

N-Channel Enhancement Mode Power MOSFET

Description

The GT017N04D5A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

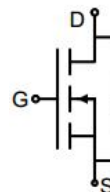
AEC-Q101 Qualified

General Features

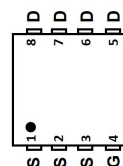
- V_{DS} 40V
- I_D (at $V_{GS} = 10V$) 150A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 1.75m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 2.5m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

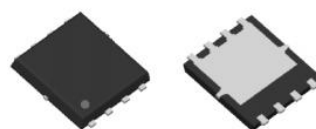
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6-8L

Ordering Information

Device	Package	Marking	Packaging
GT017N04D5A	DFN5X6-8L	GT017N04	5000pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	150	A
	$T_C = 100^\circ\text{C}$	108	
Pulsed Drain Current (note1)	I_{DM}	600	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	100	W
Single pulse avalanche energy (note2)	E_{AS}	196	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	1.5	$^\circ\text{C/W}$

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.5	2.4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	--	1.45	1.75	m Ω
		$V_{GS} = 4.5V, I_D = 20A$	--	2.0	2.5	
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 20A$	--	80	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 20V,$ $f = 1MHz$	--	3100	--	pF
Output Capacitance	C_{oss}		--	1500	--	
Reverse Transfer Capacitance	C_{rss}		--	80	--	
Total Gate Charge	Q_g	$V_{DD} = 20V,$ $I_D = 20A,$ $V_{GS} = 10V$	--	64	--	nC
Gate-Source Charge	Q_{gs}		--	12	--	
Gate-Drain Charge	Q_{gd}		--	11	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V,$ $I_D = 20A,$ $R_G = 0.5\Omega$	--	890	--	ns
Turn-on Rise Time	t_r		--	20	--	
Turn-off Delay Time	$t_{d(off)}$		--	71	--	
Turn-off Fall Time	t_f		--	33	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ C$	--	--	150	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = 20A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = 20A, V_{GS} = 0V$ $di/dt = 100A/us$	--	109	--	nC
Reverse Recovery Time	T_{rr}		--	30	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J = 25^\circ\text{C}, V_{DD} = 40V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$

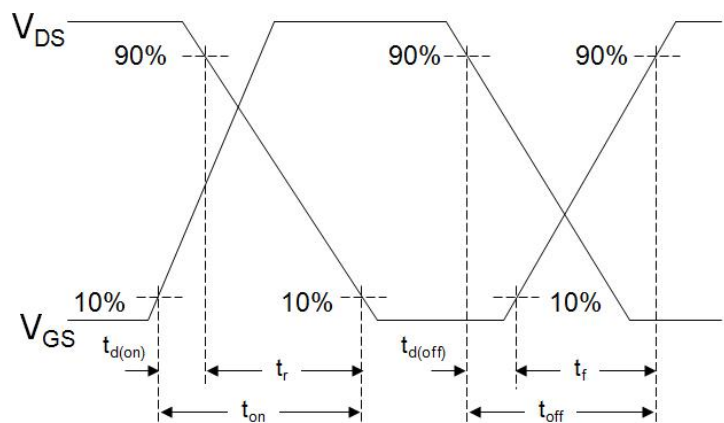
The table shows the minimum avalanche energy, which is 543mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

