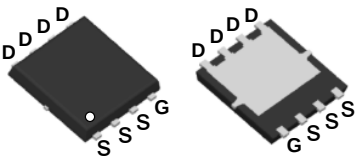
GPT054N12LNC

120V N-Channel MOSFET

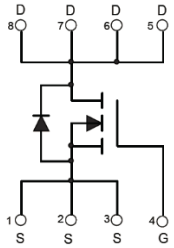
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
120V	5.4mΩ@10V	90A
	6.6mΩ@4.5V	

PDFN5X6-8L



Schematic diagram



Feature

- Split Gate Trench Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested
- Optimized for High Speed Smooth Switching

Application

- Power Switching Application
- DC/DC Converters

MARKING:

T054N12L = Device Code

XX = Date Code

Solid Dot = Green Indicater

ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	120	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_C = 25℃	I_D	90	A
	T_C = 120℃	I_D	57	A
Pulsed Drain Current[2]		I_{DM}	360	A
Single Pulsed Avalanche Current[3]		I_{AS}	35	A
Single Pulsed Avalanche Energy[3]		E_{AS}	245	mJ
Power Dissipation[5]	T_C = 25℃	P_D	118	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	56	℃/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	1.06	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS (T_A = 25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	120			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120V, V_{GS} = 0V			1	μA
Gate - Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics[4]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	2	3	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		5.4	7.0	mΩ
		V_{GS} = 4.5V, I_D = 20A		6.6	9.0	
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D = 20A		92		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 60V, V_{GS} = 0V, f = 1MHz		3415		pF
Output Capacitance	C_{oss}			520		
Reverse Transfer Capacitance	C_{rss}			12		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		3		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 60V, V_{GS} = 10V, I_D = 20A		53		nC
Gate-source Charge	Q_{gs}			10		
Gate-drain Charge	Q_{gd}			9.5		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 60V, V_{GS} = 10V, I_D = 20A, R_G = 3Ω		12		ns
Turn-on Rise Time	t_r			10		
Turn-off Delay Time	$t_{d(off)}$			52		
Turn-off Fall Time	t_f			19		
Source - Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 20A			1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=20A, dI_F/dt=500A/μs		66		ns
Body Diode Reverse Recovery Charge	Q_{rr}			113		nC

Notes :

1.The maximum current rating is limited by package.And device mounted on a large heatsink

2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

3.E_{AS} condition: V_{DD} = 25V,V_{GS} = 10V, L = 0.4mH, R_G = 25Ω Starting T_J = 25°℃.

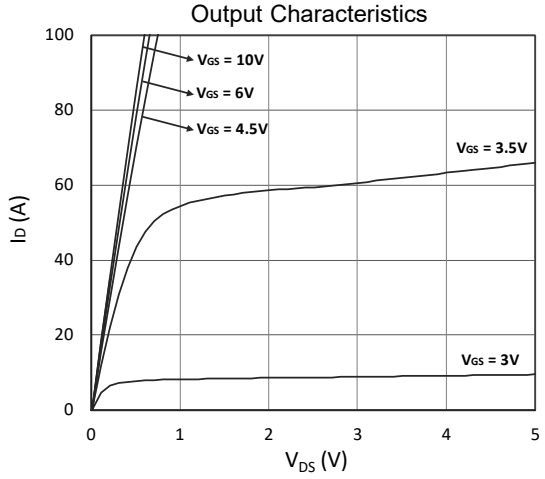
4.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

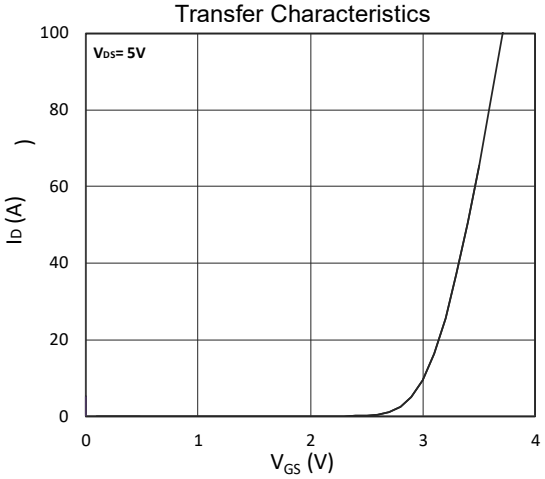
6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

