

TM55EH02DF

N+N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

Product Summary

$V_{DS} = 20V$ $I_D = 55A$

$R_{DS(ON)} = 3.5m\Omega$ (Typ.) @ $V_{GS} = 4.5V$

ESD protection

100% UIS Tested

100% R_g Tested



Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Rating s (T _A =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		±10	
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	55	A
I _D ^a	Continuous Drain Current	T _C =25°C	55	A
		T _C =100°C	28	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	175	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	3.5	°C/W
P _D ^c	Maximum Power Dissipation	T _A =25°C	1.6	W
		T _A =70°C	1	
R _{θJA} ^d	Thermal Resistance-Junction to Ambient	Steady State	78	°C/W
I _{AS} ^e	Avalanche Current, Single pulse (L=0.1mH)		45	A
E _{AS} ^e	Avalanche Energy, Single pulse (L=0.1mH)		100	mJ

Note a: Package is limited by 50A

Note b: Pulse width limited by max. junction temperature.

Note c: $R_{\theta JA}$ steady state=999s.

Note d: $R_{\theta JA}$ steady state=999s. $R_{\theta JA}$ is measured with the device mounted on 1in2, Fr-4 board with 2oz.Copper.

Note e: UIS tested and pulse width limited by maximum junction temperature $150^\circ C$ (initial temperature $T_J = 25^\circ C$).

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

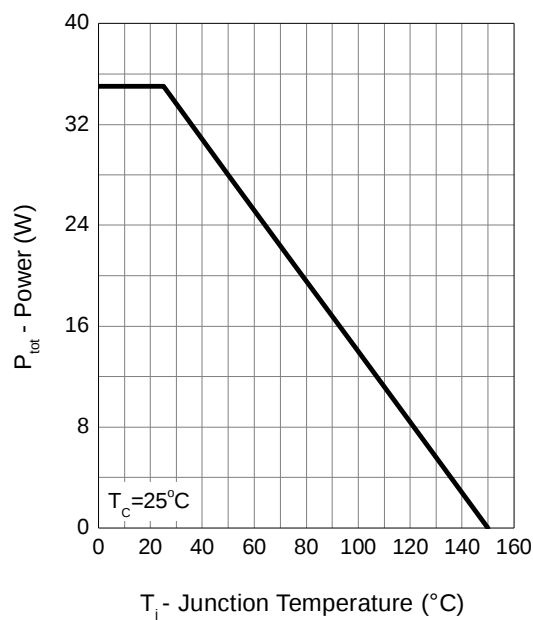
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =14.4V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±10V, V _{DS} =0V	-	-	±10	μA
R _{DS(ON)} ^g	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =13.5A	-	3.5	4.4	mΩ
		V _{GS} =2.5V, I _{DS} =10A	-	4.5	6	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =10A	-	34	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =2A, V _{GS} =0V	-	0.7	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =13.5A,	-	18	-	ns
Q _{rr}	Reverse Recovery Charge	dI _{SD} /dt=100A/μs	-	6.2	-	nC
Dynamic Characteristics ^g						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2	3.6	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Frequency=1.0MHz	-	3775		pF
C _{oss}	Output Capacitance		-	730		
C _{rss}	Reverse Transfer Capacitance		-	525		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =10V, R _L =10Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	14	26	ns
t _r	Turn-on Rise Time		-	14.5	27	
t _{d(OFF)}	Turn-off Delay Time		-	130	234	
t _f	Turn-off Fall Time		-	70	126	
Gate Charge Characteristics ^g						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _{DS} =13.5A	-	35	50	nC
Q _{gs}	Gate-Source Charge		-	4.7	-	
Q _{gd}	Gate-Drain Charge		-	11.5	-	

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

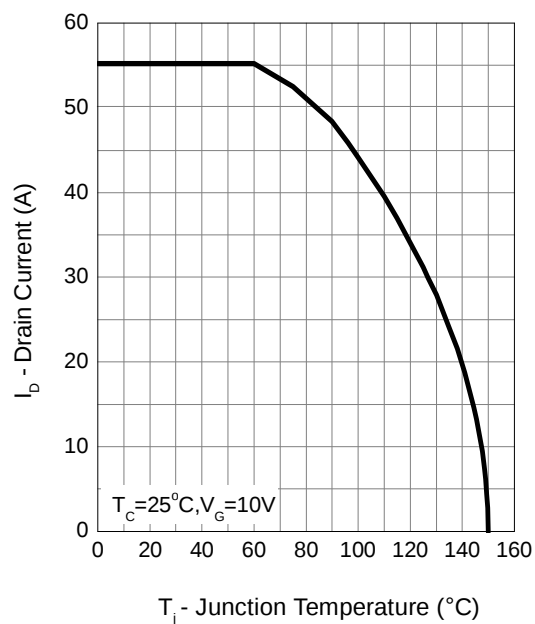
Note g: Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

