



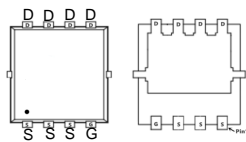
TM50P03DF

P-Channel Enhancement Mosfet

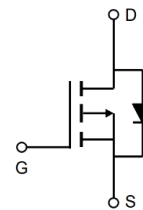
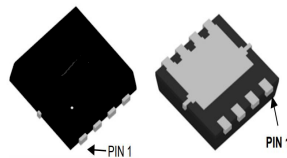
<p>General Description</p> <ul style="list-style-type: none"> • Low R_{DS(ON)} • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>V_{DS} = -30V I_D = -50A R_{DS(ON)} = 9.5mΩ (typ.) @ V_{GS} = -10V</p> <p>100% UIS Tested 100% R_g Tested</p>
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DF:DFN3.3x3.3-8L



Marking: 30P13



Absolute Maximum Ratings (T_A = 25°C, unless otherwise noted)

Symbol	Parameter	Rating	Unit	
Common Ratings				
V _{DSS}	Drain-Source Voltage	-30	V	
V _{GSS}	Gate-Source Voltage	±25		
T _J	Maximum Junction Temperature	150	°C	
T _{STG}	Storage Temperature Range	-55 to 150		
I _S	Diode Continuous Forward Current	T _C =25°C	A	
I _D	Continuous Drain Current	T _C =25°C		-50
		T _C =100°C		-32.5
I _{DM}	Pulsed Drain Current	T _C =25°C	-185	
P _D	Maximum Power Dissipation	T _C =25°C	32.9	W
		T _C =100°C	13.2	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	3.8	°C/W
R _{θJA}	Thermal Resistance-Junction to Ambient	t ≤ 10s	40	°C/W
		Steady State	75	
I _{AS} ^a	Avalanche Current, Single pulse	L=0.5mH	18	A
E _{AS} ^a	Avalanche Energy, Single pulse	L=0.5mH	81	mJ

Note * : Current limited by bond wire.

Note a : UIS tested and pulse width are limited by maximum junction temperature 150°C (initial temperature T_J = 25°C).

Note b : t < 10s.

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-24V, V_{GS}=0V$	-	-	-1	μA
		$T_J=85^\circ\text{C}$	-	-	-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-1.3	-1.8	-2.3	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	± 10	μA
$R_{DS(ON)}^c$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_{DS}=-20A$	-	9.5	13	m Ω
		$V_{GS}=-4.5V, I_{DS}=-10A$	-	14	18	
Diode Characteristics						
V_{SD}^c	Diode Forward Voltage	$I_{SD}=-1A, V_{GS}=0V$	-	-0.7	-1	V
t_{rr}^d	Reverse Recovery Time	$I_{SD}=-20A, di_{SD}/dt=100A/\mu s$	-	20	-	ns
Q_{rr}^d	Reverse Recovery Charge		-	8	-	nC
Dynamic Characteristics ^d						
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	9	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-15V,$ Frequency=1.0MHz	-	1380	-	pF
C_{oss}	Output Capacitance		-	280	-	
C_{rss}	Reverse Transfer Capacitance		-	217	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-15V, R_L=15\Omega,$ $I_{DS}=-1A, V_{GEN}=-10V,$ $R_G=6\Omega$	-	11	-	ns
t_r	Turn-on Rise Time		-	11	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	101	-	
t_f	Turn-off Fall Time		-	60	-	
Gate Charge Characteristics ^d						
Q_g	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-10V,$ $I_{DS}=-20A$	-	30	-	nC
Q_{gs}	Gate-Source Charge		-	1.2	-	
Q_{gd}	Gate-Drain Charge		-	11	-	

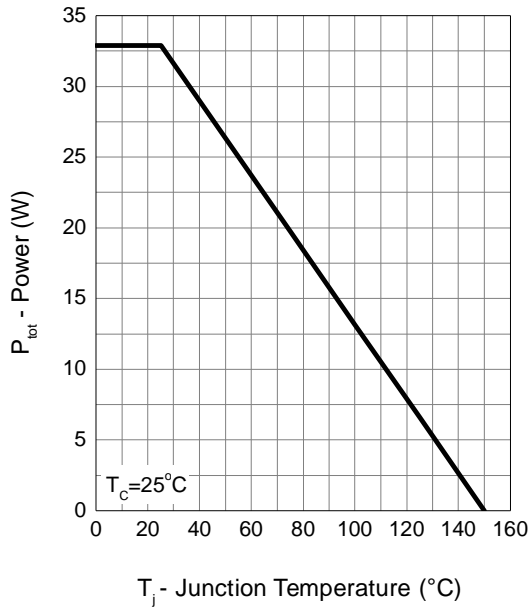
 Note c : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note d : Guaranteed by design, not subject to production testing.

