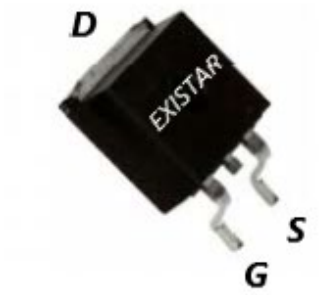
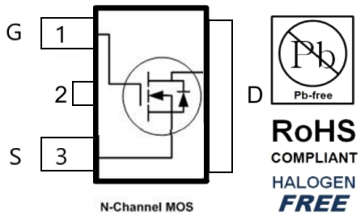
N-Channel 65V MOSFET

E065N9P5CL1

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
65V	9.5@ V_{GS} = 10V	62

TO252





Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- PD charger
- Moto driver

Package And Ordering Information

Ordering code	Package	Marking
E065N9P5CL1	TO252	E065N9P5CL1

Ordering Information

Package	Units/ Reel	Reels/ Inner Box	Units/ Inner Box
TO252	2500	2	5000

Key Performance Parameters

Parameter	Value	Unit
VDS, min @ Tj(max)	65	V
ID, pulse	248	A
RDS(ON), max @ VGS=10V	9.5	mΩ
Qg	14	nC

Absolute Maximum Ratings at Tj=25°C Unless Otherwise Noted

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	65	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25°C	I_D	62	A
	T_C=100°C		30	
Pulsed drain current		$I_{D,pulse}$	248	
Avalanche energy, single pulse		E_{AS}	38	mJ
Power dissipation	T_C=25°C	P_D	60	W
	T_A=25°C		-	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	2.1	°C/W
Thermal resistance, junction-to-ambient	Steady state	$R_{\theta JA}$	62	

Electrical Characteristics at Tj=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	$V_{(BR)DSS}$	65			V	V_{GS} = 0, I_D = 250 μA
Gate-source threshold voltage	$V_{GS(th)}$	1.5	2	2.5	V	V_{DS} = V_{GS}, I_D = 250 μA
Gate-body leakage	I_{GSS}			±100	nA	V_{DS} = 0 V, V_{GS} = ±20 V
Zero gate voltage drain current	I_{DSS}			1	μA	V_{DS} = 52 V, V_{GS} = 0 V
Drain-source on-resistance	$R_{DS(on)}$		7.8	9.5	mΩ	V_{GS} = 10 V, I_D = 10 A
Drain-source on-resistance	$R_{DS(on)}$		13.4	15	mΩ	V_{GS} = 4.5 V, I_D = 8 A

Forward transconductance	gfs		22		S	V_{DS} = 5 V, I_D = 5 A
Gate resistance	Rg		1.3		Ω	f=1MHz
Gate Charge						
Total gate charge	Qg		14		nC	V_{DS} = 30 V, I_D = 10 A, V_{GS} = 10 V
Gate-source charge	Qgs		2.6			
Gate-drain charge	Qgd		2.8			
Dynamic						
Turn-on delay time	$t_{d(on)}$		10		ns	V_{DS} = 30 V, I_D =10 A, V_{GS} = 10 V, R_{GEN} = 4.7 Ω
Rise time	t_r		16			
Turn-off delay time	$t_{d(off)}$		9.2			
Fall time	t_f		2			
Input capacitance	C_{iss}		825		pF	V_{DS} =30 V, V_{GS} = 0 V, f = 1MHz
Output capacitance	C_{oss}		290			
Reverse transfer capacitance	C_{rss}		15			
Body Diode						
Diode forward voltage	V_{SD}			1.2	V	V_{GS} = 0 V, I_F = 10 A
Reverse recovery time	t_{rr}		17		ns	V_R= 30 V, I_S =10 A, di/dt = 100 A/μs
Reverse recovery charge	Q_{rr}		7		nC	

