N-Channel 60V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
60	7.2 @ V_{GS} = 10V	24 [1]

SOP-8L

Features

- Low $R_{DS(on)}$ SGT technology

- Low thermal impedance

- Fast switching speed

- 100% avalanche tested

Applications

- DC/DC conversion

- Power switch

- Motor drives

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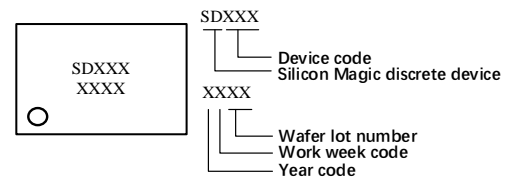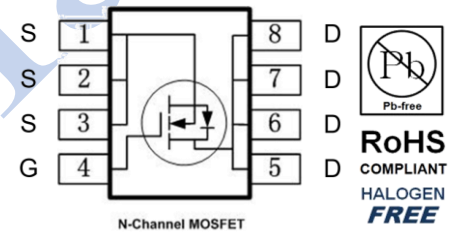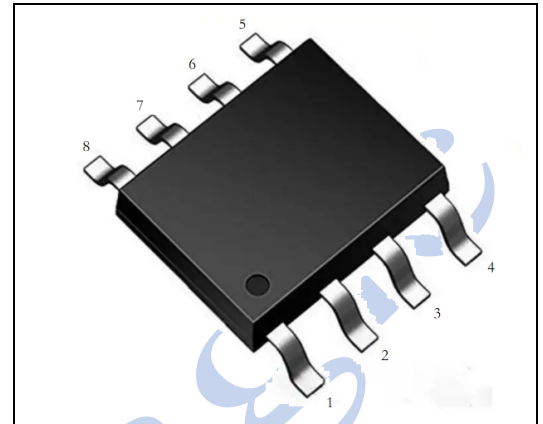

N-Channel MOSFET

Package and ordering information

Ordering code	Package	Device code
SDN06K7P2O-AB	SOP-8L	AHF

SDXXX — Device code
Silicon Magic discrete device
XXXX — Wafer lot number
Work week code
Year code

1. Maximum ratings

Absolute maximum ratings (T_A = 25℃ unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current[1]	T_C=25℃	I_D	24	A
	T_C=100℃		15	
	T_A=25℃		13	
Pulsed drain current[2]		$I_{D,pulse}$	96	
Avalanche energy, single pulse[3]		E_{AS}	82	mJ
Power dissipation	T_C=25℃	P_D	6.9	W
	T_A=25℃ [4]		2	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

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2. Thermal resistance ratings

Thermal resistance ratings		Symbol	Max.	Unit
Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	18	℃/W
Thermal resistance, junction-to-ambient [4]	Steady state	$R_{\theta JA}$	62.5	

3. Electrical Characteristics

Electrical characteristics (T_J = 25℃ unless otherwise noted)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0, I_D = 250 µA	60			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.2	1.9	2.6	V
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A		6	7.2	mΩ
		V_{GS} = 4.5 V, I_D = 10 A		10	14	
Forward transconductance [5]	g_{fs}	V_{DS} = 5 V, I_D = 20 A		50		S
Gate resistance	R_g	f = 1 MHz		2		Ω
Dynamic[5]						
Total gate charge	Q_g	V_{DS} = 30 V, I_D = 10 A, V_{GS} = 4.5 V		14.5		nC
Total gate charge	Q_g	V_{DS} = 30 V, I_D = 20 A, V_{GS} = 10 V		27		
Gate-source charge	Q_{gs}			4.5		
Gate-drain charge	Q_{gd}			8.7		
Turn-on delay time	$t_{d(on)}$	V_{DS} = 30 V, I_D = 20 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		13		ns
Rise time	t_r			81		
Turn-off delay time	$t_{d(off)}$			45		
Fall time	t_f			16		
Input capacitance	C_{iss}	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		1180		pF
Output capacitance	C_{oss}			420		
Reverse transfer capacitance	C_{rss}			38		
Reverse Diode Characteristics [5]						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 20 A		0.88	1.2	V
Reverse recovery time	t_{rr}	V_{DS} = 30 V, I_F = 20 A, di/dt = 100 A/µs		26		ns
Reverse recovery charge	Q_{rr}			20		nC

Notes

(1) Limited by maximum junction temperature.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 30 V, V_{GS} = 10 V, L = 0.3 mH.