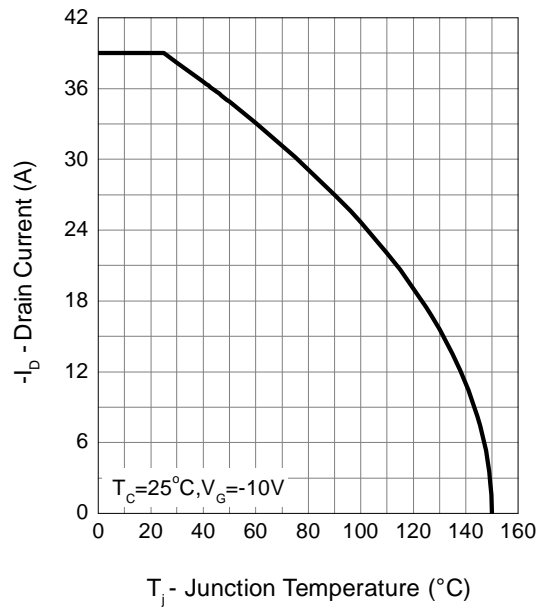


Typical Performance Characteristics

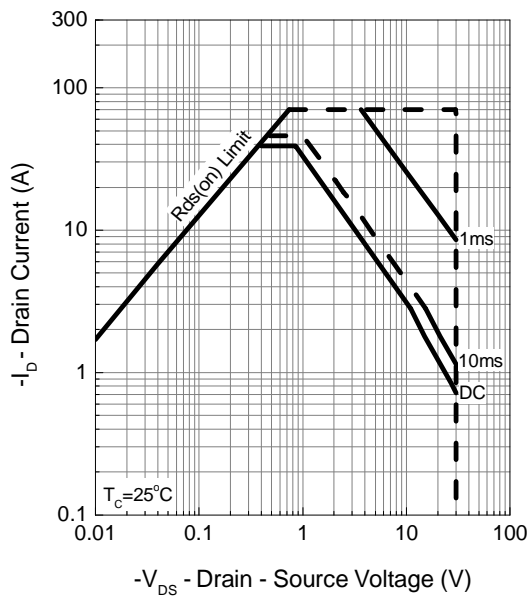
Power Dissipation



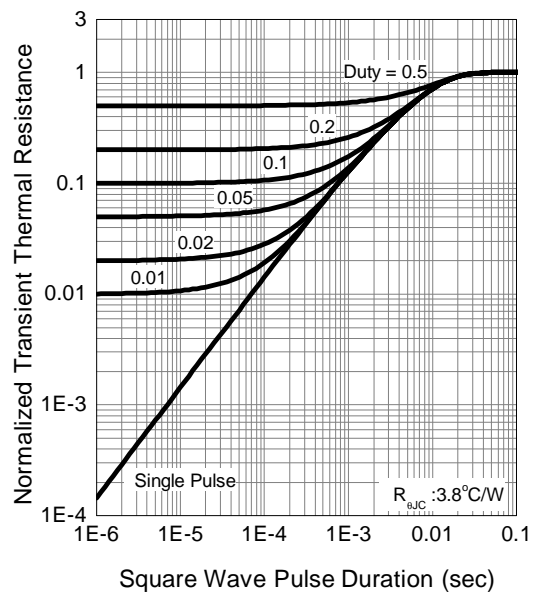
Drain Current



Safe Operation Area

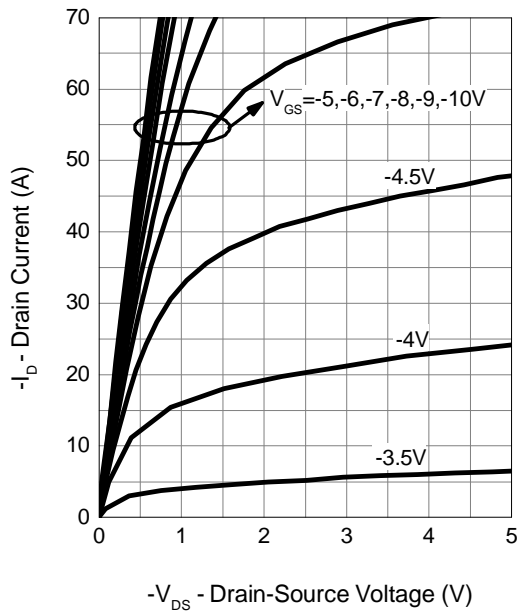