Electrical Characteristics Diagrams

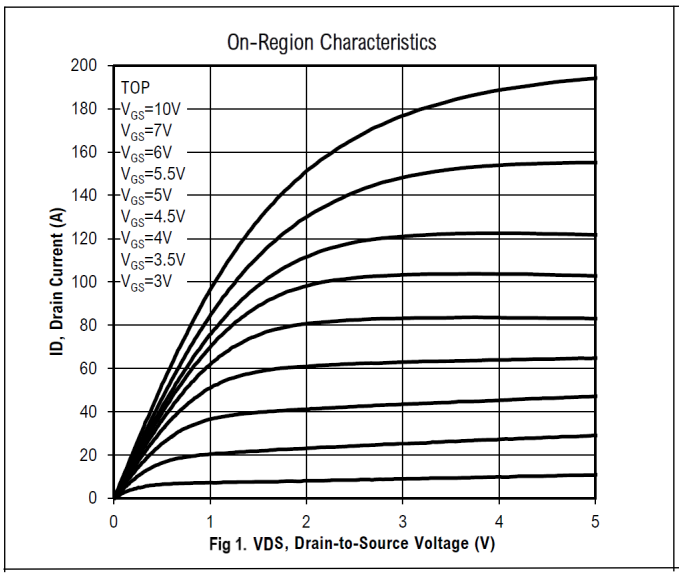


Fig 1. VDS, Drain-to-Source Voltage (V)

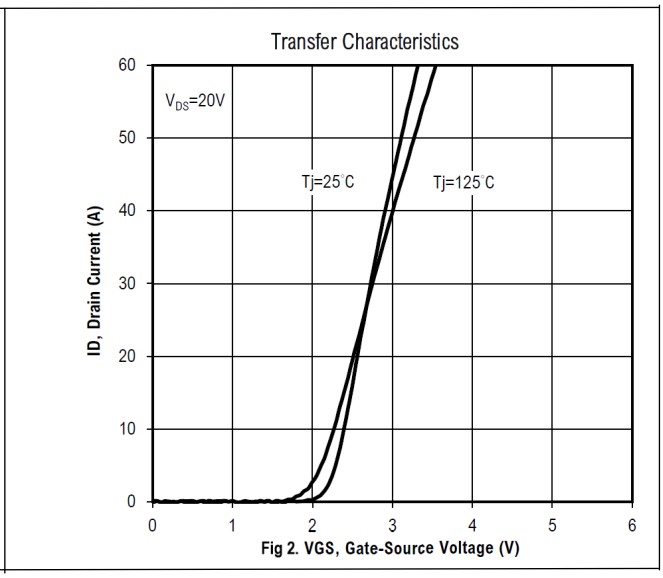


Fig 2. VGS, Gate-Source Voltage (V)

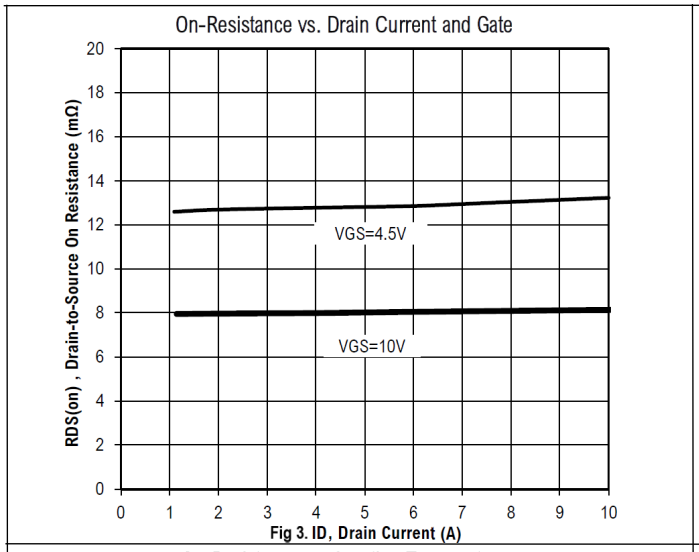


Fig 3. ID, Drain Current (A)

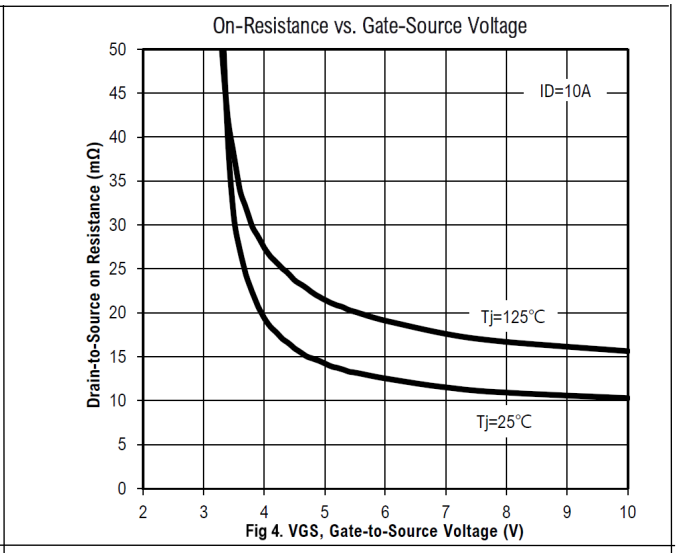


Fig 4. VGS, Gate-to-Source Voltage (V)