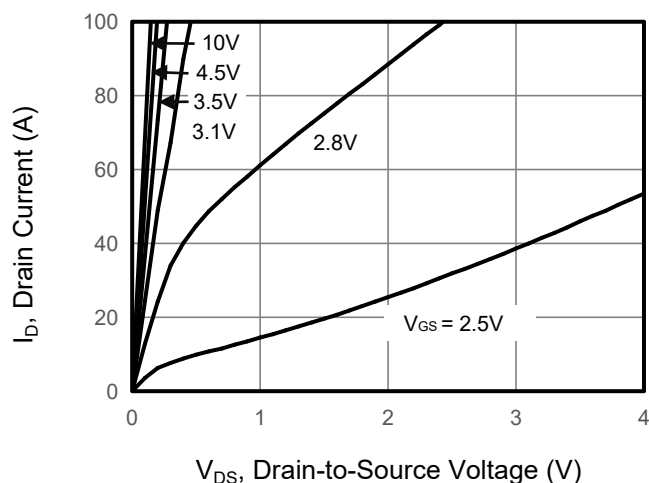


Figure 2. Transfer Characteristics

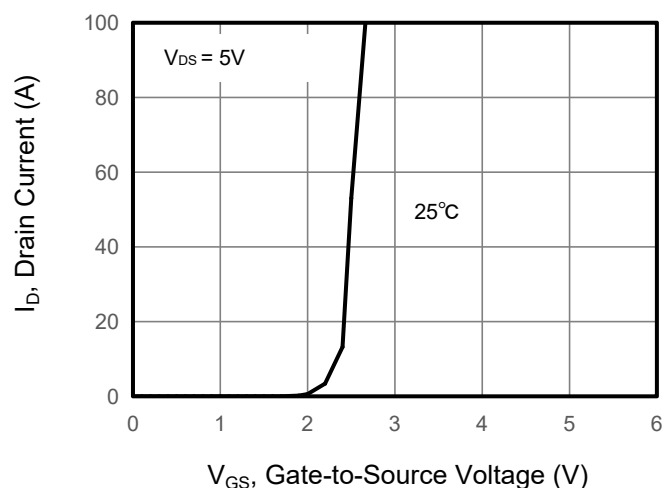


Figure 3. Drain Source On Resistance

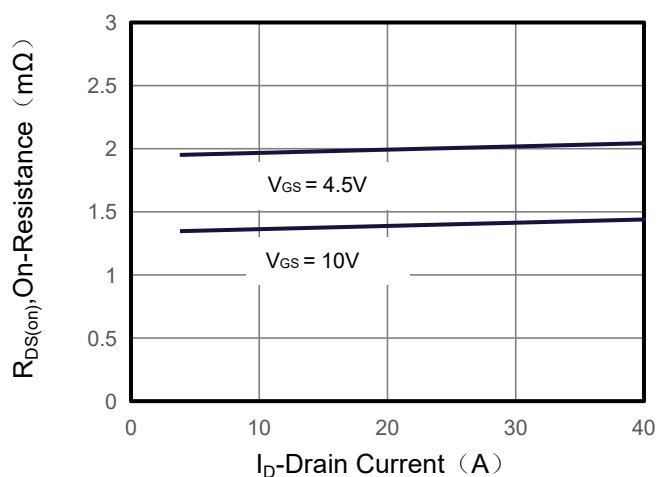