Thermal Transient Impedance

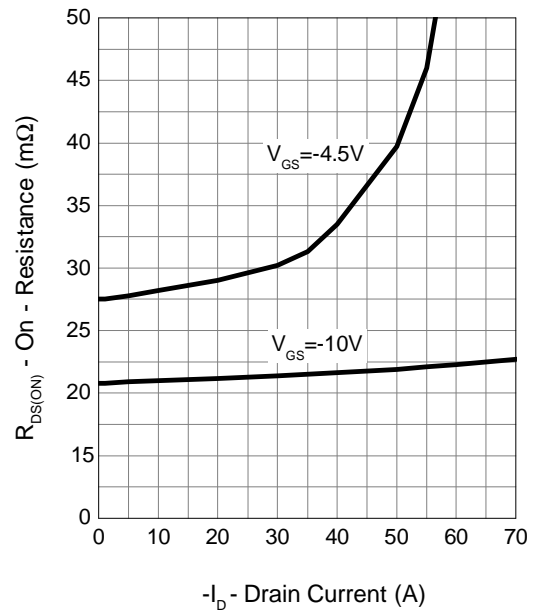




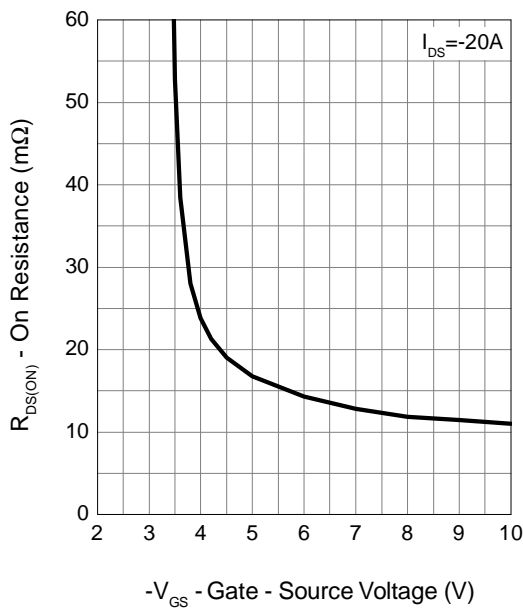
Output Characteristics



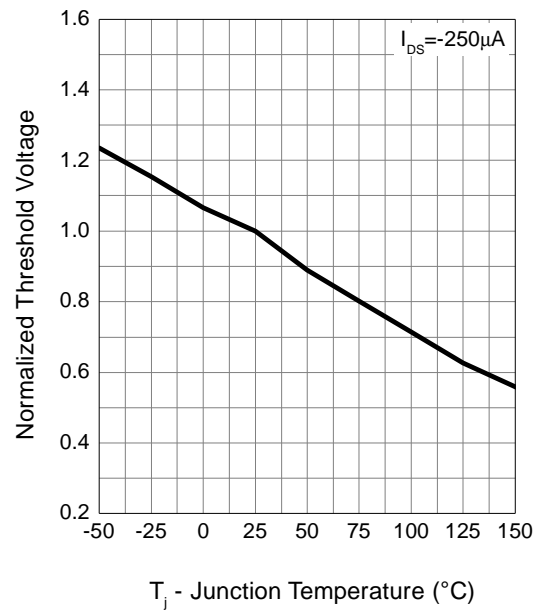
Drain-Source On Resistance



Gate-Source On Resistance