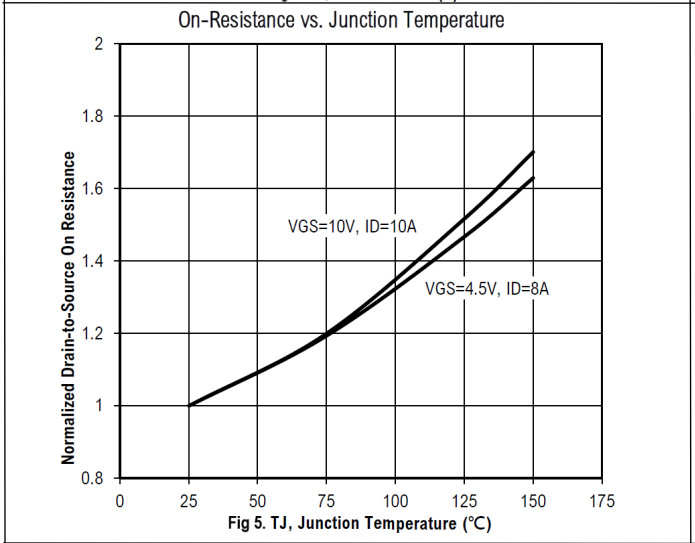


Fig 5. TJ, Junction Temperature (℃)

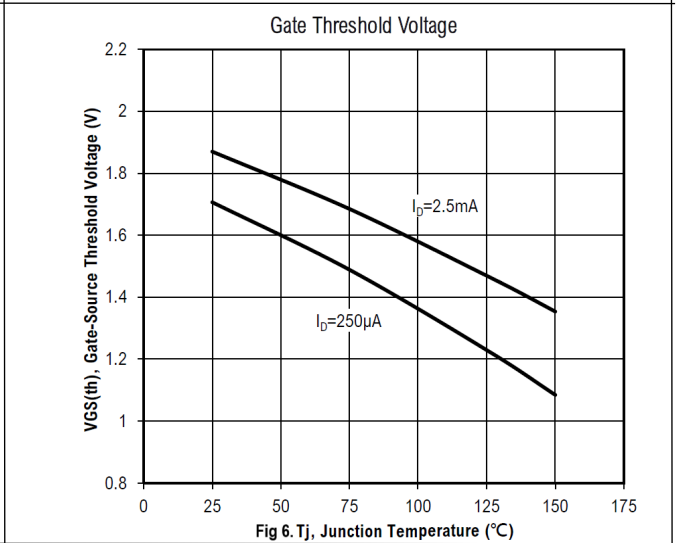


Fig 6. Tj, Junction Temperature (℃)

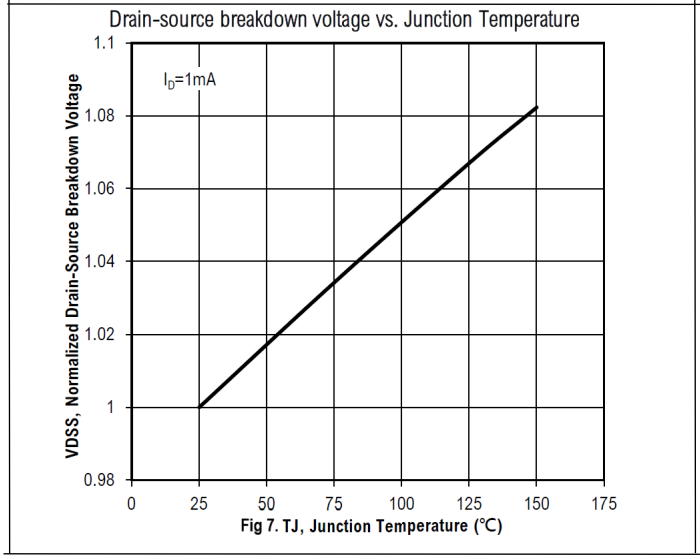


Fig 7. TJ, Junction Temperature (℃)

