ER4614

N-Ch and P-Ch Fast Switching MOSFET

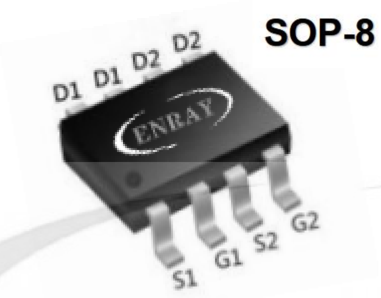
Features

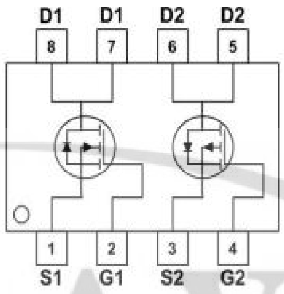
The E R 4614 is the high performance complementary N-ch and P-ch MOSFETs with high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The DS4614 meet thee RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Product Summary

BVDSS	RDSON	ID
40V	17mΩ	8.5A
-40V	39mΩ	-7.5A

SOP-8





Maximum Ratings(Ta=25℃ unless otherwise noted)

Parameter	Symbol	Rating		Unit
		N-Ch	P-Ch	
Drain-Source Voltage	V_{DS}	40	-40	V
Gate-Source Voltage	V_{GS}	±20	±20	
Continuous Drain Current	ID@TA=25℃	8.5	-7.5	A
Continuous Drain Current	ID@TA=100℃	5.2	-3.9	
Pulsed Drain Current [2]	I_{DM}	32	-24	
Single Pulse Avalanche Energy[3]	EAS	13	17.6	mJ
Total Power Dissipation	PD@TC=25℃	2	3.2	W
StorageTemperature Range	TSTG	-55 to 150		℃
Operating Junction Temperature	TJ	-55 to 150		

Thermal Data

Parameter	Symbol	Max.	Max.	Unit
Thermal Resistance Junction-Ambient [1]	RθJA	62.5	39	℃/W

N-Channel Electrical Characteristics(TJ=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters ③						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS = 0V, ID = 250μA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=40V , VGS=0V			1	μA
Gate-Body leakage Current	I_{GSS}	VGS=±20 V , VDS=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID=250uA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	RDS(on)	VGS=10V , ID=8A		17	22	mΩ
		VGS=4.5V , ID=5A		25	35	mΩ
Dynamic Parameters ④						
Input Capacitance	C_{iss}	VDS=20V, VGS=0V, f=1.0MHz		633		pF
Output Capacitance	C_{oss}			76		pF
Reverse Transfer Capacitance	C_{rss}			58		pF
Total Gate Charge	Q_g	VDS=20V, ID=8A, VGS=10V		12		nC
Gate Source Charge	Q_{gs}			3.2		nC
Gate Drain Charge	Q_{gd}			3.1		nC
Switching Parameters ④						
Turn-On DelayTime	td(on)	VDD= 20V, RL =2.5Ω VGS=10V,RREN =3Ω		4		ns
Turn-On Rise Time	tr			3		ns
Turn-Off DelayTime	td(off)			15		ns
Turn-Off Fall Time	tf			2		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current	Is				8.5	A
Maximum Pulsed Drain to Source Diode Forwa Current	I_{SM}				32	A
Drain to Source Diode Forward Voltage^2	VSD	VGS=0V, IS= 8A			1.2	V