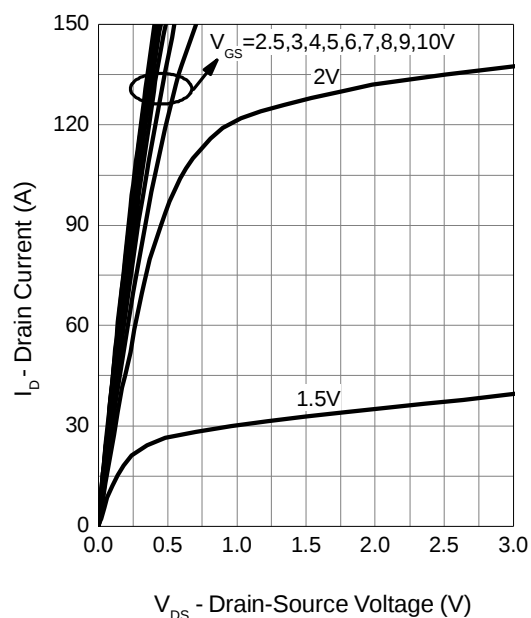
Power Dissipation



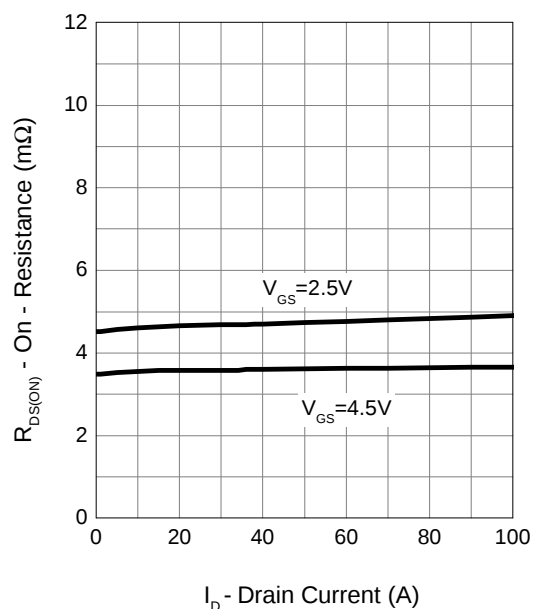
Drain Current



Output Characteristics



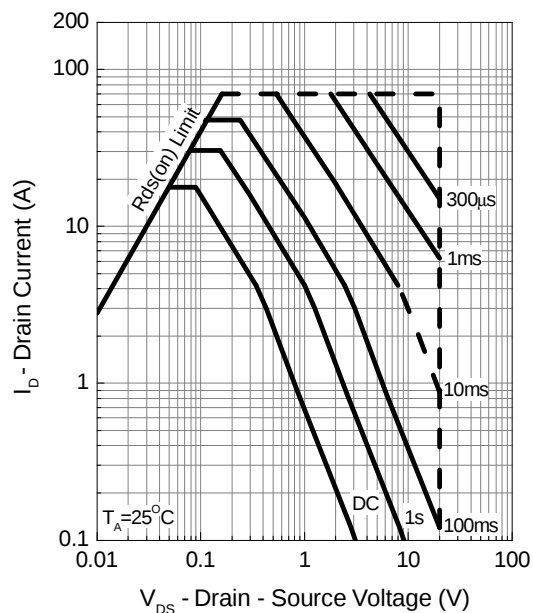
Drain-Source On Resistance



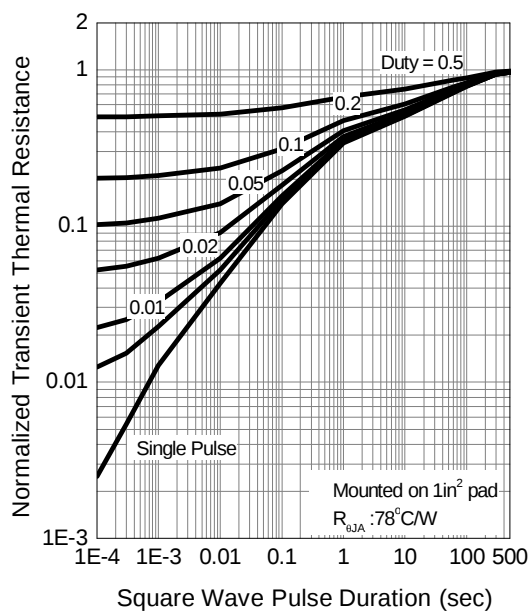
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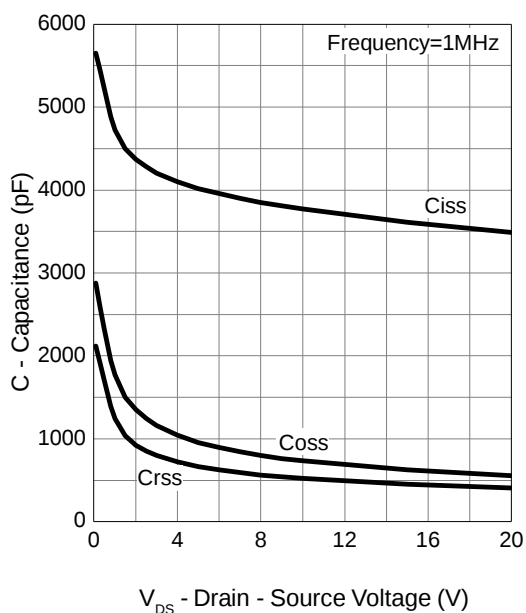
Safe Operation Area