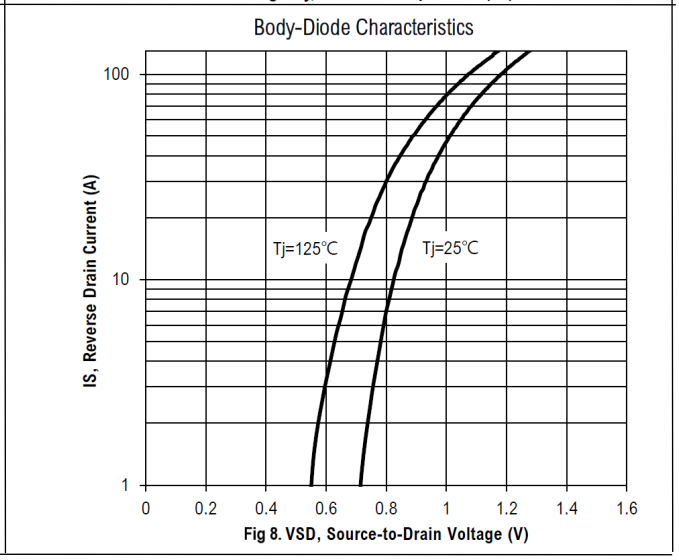
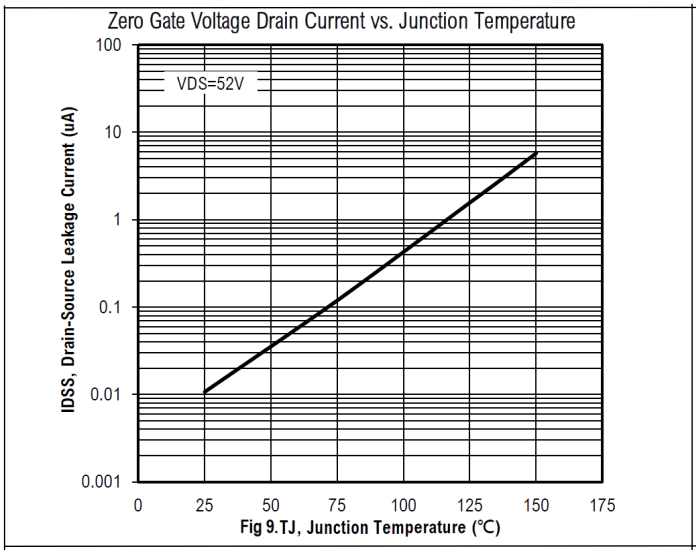
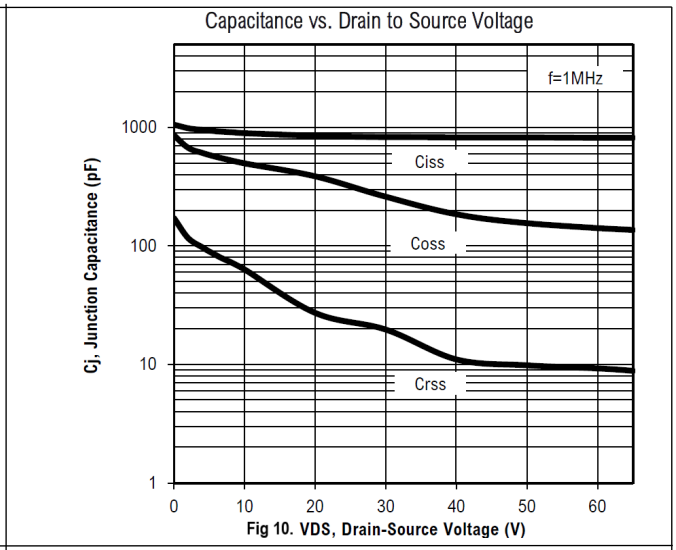
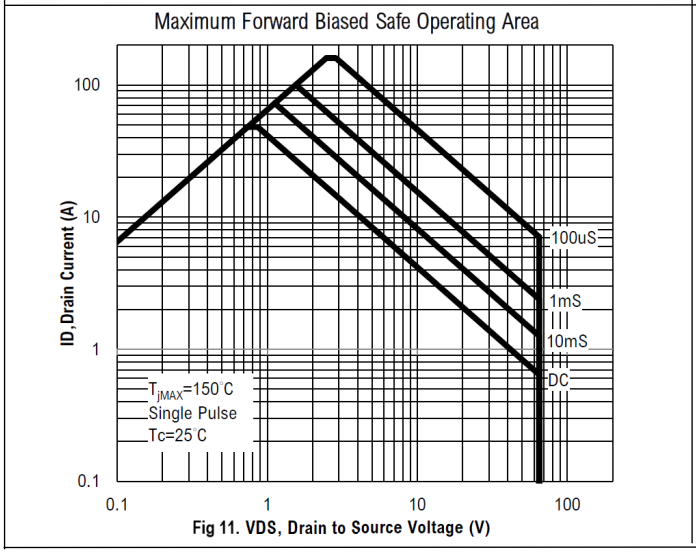
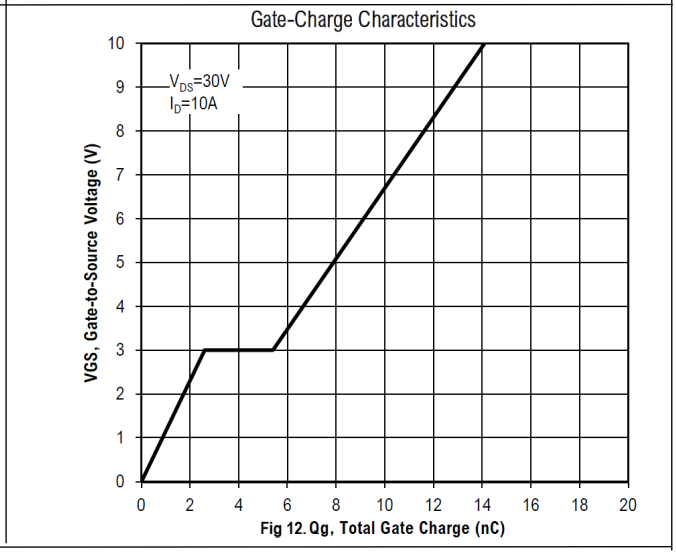