(4) $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.

(5) Guaranteed by design, not subject to production testing.
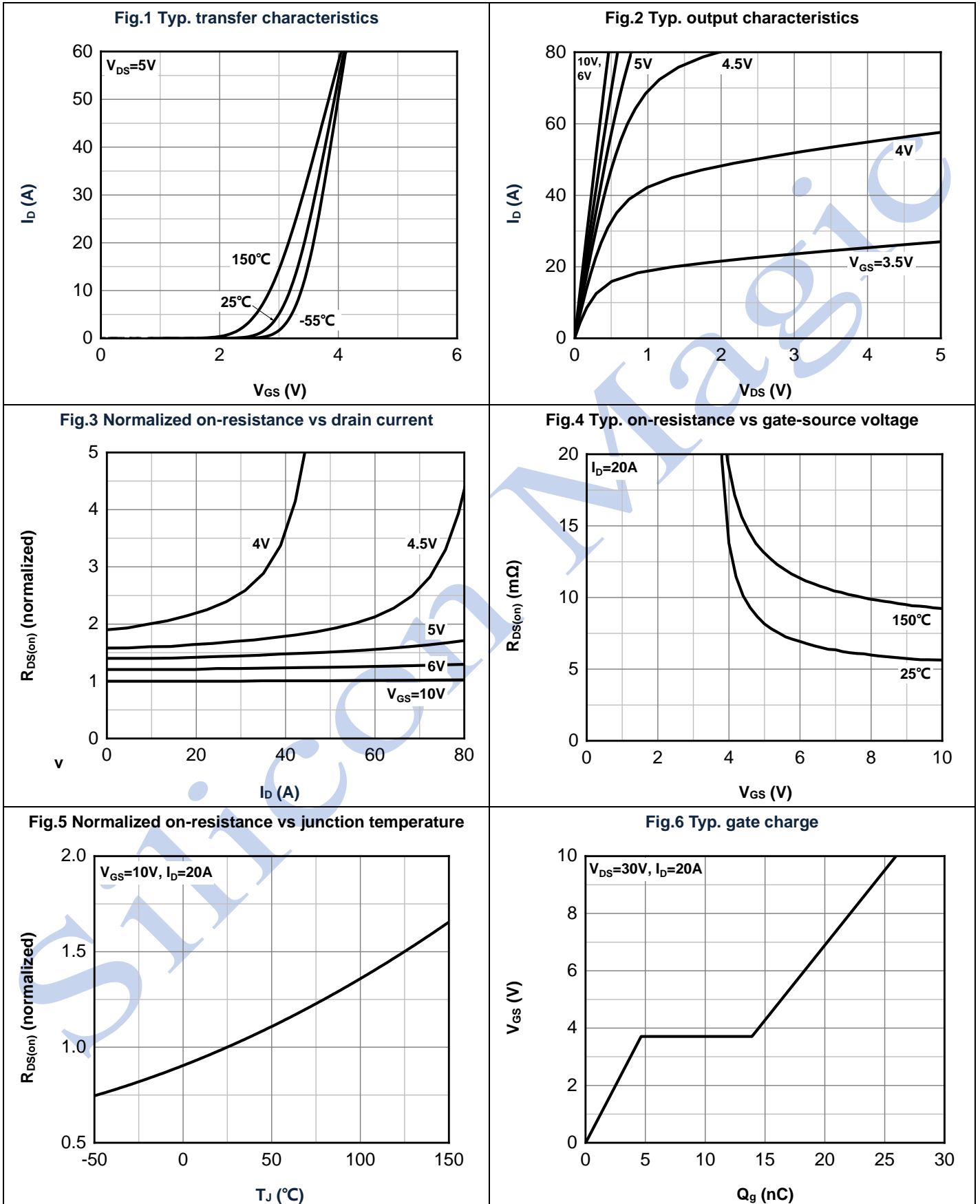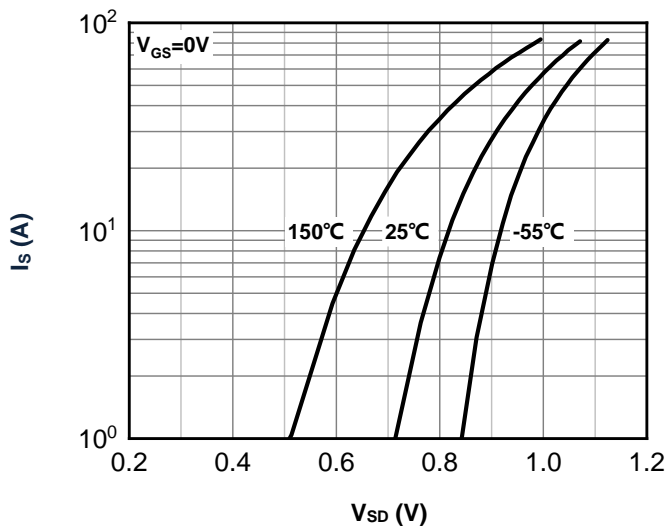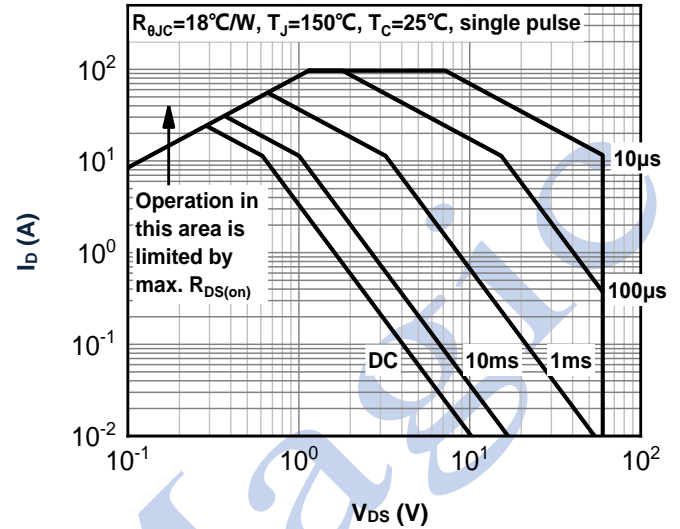
4. Electrical characteristics diagrams