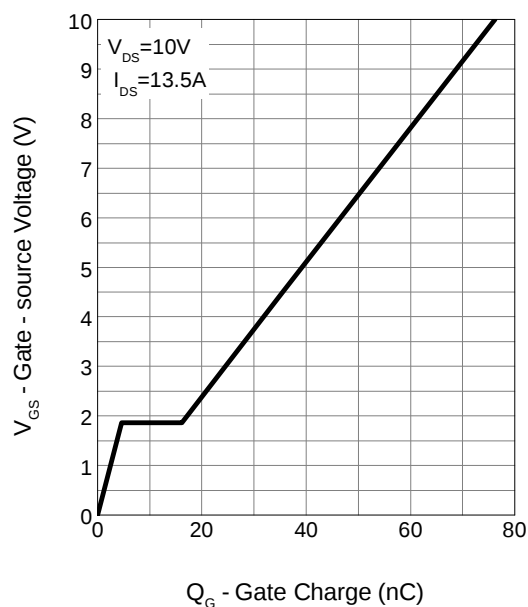
Thermal Transient Impedance



Capacitance



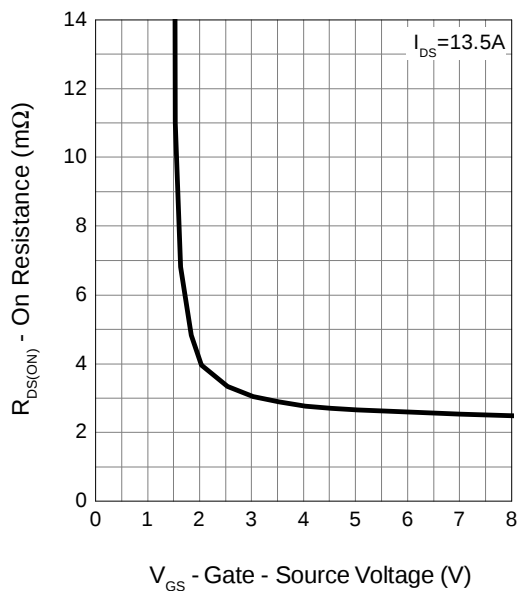
Gate Charge



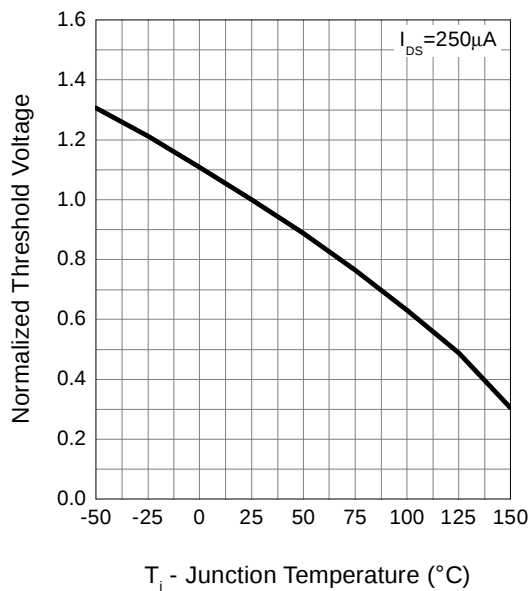
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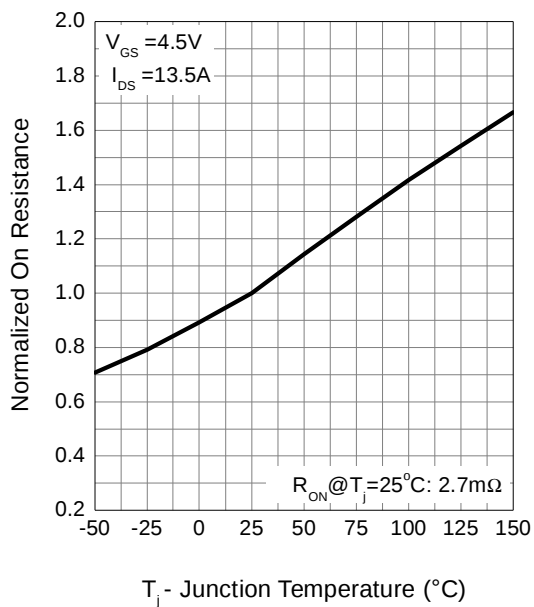
Gate-Source On Resistance



