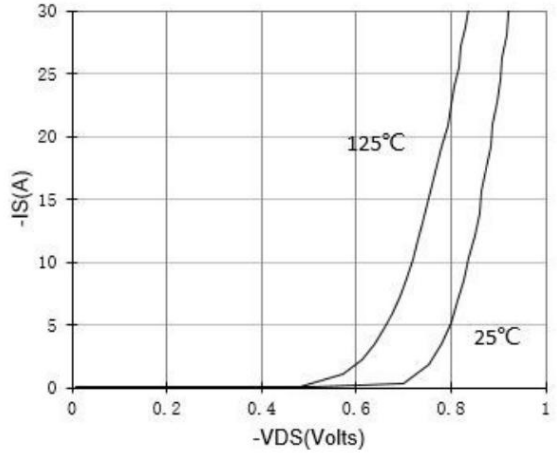


Figure.7 Gate-Charge Characteristics

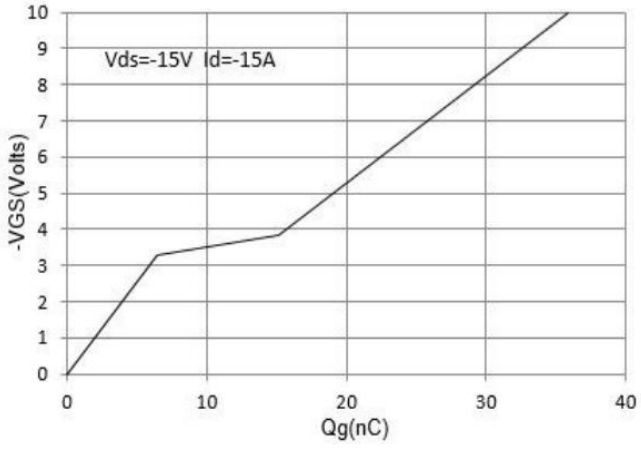


Figure.8 Capacitance Characteristics

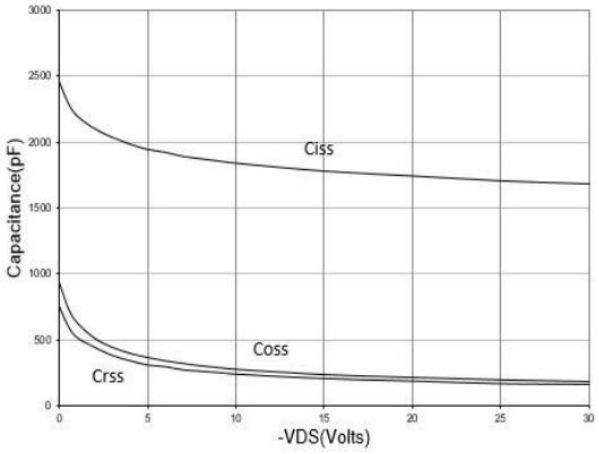


Figure.9 Maximum Forward Biased Safe Operating Area

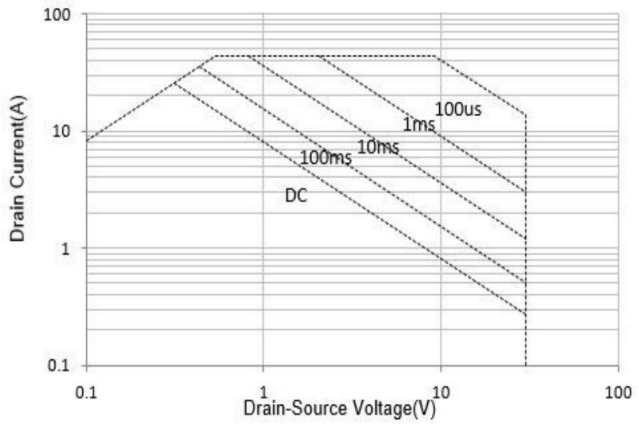


Figure.10 Single Pulse Power Rating Junction-to-Ambient