Typical Characteristics

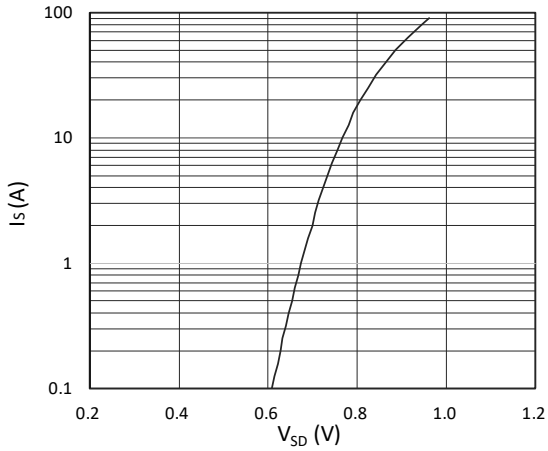
Output Characteristics



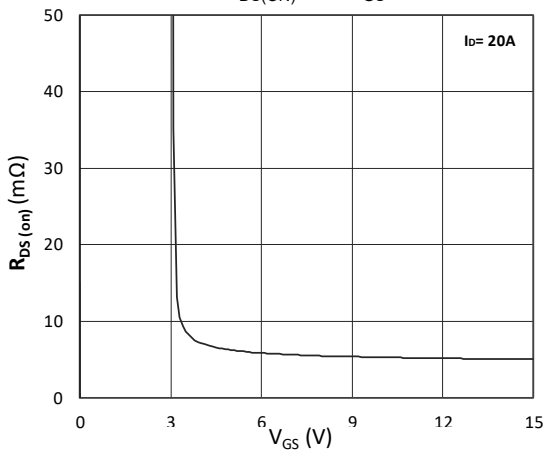
Transfer Characteristics



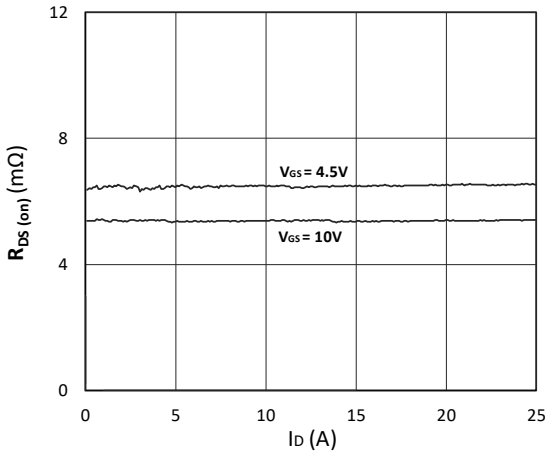
I_S vs V_{SD}



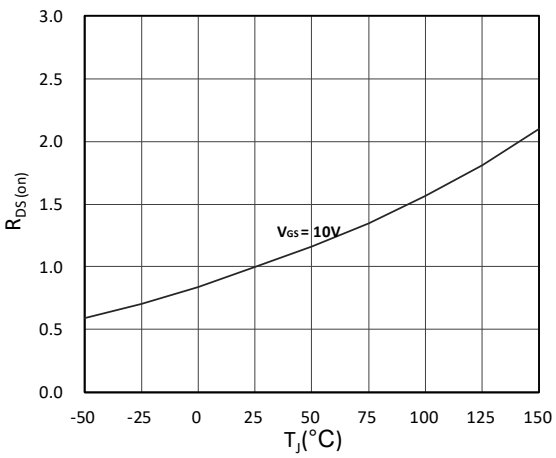
$R_{DS(ON)}$ vs V_{GS}

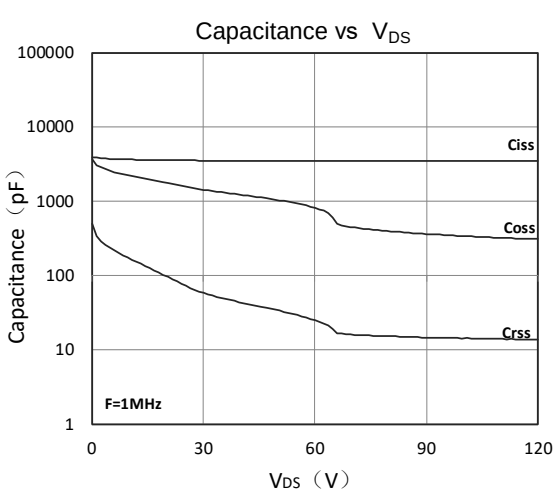


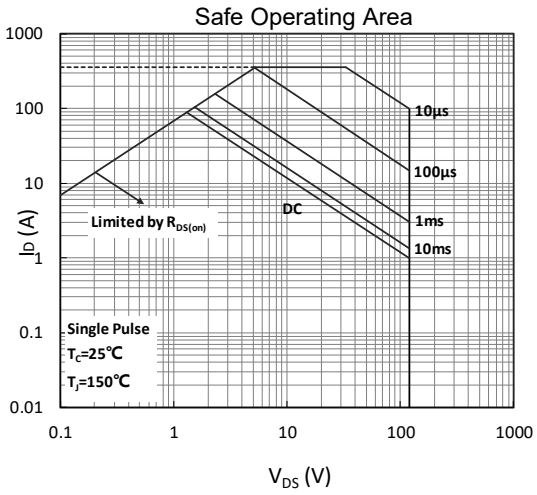
$R_{DS(ON)}$ vs I_D

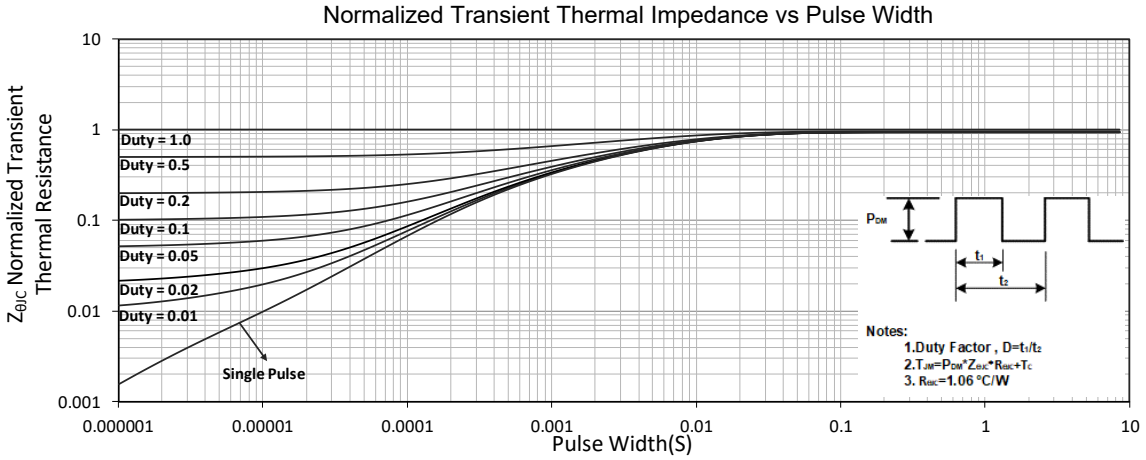


Normalized $R_{DS(on)}$ vs Temperature

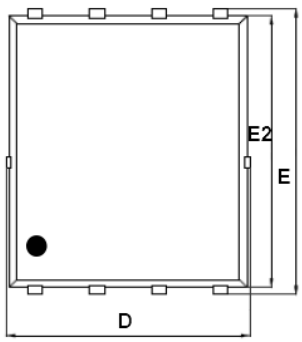


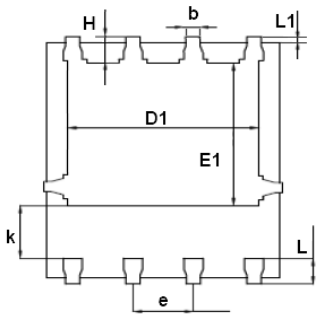

Capacitance vs V_{DS}
100000
10000
1000
100
10
1
Capacitance（pF）
Ciss
Coss
Crss
F=1MHz
0
30
60
90
120
V_{DS}（V）

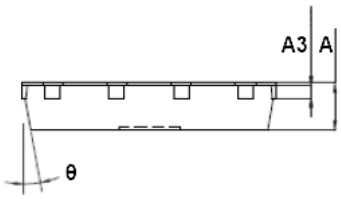

Safe Operating Area
1000
100
10
1
0.1
0.01