Gate Threshold Voltage

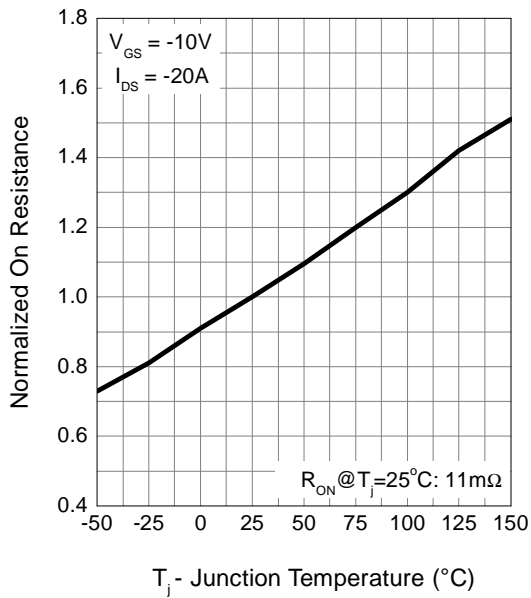




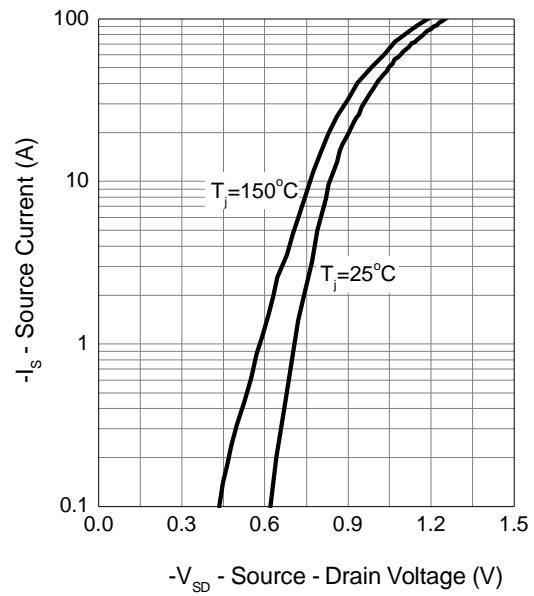
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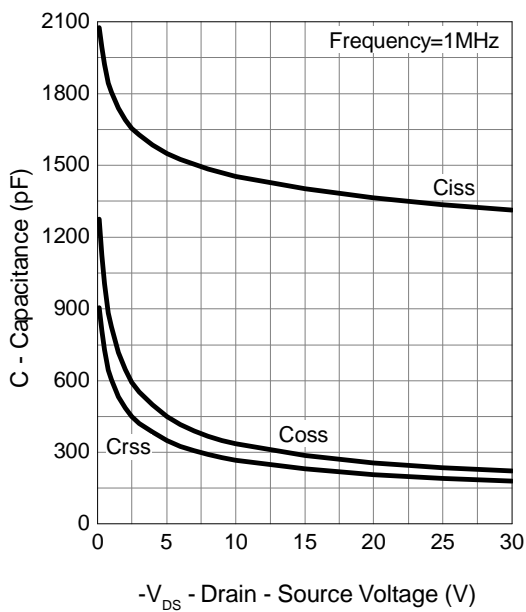
Drain-Source On Resistance