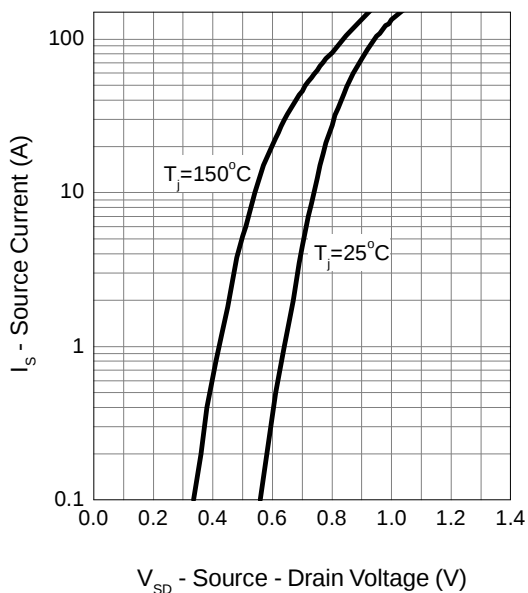
Gate Threshold Voltage



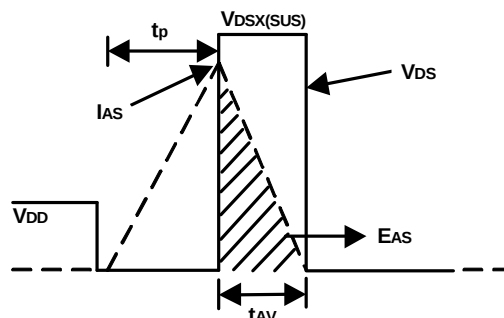
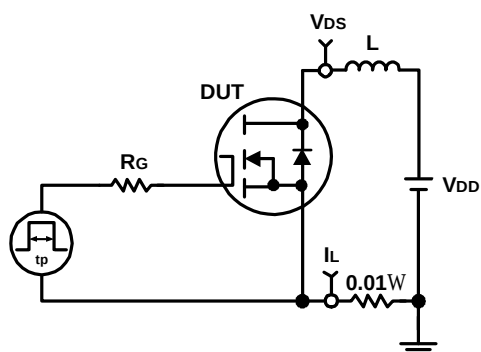
Drain-Source On Resistance



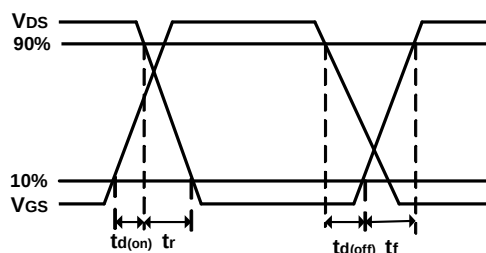
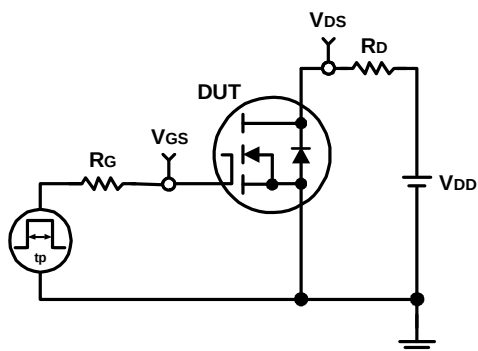
Source-Drain Diode Forward



