

P-Channel Enhancement Mode Power MOSFET

Description

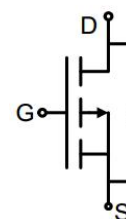
The G45P40D3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

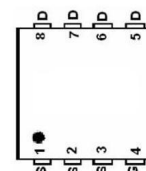
- V_{DS} -40V
- I_D (at $V_{GS} = -10V$) -30A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 14m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 20m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

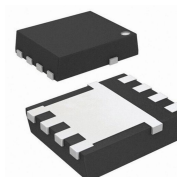
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN3X3-8L

Ordering Information

Device	Package	Marking	Packaging
G45P40D3	DFN3X3-8L	G45P40D3-MT	3000pcs/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	I_D	-30	A
Pulsed Drain Current (note1)	I_{DM}	-120	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	32	W
Single pulse avalanche energy (note2)	E_{AS}	132	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	3.9	$^\circ\text{C/W}$

Specifications T _J = 25°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 = -250μA	-40	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -40V, V _{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.2	-1.6	-2.3	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -10A	--	10.8	14	mΩ
		V _{GS} = -4.5V, I _D = -10A	--	14.7	20	
Forward Transconductance	g _{FS}	V _{DS} = -5V,I _D = -10A	--	26	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -20V, f = 1.0MHz	--	3300	--	pF
Output Capacitance	C _{oss}		--	350	--	
Reverse Transfer Capacitance	C _{rss}		--	290	--	
Total Gate Charge	Q _g	V _{DD} = -20V, I _D = -10A, V _{GS} = -10V	--	60	--	nC
Gate-Source Charge	Q _{gs}		--	10	--	
Gate-Drain Charge	Q _{gd}		--	12	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -20V, I _D = -10A, R _G = 3Ω	--	13	--	ns
Turn-on Rise Time	t _r		--	11	--	
Turn-off Delay Time	t _{d(off)}		--	28	--	
Turn-off Fall Time	t _f		--	14	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-30	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -10A, V _{GS} = 0V	--	--	-1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = -10A, V _{GS} = 0V di/dt=-100A/us	--	26	--	nC
Reverse Recovery Time	T _{rr}		--	15	--	ns

Notes

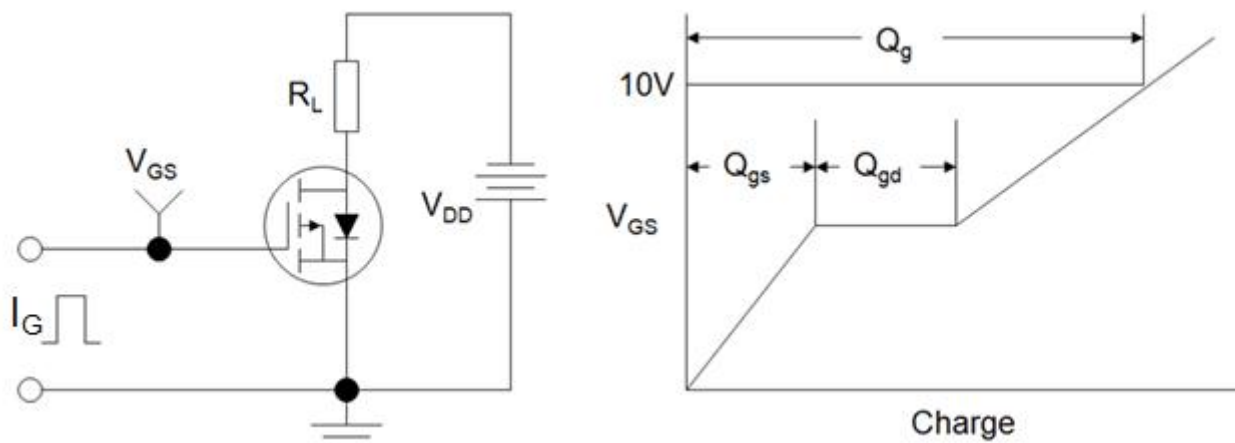
1. Repetitive Rating: Pulse width limited by maximum junction temperature

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 360mJ 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