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

P-Channel Electrical Characteristics(TJ=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters ③						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS = 0V, ID = -250μA	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=-40V , VGS=0V			-1	μA
Gate-Body leakage Current	I_{GSS}	VGS=±20 V , VDS=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VDS=VGS, ID= -250μA	-1.0	-1.6	-2.5	V
Static Drain-Source On-Resistance	RDS(on)	VGS=10V , ID=-6A		39	53	mΩ
		VGS=4.5V , ID=-4A		58	81	mΩ
Dynamic Parameters ④						
Input Capacitance	C_{iss}	VDS= -20V, VGS=0V, f=1.0MHz		860		pF
Output Capacitance	C_{oss}			87		pF
Reverse Transfer Capacitance	C_{rss}			70		pF
Total Gate Charge	Q_g	VDS= -20V, ID= -6A, VGS= -10V		13		nC
Gate Source Charge	Q_{gs}			3.8		nC
Gate Drain Charge	Q_{gd}			3.1		nC
Switching Parameters ④						
Turn-On DelayTime	$t_{d(on)}$	VDD= -20V, RL =2.3Ω VGS=-10V,RREN =6Ω		7.5		ns
Turn-On Rise Time	tr			5.5		ns
Turn-Off DelayTime	td(off)			19		ns
Turn-Off Fall Time	tf			7		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current	IS				-7.5	A
Maximum Pulsed Drain to Source Diode Forwa Current	I_{SM}				-24	A
Drain to Source Diode Forward Voltage^2	VSD	VGS=0V , IS=-1A , TJ=25℃			-1.2	V