Fig.1 Typ. transfer characteristics

Fig.2 Typ. output characteristics

Fig.3 Normalized on-resistance vs drain current

Fig.4 Typ. on-resistance vs gate-source voltage

Fig.5 Normalized on-resistance vs junction temperature
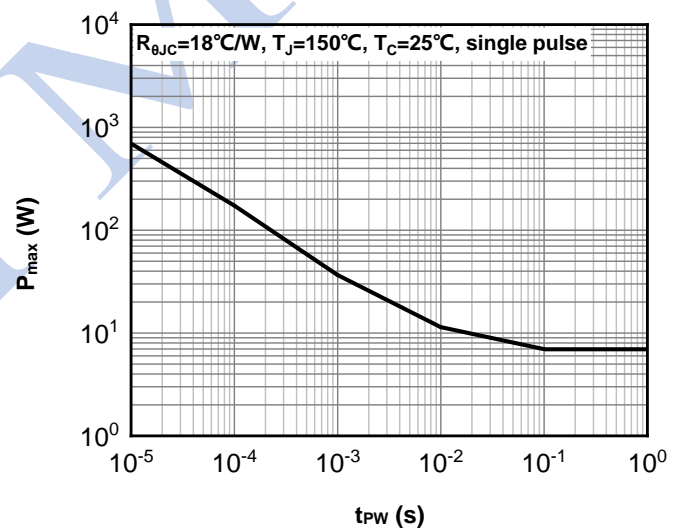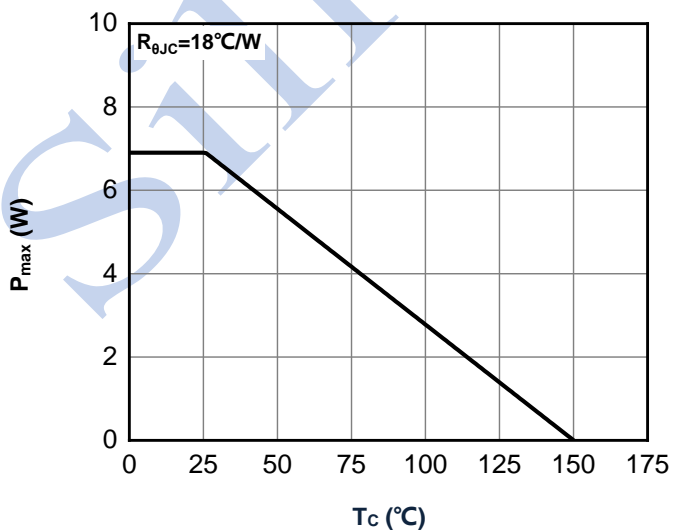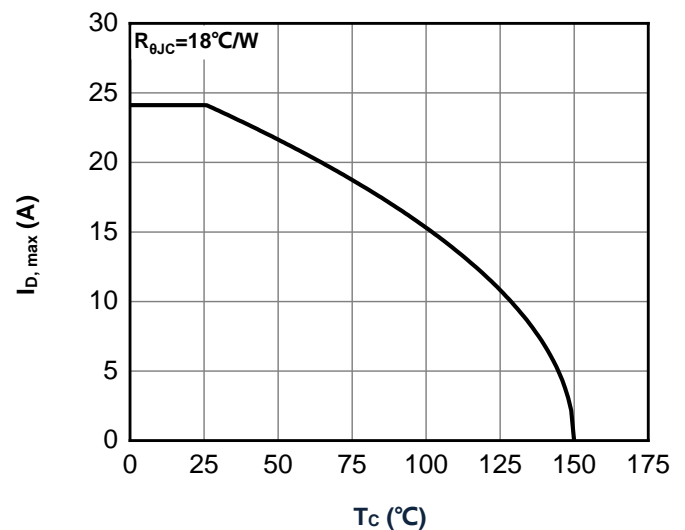

Fig.6 Typ. gate charge