Figure 4. Gate Charge

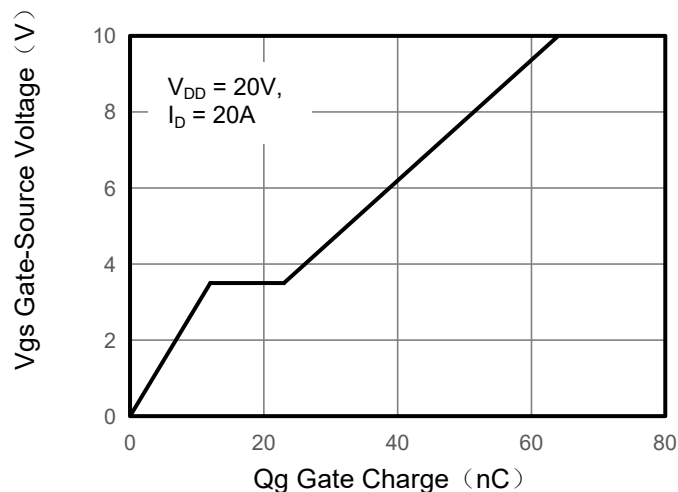


Figure 5. Capacitance

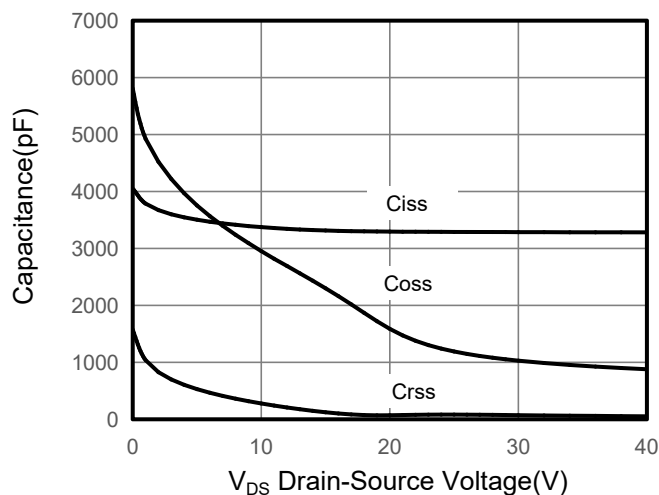
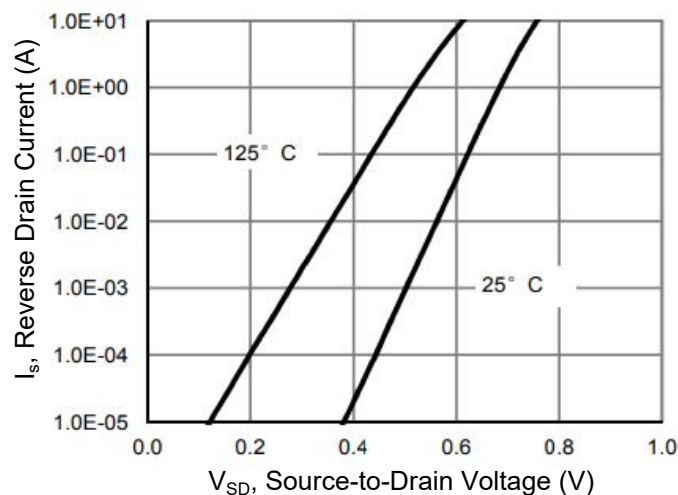