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

Figure1: Output Characteristics

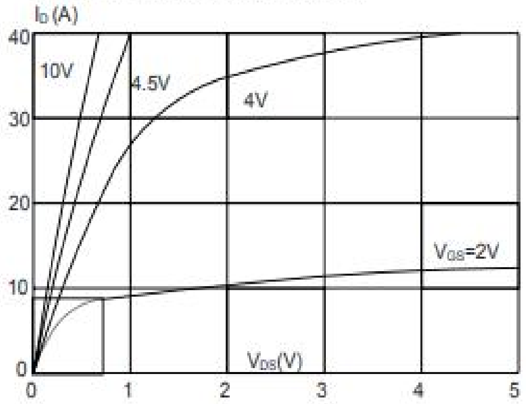


Figure 2: Typical Transfer Characteristics

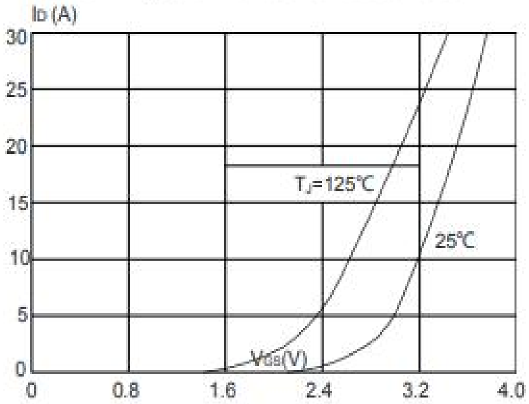


Figure 3: On-resistance vs. Drain Current

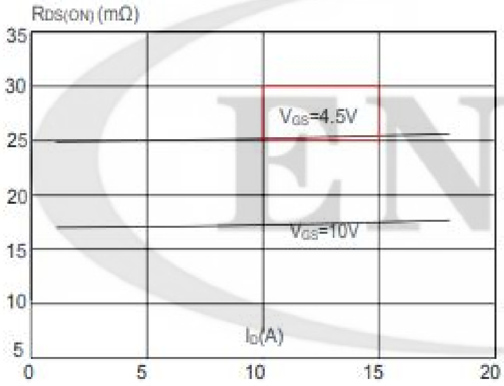


Figure 4: Body Diode Characteristics

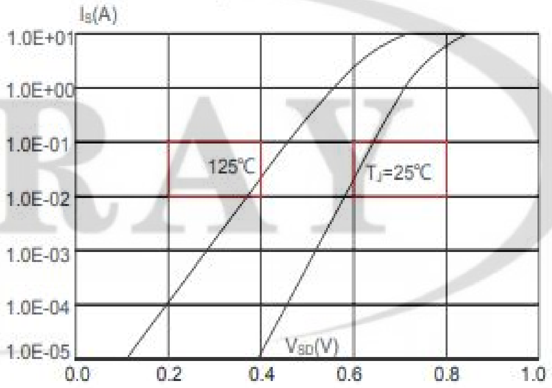


Figure 5: Gate Charge Characteristics

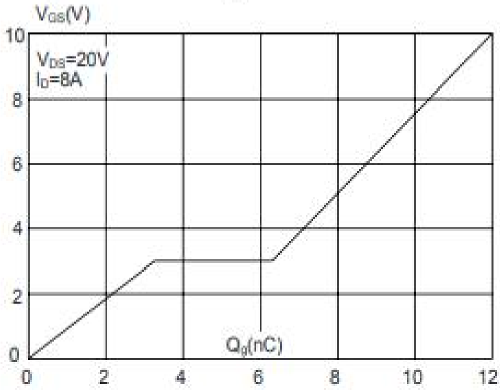
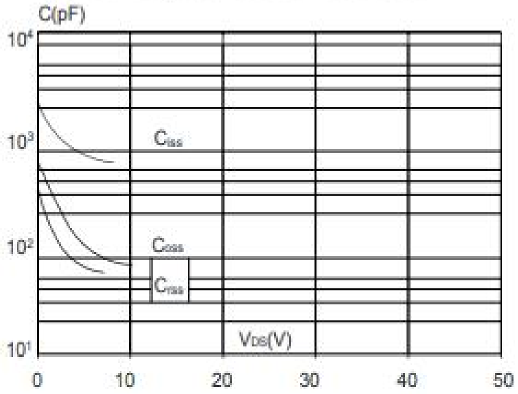