Fig 8. VSD, Source-to-Drain Voltage (V)


Zero Gate Voltage Drain Current vs. Junction Temperature
VDS=52V
IDSS, Drain-Source Leakage Current (uA)
100
10
1
0.1
0.01
0.001
0
25
50
75
100
125
150
175
Fig 9.TJ, Junction Temperature (°C)


Capacitance vs. Drain to Source Voltage
f=1MHz
Ciss
Coss
Crss
Cj, Junction Capacitance (pF)
1000
100
10
1
0
10
20
30
40
50
60
Fig 10. VDS, Drain-Source Voltage (V)


Maximum Forward Biased Safe Operating Area
ID,Drain Current (A)
100
10
1
0.1
100uS
1mS
10mS
DC
TjMAX=150°C
Single Pulse
Tc=25°C
0.1
1
10
100
Fig 11. VDS, Drain to Source Voltage (V)


Gate-Charge Characteristics
VDS=30V
ID=10A
VGS, Gate-to-Source Voltage (V)
10
9
8
7
6
5
4
3
2
1
0
0
2
4
6
8
10
12
14
16
18
20
Fig 12. Qg, Total Gate Charge (nC)

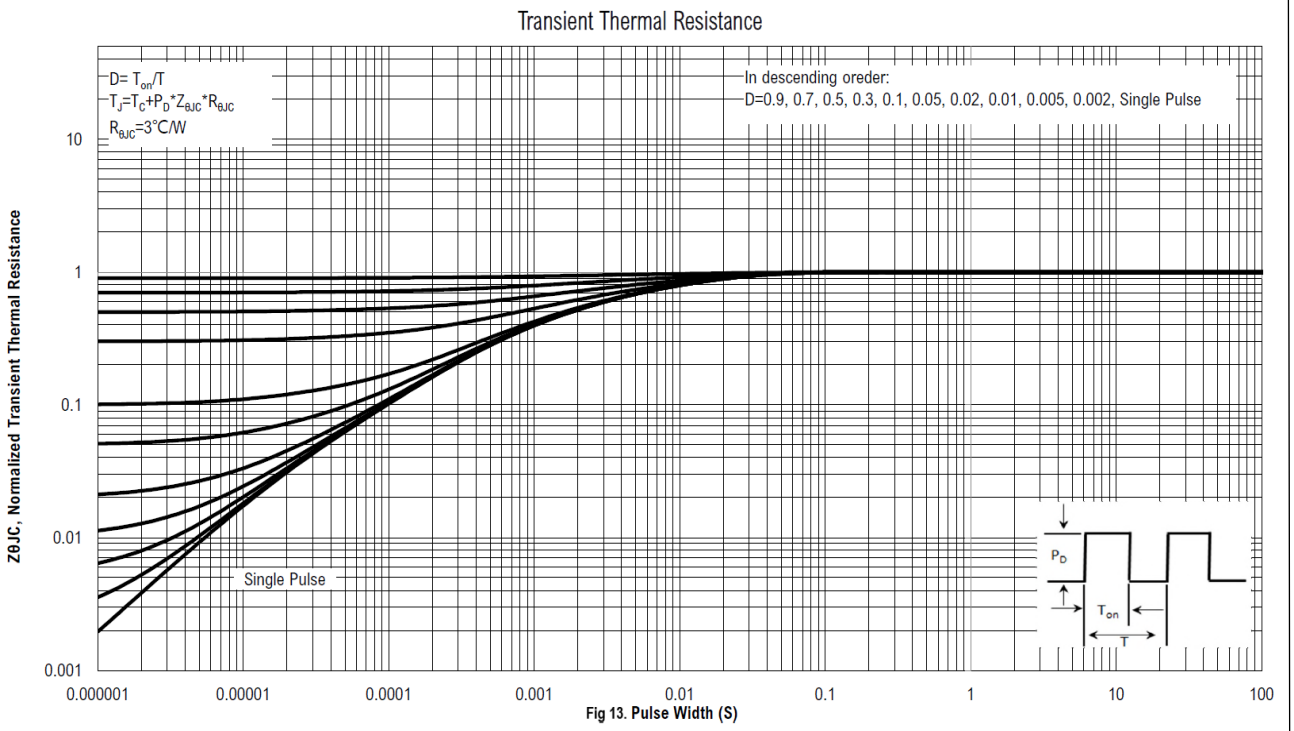


Fig 13. Pulse Width (S)