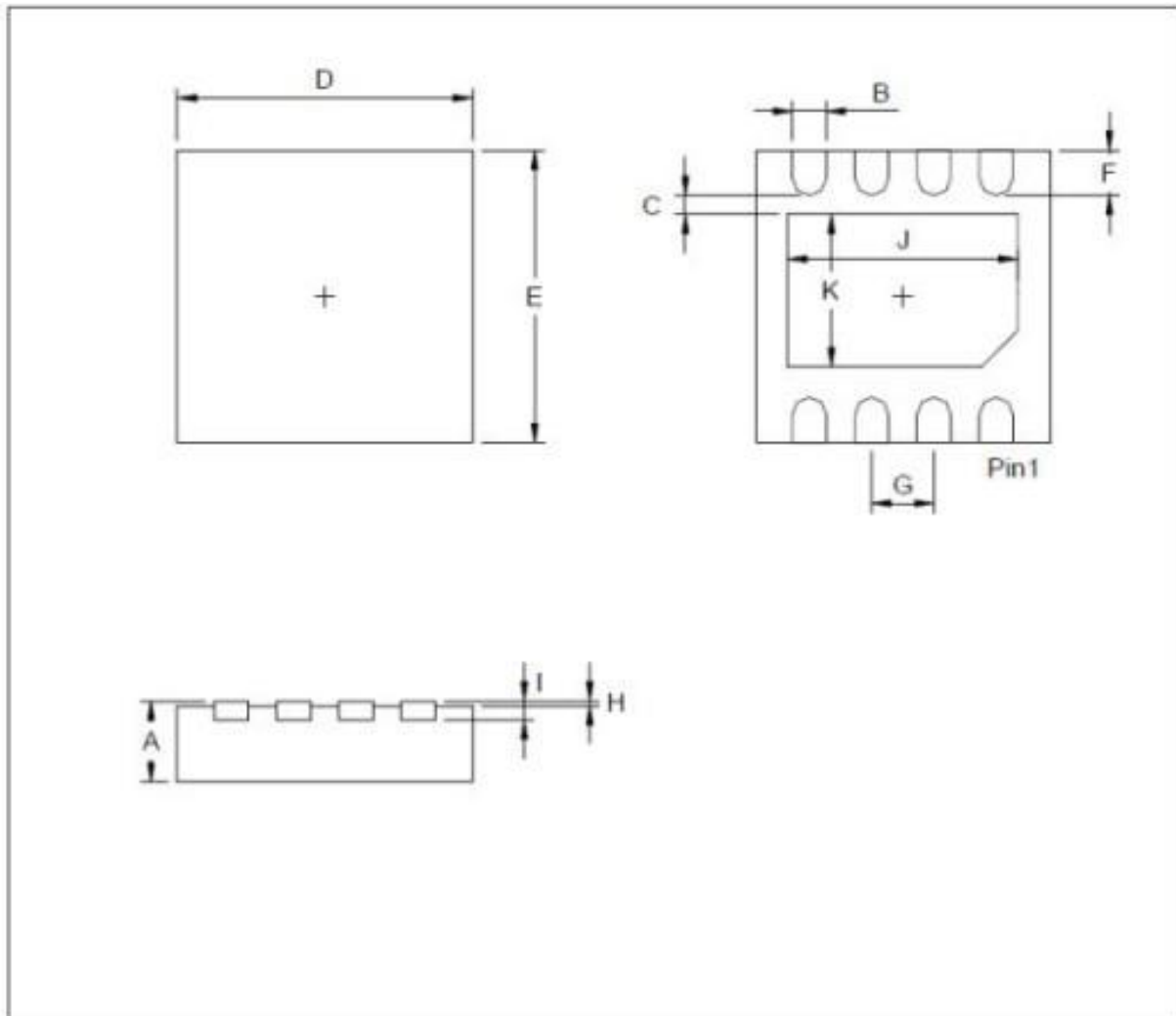
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Mechanical Data:DFN3x3-8L



Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	0.7		0.8	I		0.203	
B	0.25		0.35	J	2.2		2.4
C	0.2			K	1.4		1.6
D	2.924		3.076				
E	2.924		3.076				
F	0.324		0.476				
G		0.65					
H	0		0.05				