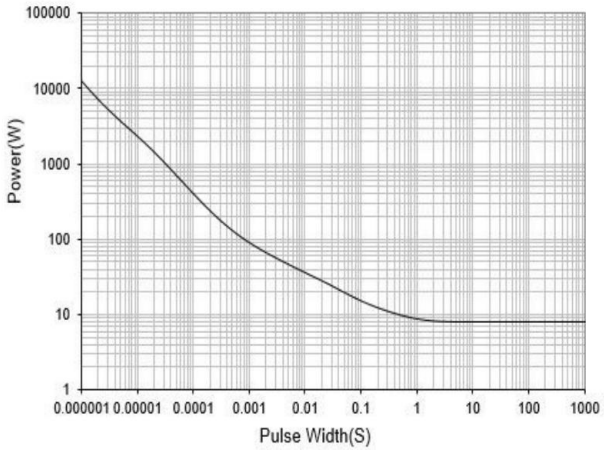
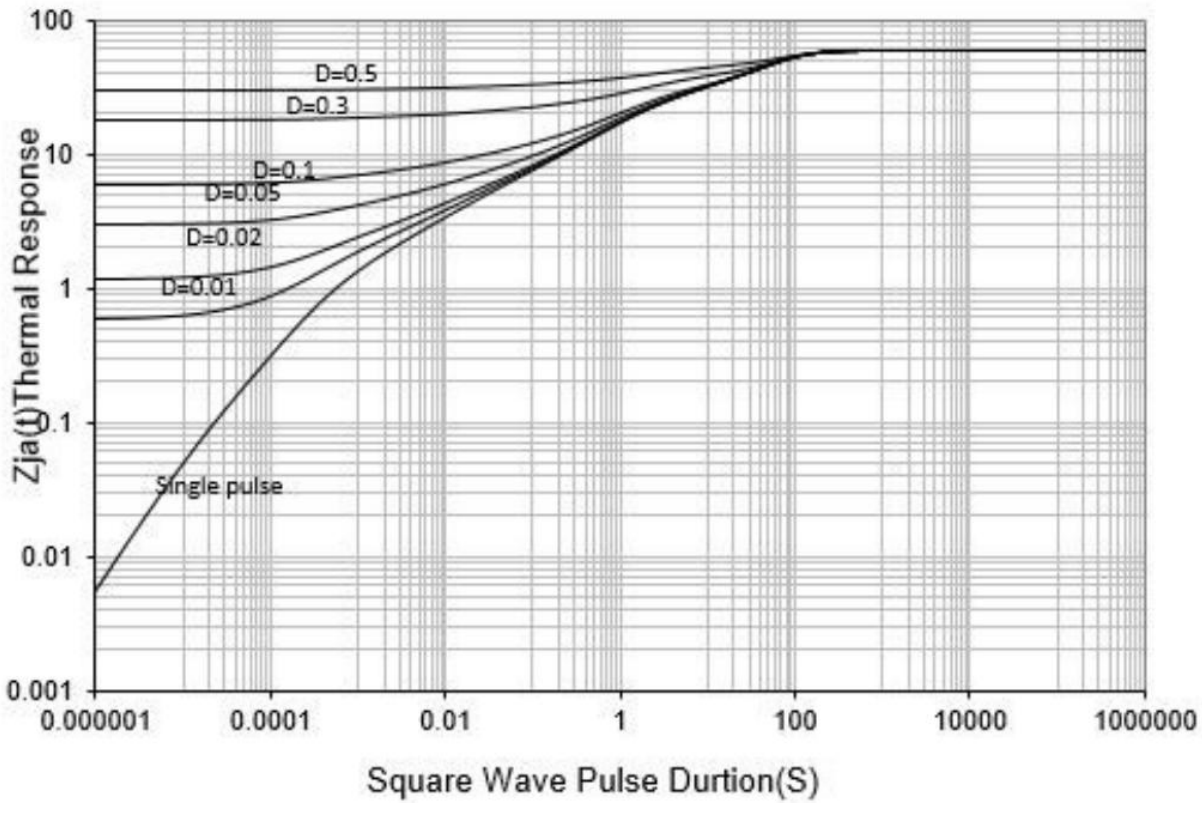
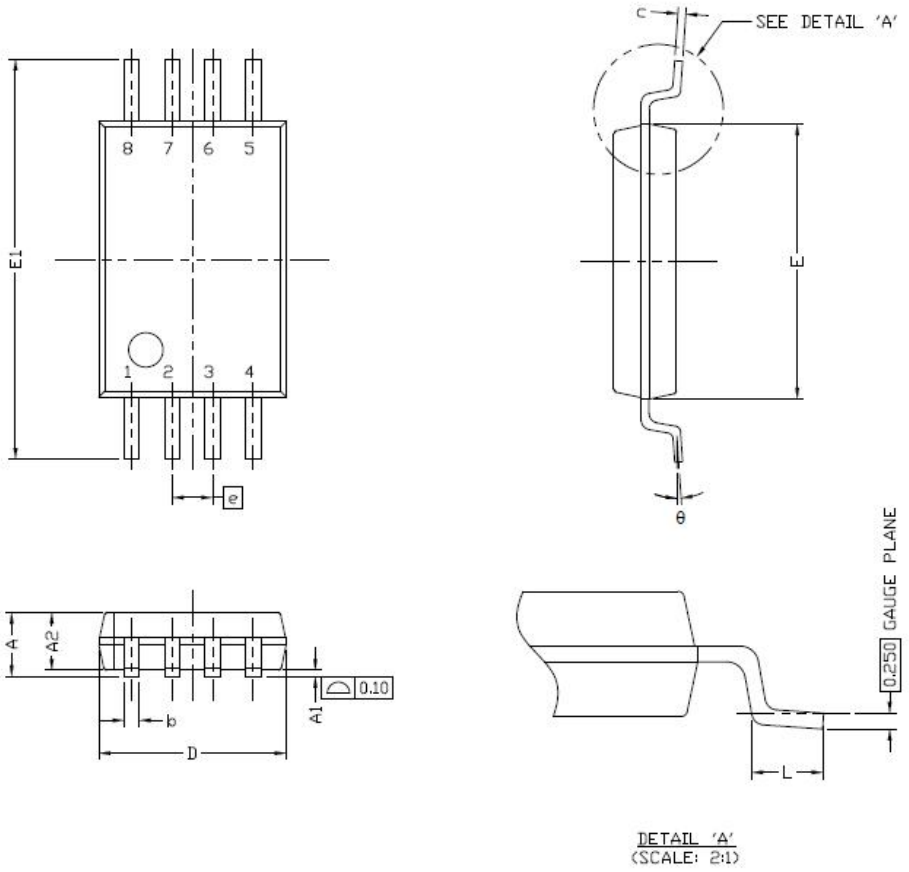


Figure 11: Maximum Transient Thermal Impedance



Package Outline: SOP-8L



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.92	-	1.12	0.035	-	0.049
A1	0.05	-	0.15	0.002	-	0.006
A2	0.87	0.92	0.97	0.034	0.036	0.038
b	0.20	0.25	0.30	0.008	0.010	0.012
c	0.08	-	0.20	0.003	-	0.008
D	2.90	3.00	3.10	0.114	0.118	0.122
E	4.30	4.40	4.50	0.169	0.173	0.177
e	0.65BSC			0.026BSC		
E1	6.20	6.40	6.60	0.244	0.252	0.260
L	0.45	-	0.75	0.018	-	0.030
θ	0°	-	8°	0°	-	8°

NOTE:

1. CONTROLLING DIMENSION IS MM
2. END FLASH PER SIDE: 0.15 MAX.
3. DIMENSIONS ARE INCLUSIVE OF PLATING