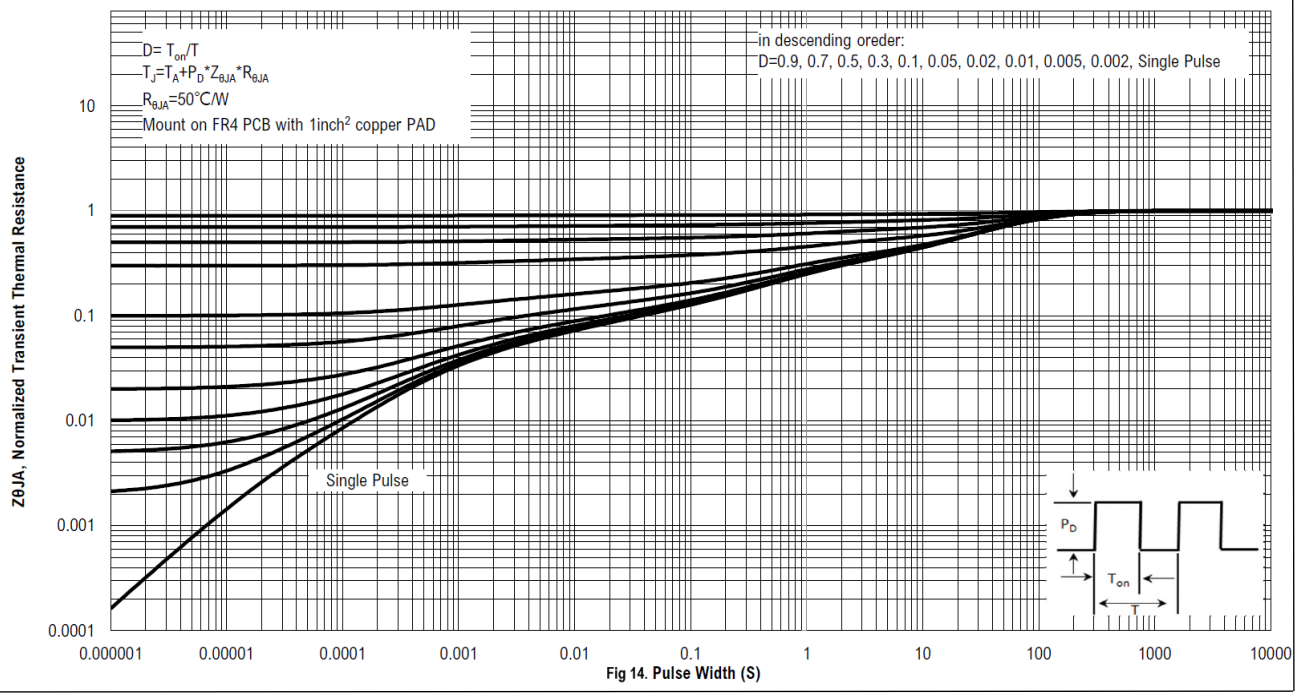
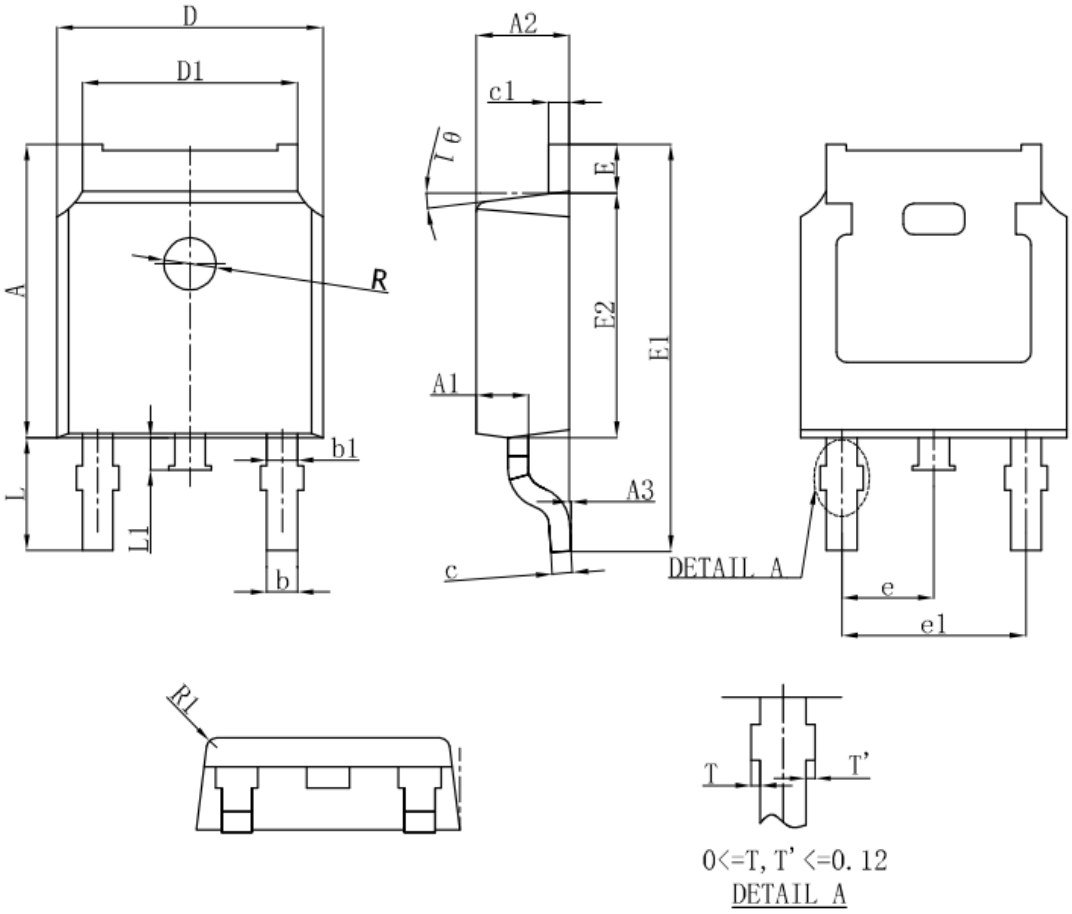


Fig 14. Pulse Width (S)

Package Outline Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	7.050	7.100	7.150
A1	0.960	1.010	1.060
A2	2.250	2.300	2.350
A3	0.000	0.050	0.100
b		0.760REF.	
b1		1.000REF.	
c		0.508REF.	
c1		0.508REF.	
D	6.550	6.600	6.650
D1	5.220	5.320	5.420
E	0.950	1.000	1.050
E1	9.700	9.900	10.100
E2	6.050	6.100	6.150
e		2.286BSC	
e1		4.572REF.	
L	2.650	2.800	2.950
L1	0.700	0.800	0.900
θ1		7° REF.	
R		0.250REF.	

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