Figure 6: Capacitance Characteristics



N-Channel Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

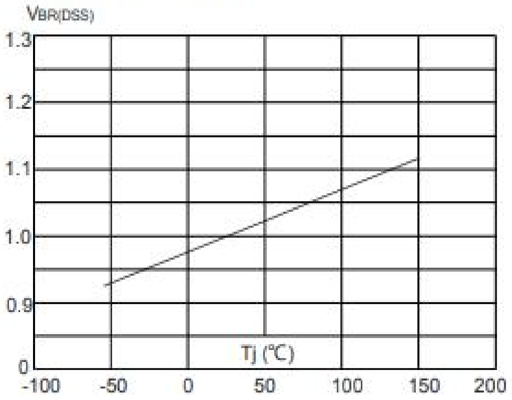


Figure 8: Normalized on Resistance vs. Junction Temperature

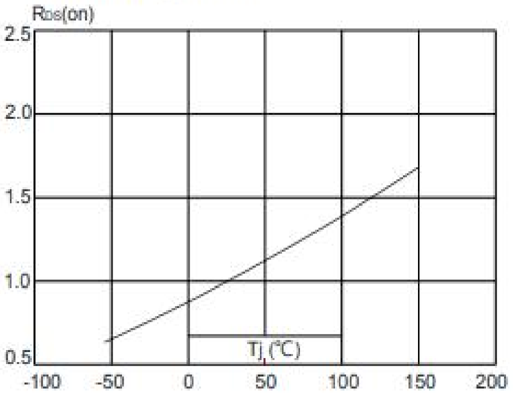


Figure 9: Maximum Safe Operating Area

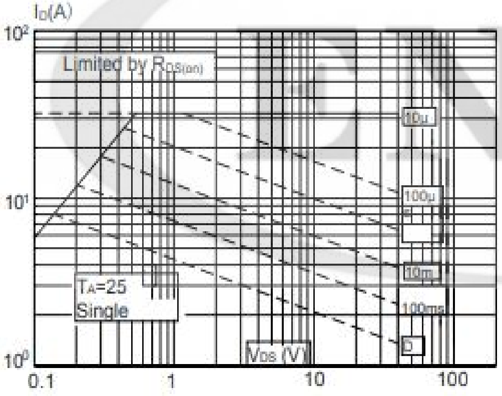


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

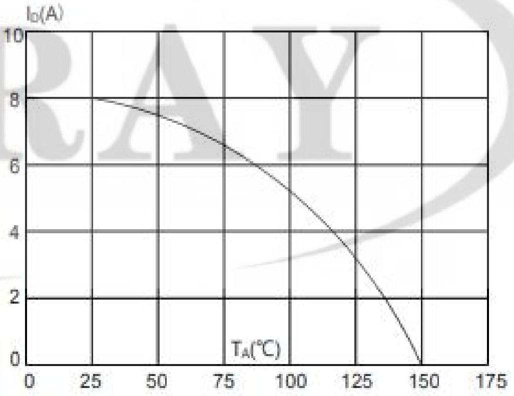
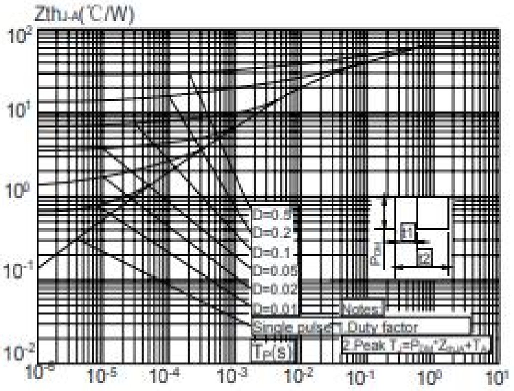