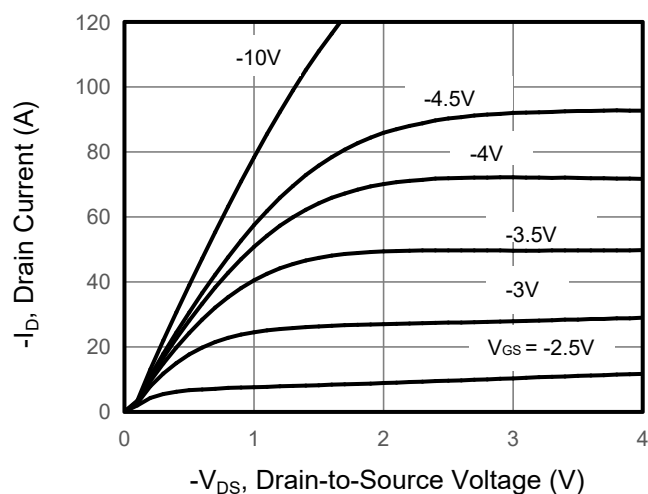


Figure 2. Transfer Characteristics

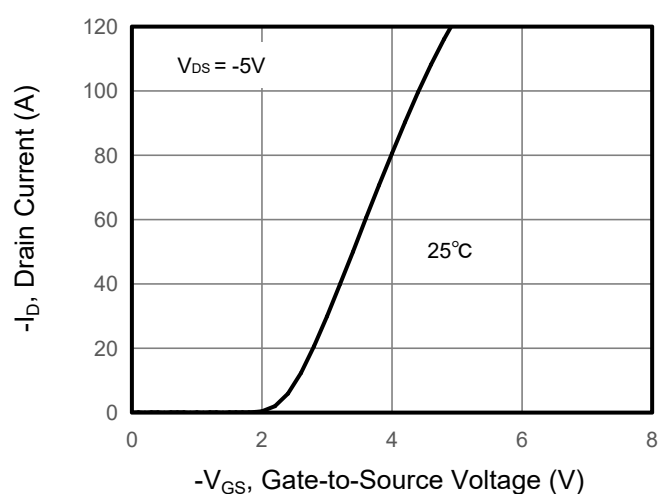


Figure 3. Drain Source On Resistance

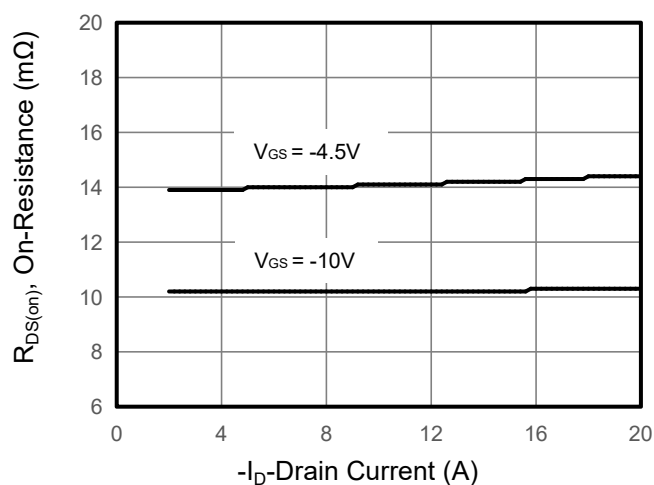


Figure 4. Gate Charge

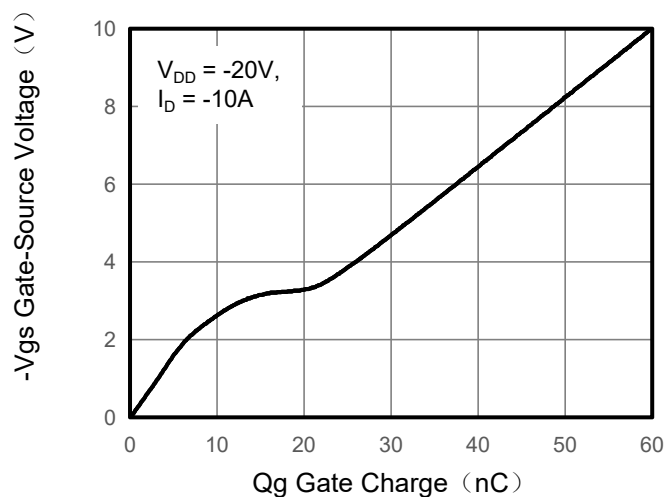


Figure 5. Capacitance

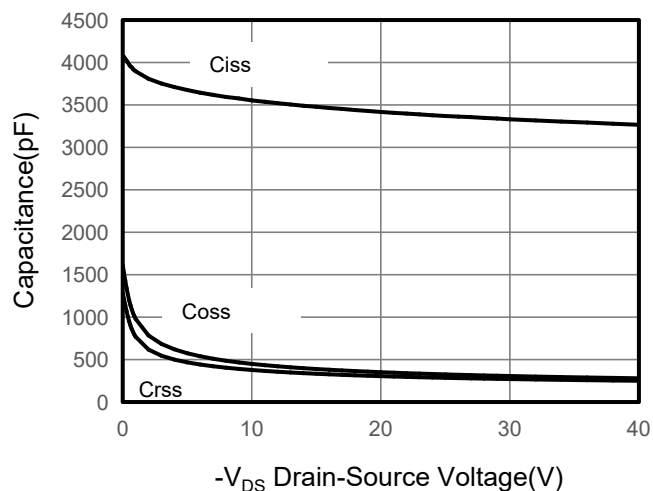
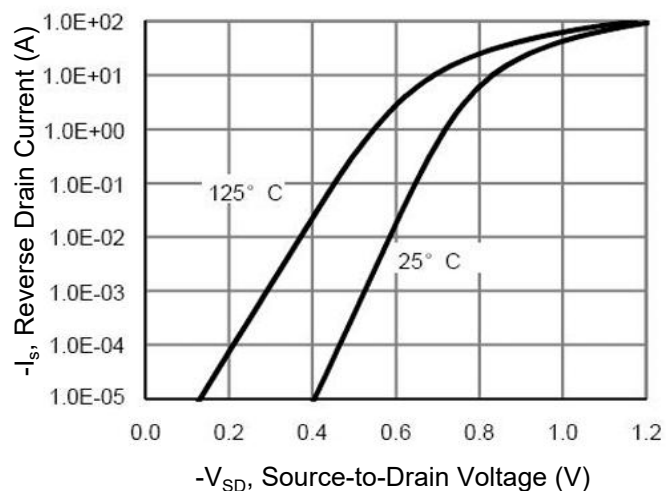