I_D (A)
10μs
100μs
DC
1ms
10ms
Limited by $R_{DS(on)}$
Single Pulse
T_c=25℃
T_j=150℃
0.1
1
10
100
1000
V_{DS} (V)


Normalized Transient Thermal Impedance vs Pulse Width
10
1
0.1
0.01
0.001
$Z_{\theta JC}$ Normalized Transient Thermal Resistance
Duty = 1.0
Duty = 0.5
Duty = 0.2
Duty = 0.1
Duty = 0.05
Duty = 0.02
Duty = 0.01
Single Pulse
P_{DM}
t_1
t_2
Notes:
1.Duty Factor , D=t_1/t_2
2.T_{JM}=P_{DM}*$Z_{\theta JC}$*$R_{\theta JC}$+T_C
3. $R_{\theta JC}$=1.06 °C/W
0.000001
0.00001
0.0001
0.001
0.01
0.1
1
10
Pulse Width(S)

PDFN5X6-8L Package Information







SYMBOL	MM	
	MIN	MAX
A	0.90	1.20
A3	0.15	0.35
D	4.80	5.40
E	5.90	6.35
D1	3.61	4.31
E1	3.30	3.92
E2	5.50	6.06
k	1.10	-
b	0.30	0.51
e	1.27BSC	
L	0.38	0.71
L1	0.05	0.36
H	0.38	0.71
θ	0°	12°