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



P-Channel Typical Characteristics

Figure1: Output Characteristics

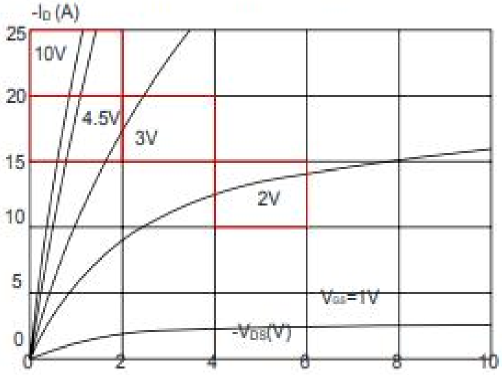


Figure 2: Typical Transfer Characteristics

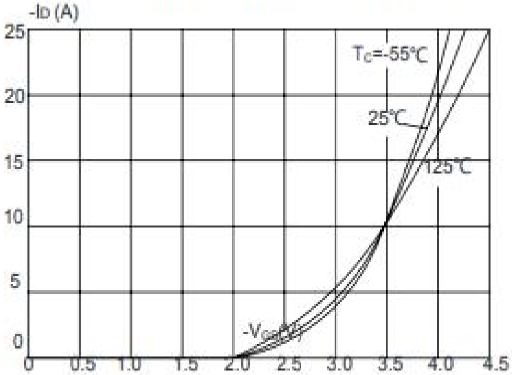


Figure 3: On-resistance vs. Drain Current

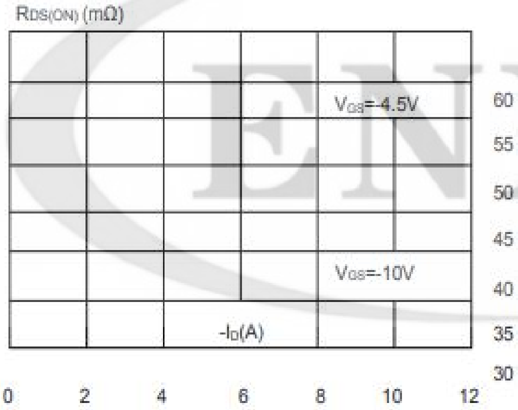


Figure 4: Body Diode Characteristics

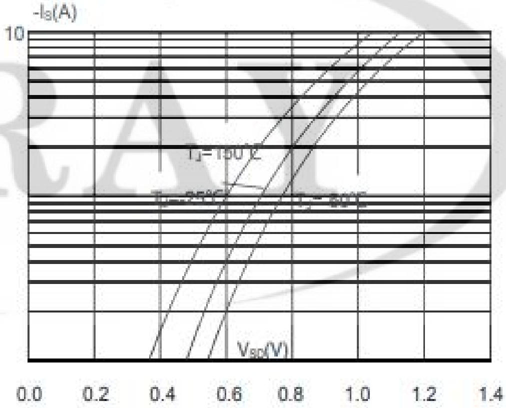


Figure 5: Gate Charge Characteristics

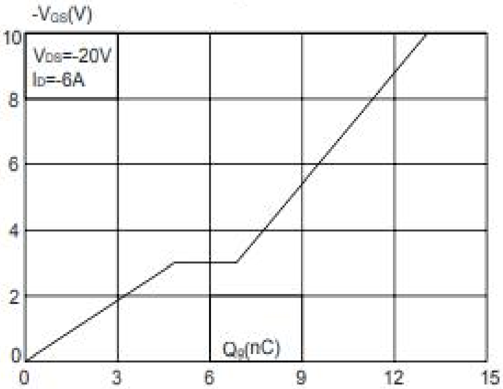
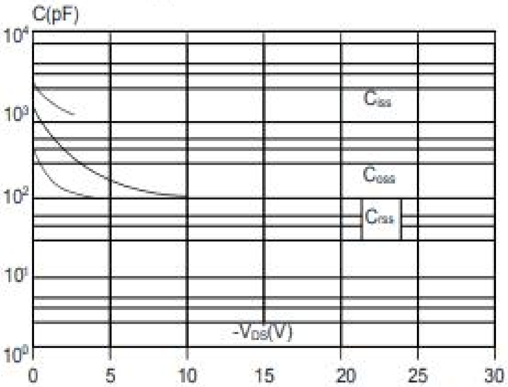


Figure 6: Capacitance Characteristics



P-Channel Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

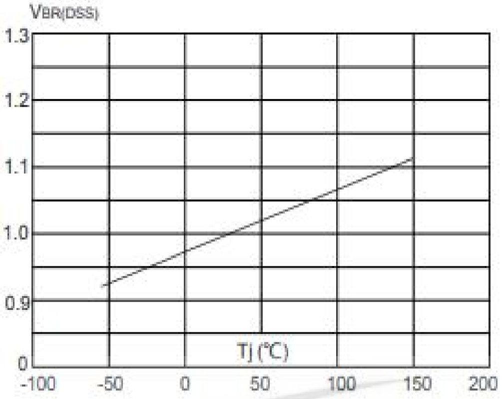


Figure 8: Normalized on Resistance vs. Junction Temperature

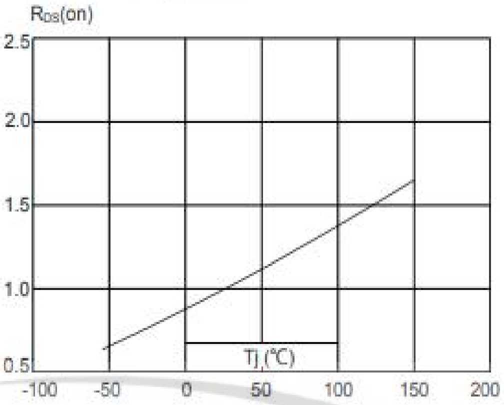


Figure 9: Maximum Safe Operating Area

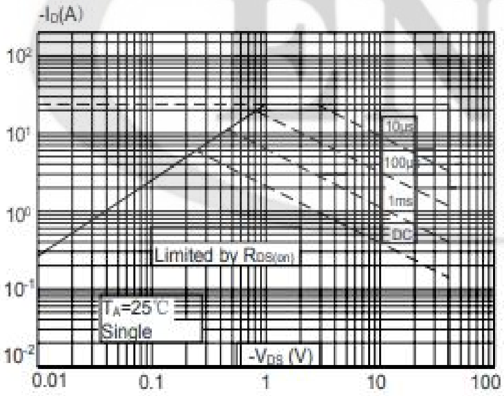
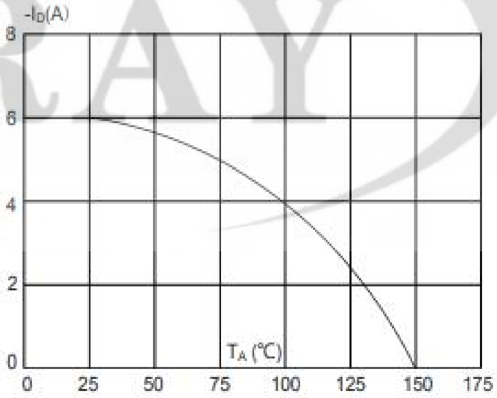