Fig.7 Typ. forward characteristics of body diode

Fig.8 Safe operating area

Fig.9 Typ. Capacitance
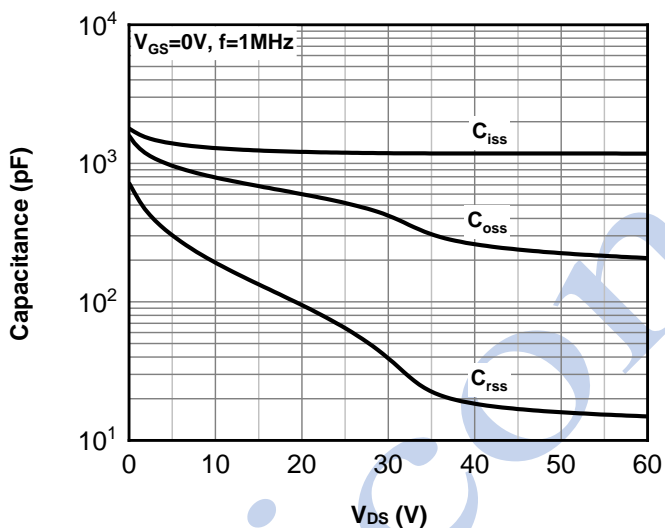
Fig.10 Single pulse maximum power dissipation

Fig.11 Max. power dissipation vs case temperature

Fig.12 Max. continuous drain current vs case temperature
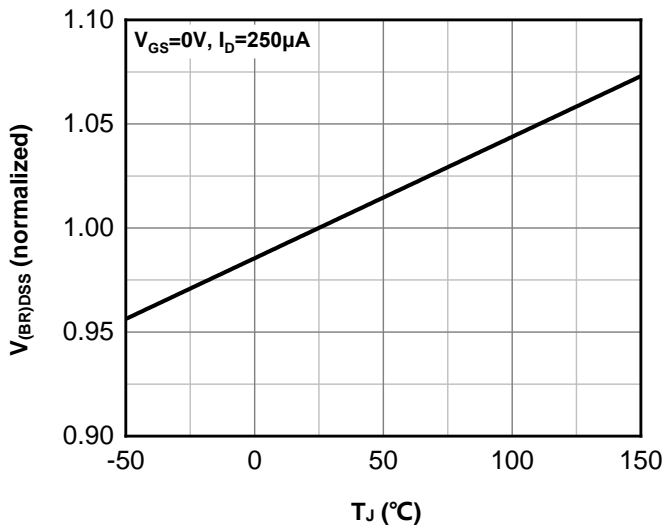
Fig.13 Normalized V(BR)DSS vs junction temperature