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

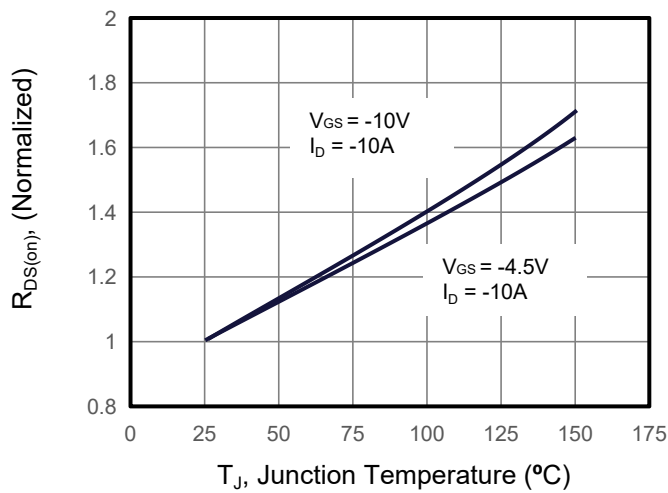


Figure 10. Safe Operation Area

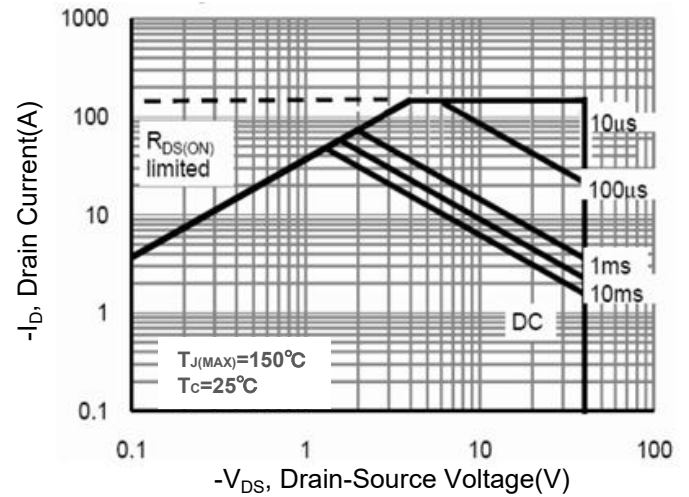
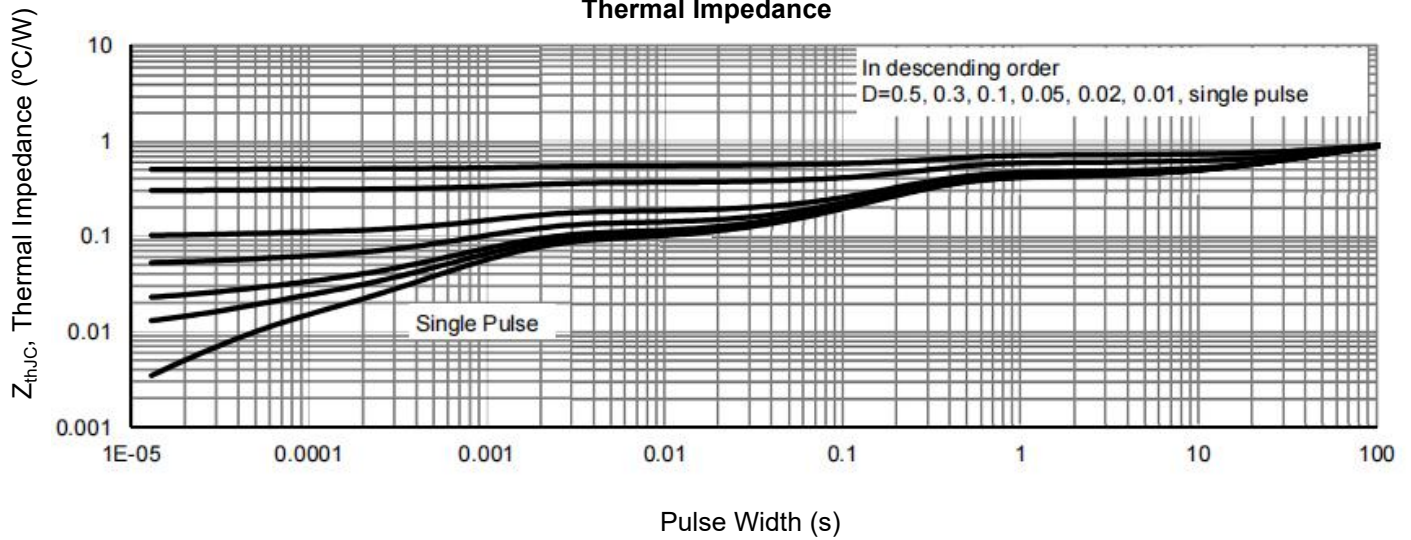
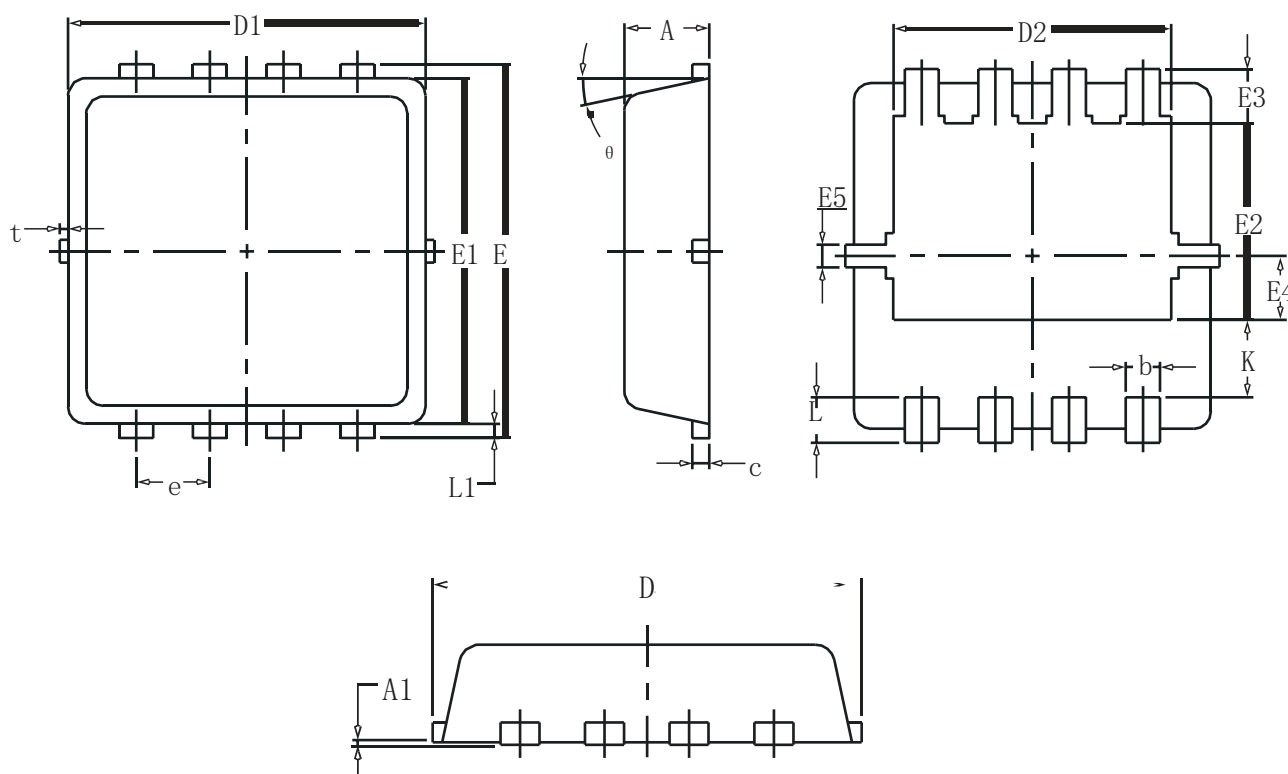


Figure 9. Normalized Maximum Transient Thermal Impedance



DFN3x3-8L Package Information



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	-	-	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
θ	10°	12°	14°