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature



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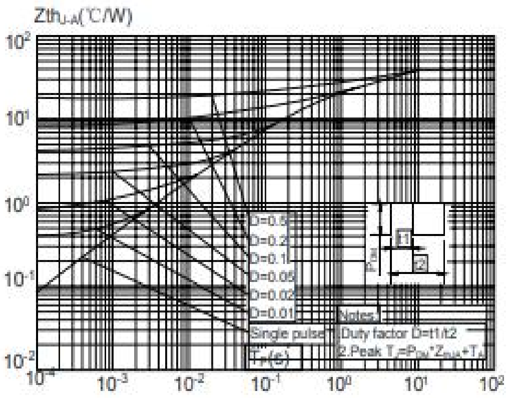
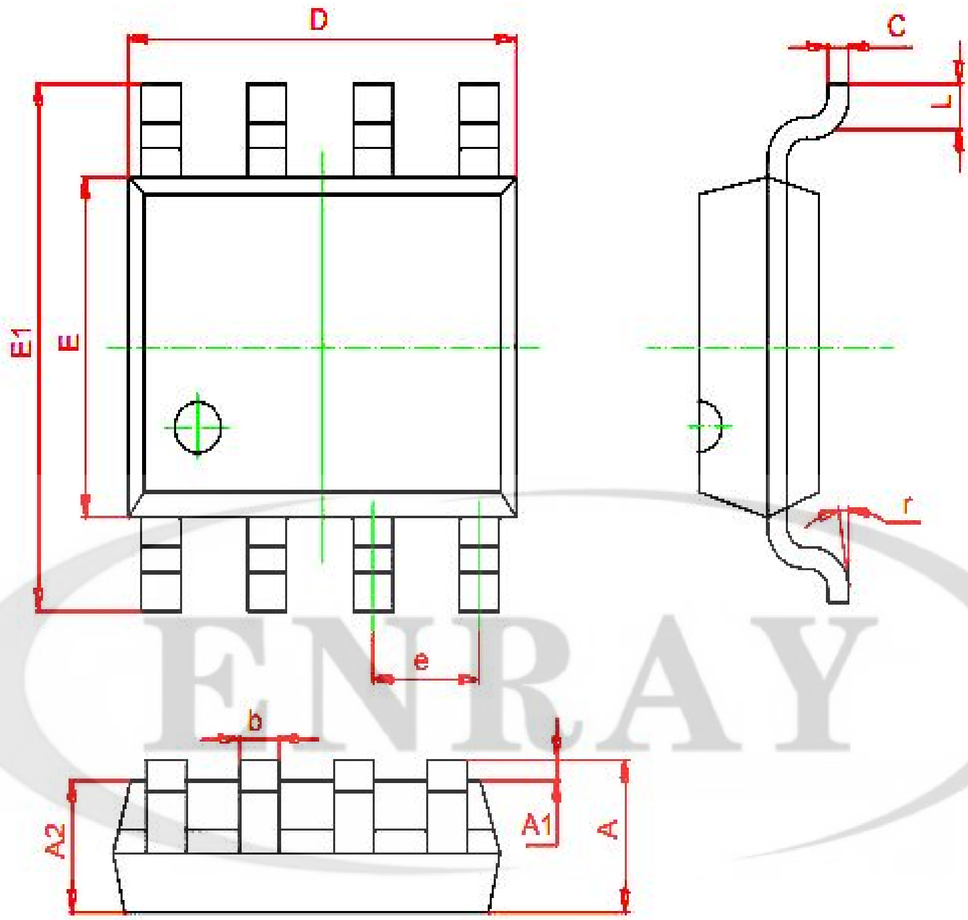


SOP-8 Package Outline Dimesions



DIMENSIONS(unit:mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
C	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°