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

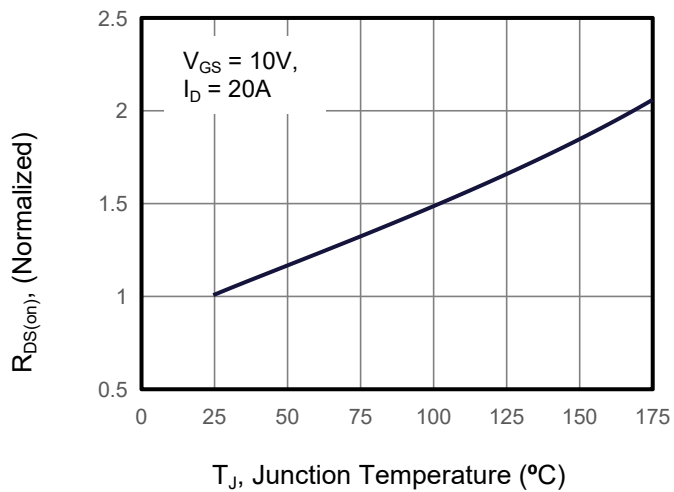


Figure 8. Safe Operation Area

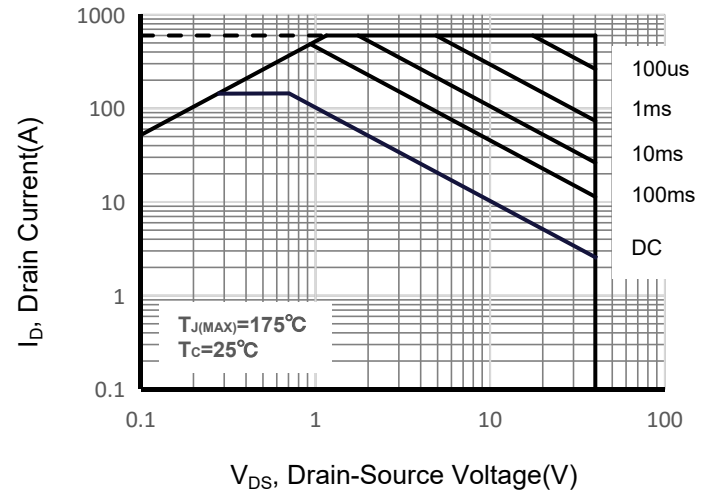


Figure 9. Maximum Continuous Drain Current vs Case Temperature

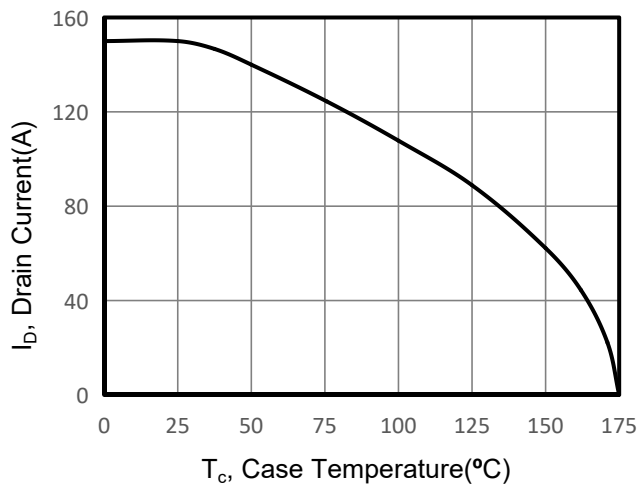
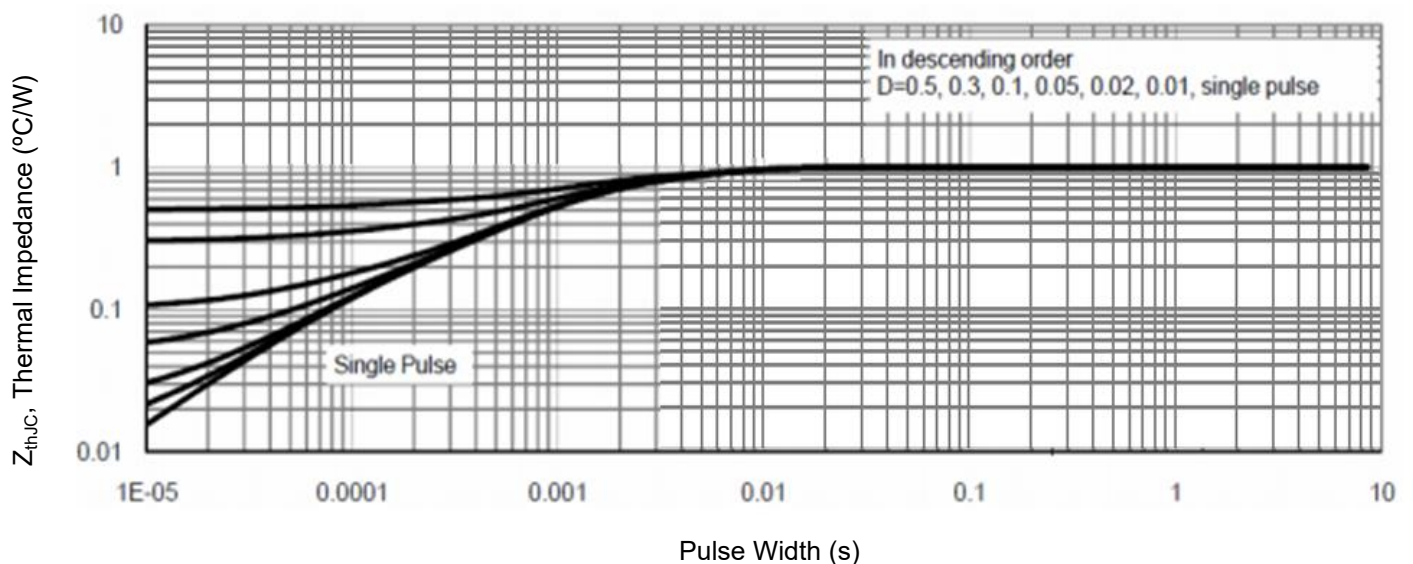
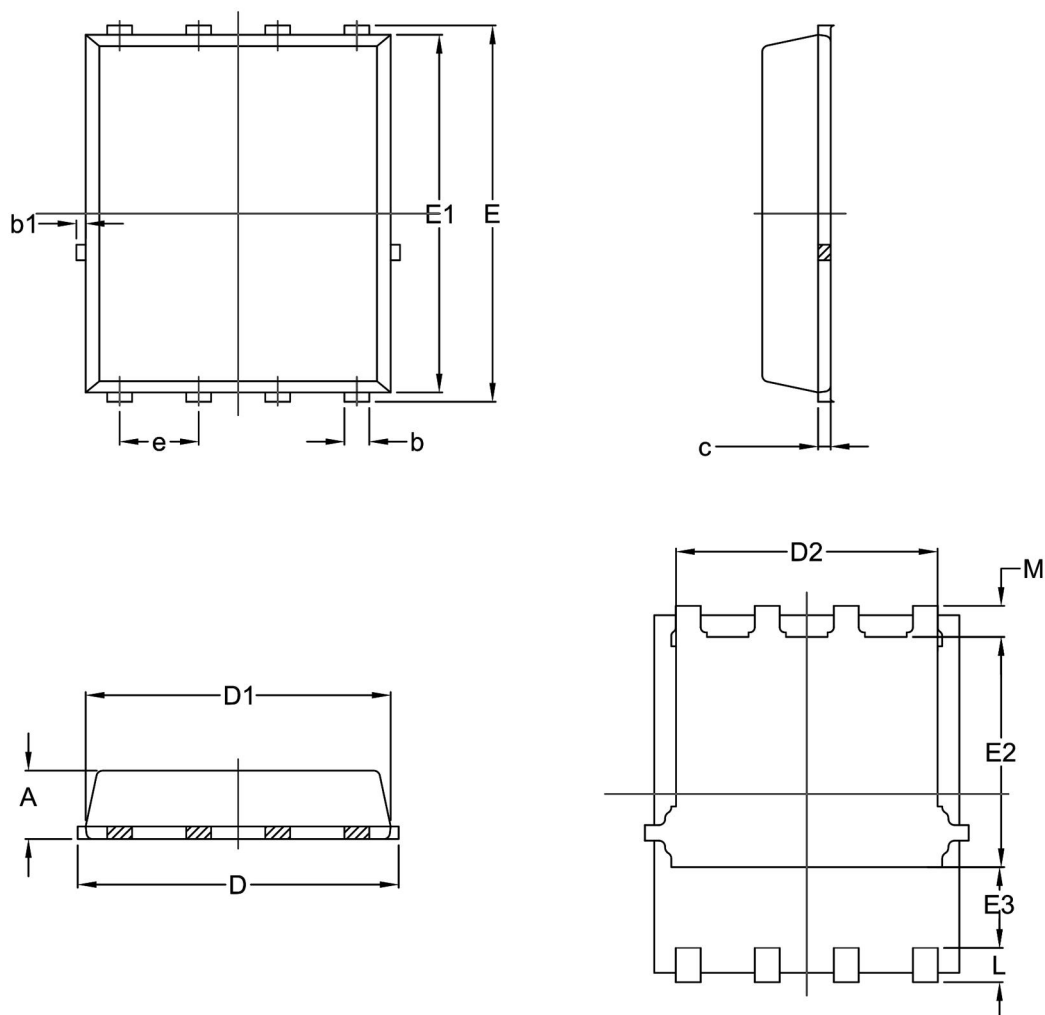


Figure 10. Normalized Maximum Transient Thermal Impedance



DFN5X6-8L Package Information



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.20
b	0.30	0.40	0.50
b1	0.02	0.15	0.22
c	0.15	0.20	0.35
D	4.95	5.15	5.35
D1	4.80	4.90	5.00
D2	4.00	4.20	4.40
E	5.95	6.05	6.25
E1	5.65	5.75	5.85
E2	3.50	3.70	3.90
E3	1.10	/	/
e	1.27		
L	0.40	0.55	0.70
M	0.35	0.50	0.65