$V_{GS}=0V, I_D=250\mu A$

Y-axis: $V_{(BR)DSS}$ (normalized), from 0.90 to 1.10

X-axis: T_J (℃), from -50 to 150

Fig.14 Normalized VGS(th) vs junction temperature

$V_{DS}=V_{GS}, I_D=250\mu A$

Y-axis: $V_{GS(th)}$ (normalized), from 0.4 to 1.4

X-axis: T_J (℃), from -50 to 150
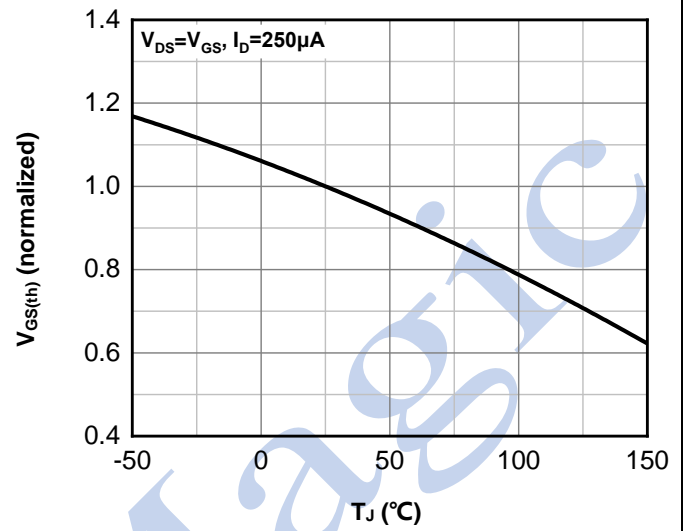
Fig.15 Transient thermal impedance from junction to ambient