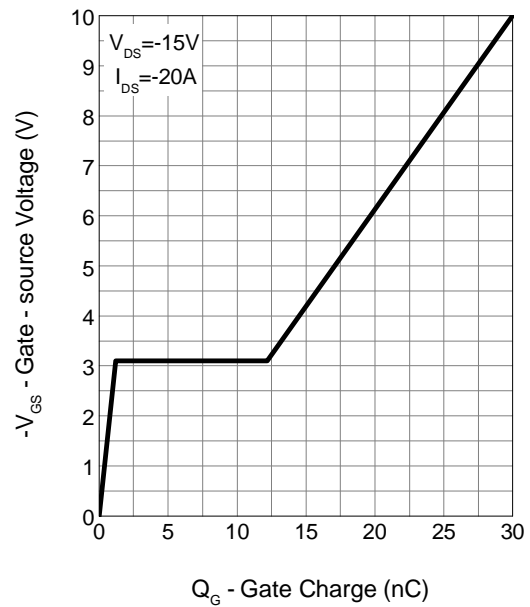
Source-Drain Diode Forward



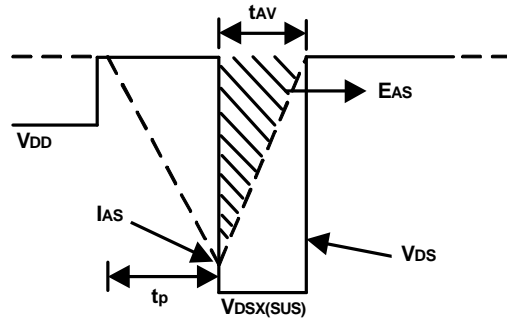
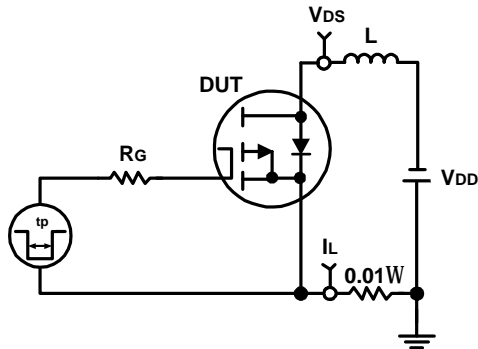
Capacitance



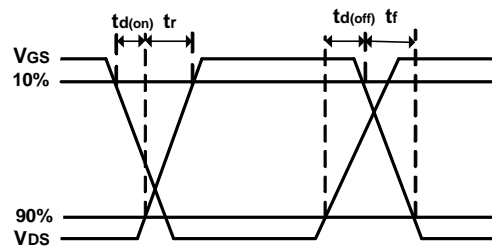
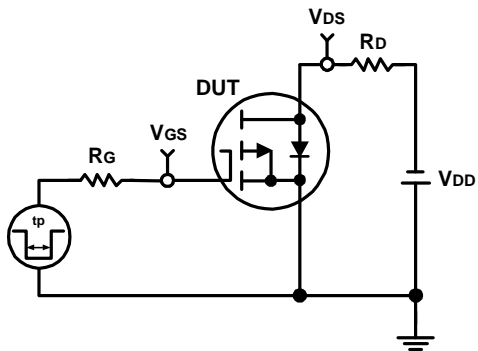
Gate Charge



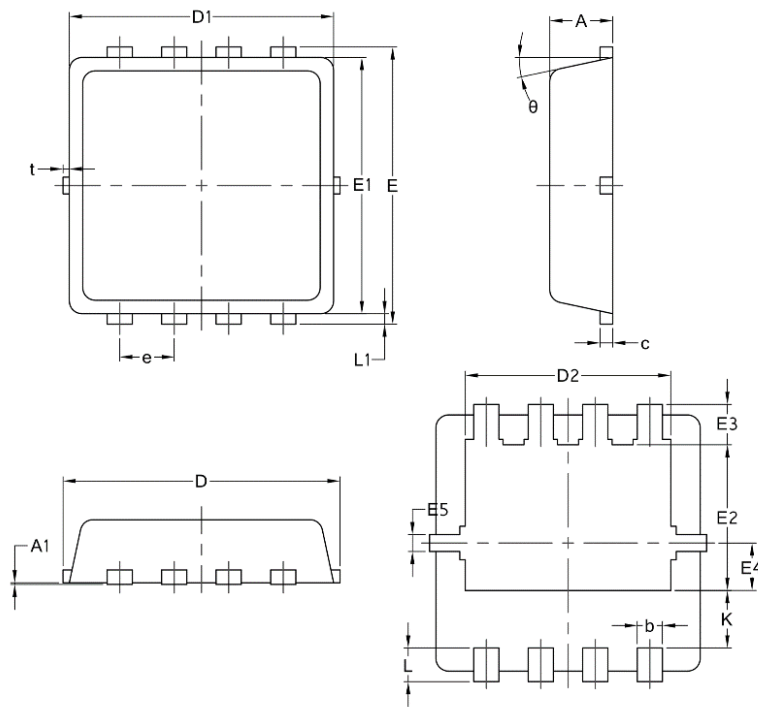
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Mechanical Data:DFN3x3-8L



Symbol	Common		
	mm		
	Mim	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
Φ	10	12	14