Y-axis: Z_{thJA}, from 0.1 to 100

X-axis: t_{PW} (s), from 10^{-5} to 10^1

Curves: D=0.5, 0.2, 0.1, 0.05, 0.02, 0.01, Single Pulse

$D = t_{PW} / T$

Peak $T_J = T_A + P_{DM} \times Z_{\theta JA}(D, t_{PW})$
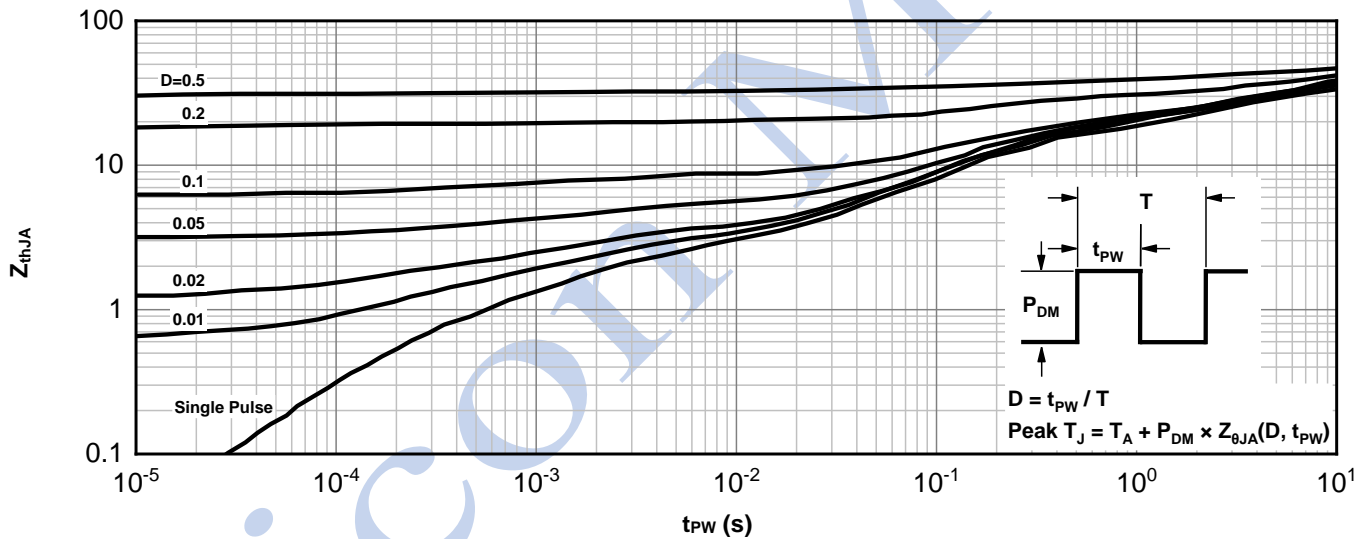
5. Package outline dimensions
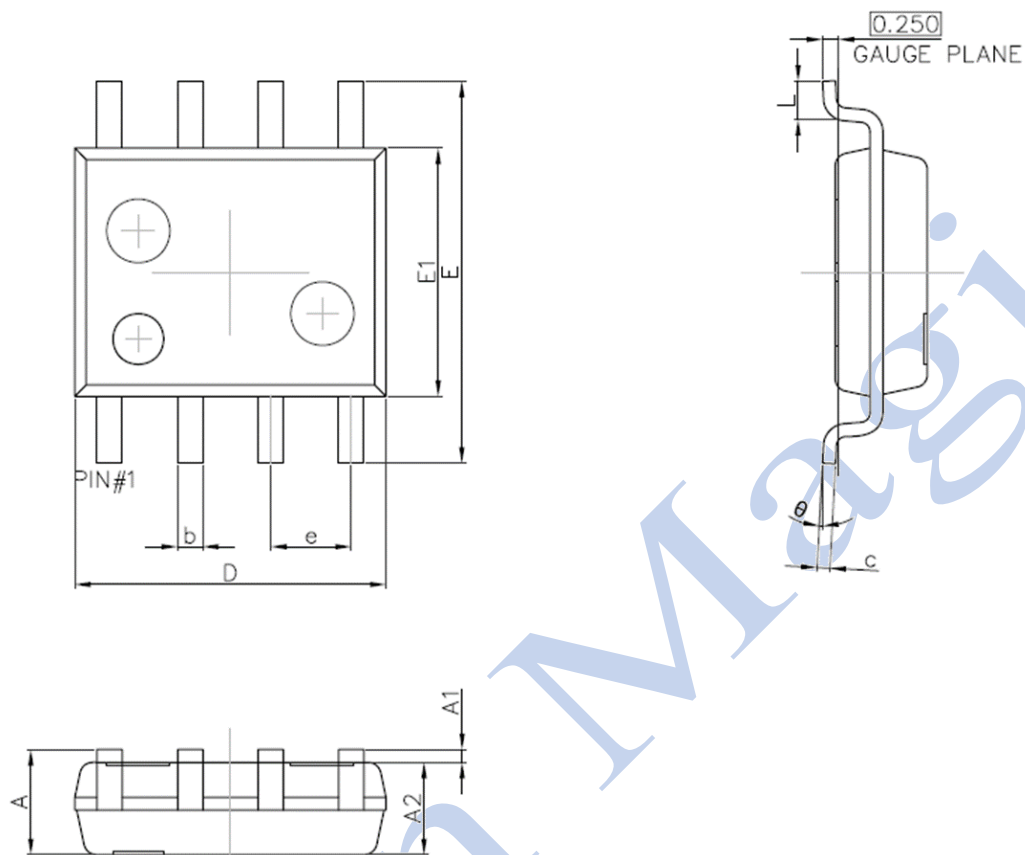
Dim	Millimeters		
	Min	Nom	Max
A	1.450		1.750
A1	0.100		0.250
A2	1.350		1.550
b	0.330		0.510
c	0.170		0.250
D	4.700		5.100
E	5.800		6.200
E1	3.800		4.00
e	1.270 BSC		
L	0.400		1.270
θ	0°		8°

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