

TM30P02DF

P -Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

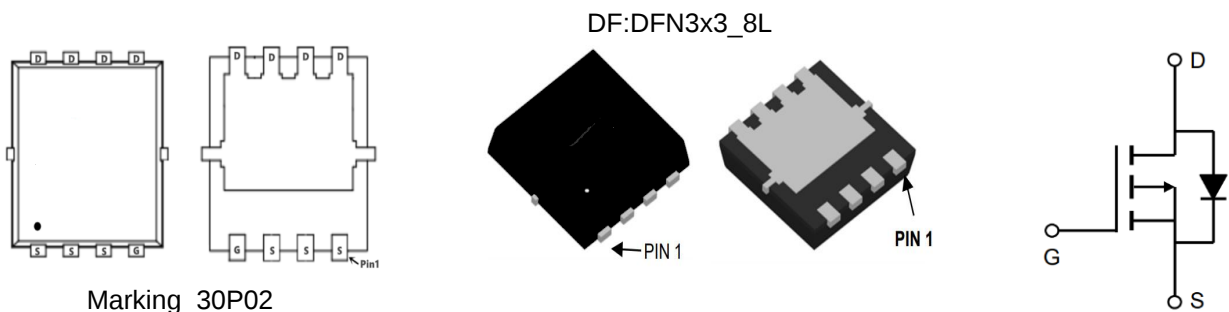
General Features

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

$R_{DS(ON)} = 15m\Omega (typ.) @ V_{GS} = -4.5V$

100% UIS Tested

100% R_g Tested



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		-20	V
V_{GSS}	Gate-Source Voltage		± 12	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-20	A
		$T_A = 100^\circ C$	-12	A
I_{DM}	Pulsed Drain Current ^{note1}		-28	A
P_D	Power Dissipation	$T_A = 25^\circ C$	5	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		62.5	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ C$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} =0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±12V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-0.4	-0.7	-1.0	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} = -4.5V, I _D = -7A	-	15	20	mΩ
		V _{GS} = -2.5V, I _D = -5A	-	21.	32	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -10V, V _{GS} =0V, f=1.0MHz	-	2000	-	pF
C _{oss}	Output Capacitance		-	242	-	pF
C _{rss}	Reverse Transfer Capacitance		-	231	-	pF
Q _g	Total Gate Charge	V _{DS} = -10V, I _D = -3A, V _{GS} = -4.5V	-	15.3	-	nC
Q _{gs}	Gate-Source Charge		-	2.2	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	4.4	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -10V, I _D = -7A, V _{GS} = -4.5V, R _{GEN} =2.5Ω	-	10	-	ns
t _r	Turn-on Rise Time		-	31	-	ns
t _{d(off)}	Turn-off Delay Time		-	28	-	ns
t _f	Turn-off Fall Time		-	8	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-20	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-28	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -7A	-	-0.8	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

Figure1: Output Characteristics

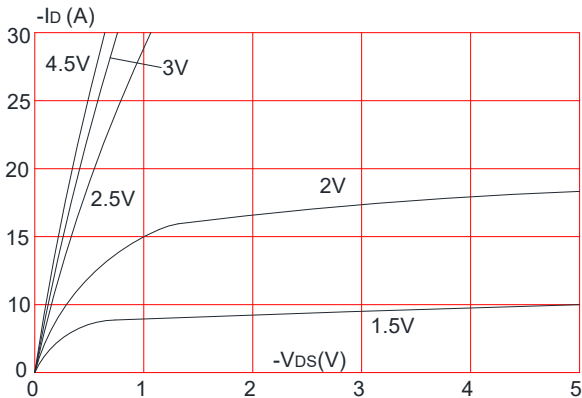


Figure 2: Typical Transfer Characteristics

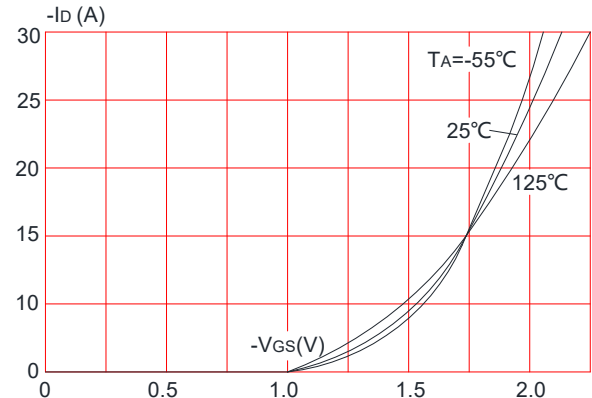


Figure 3: On-resistance vs. Drain Current

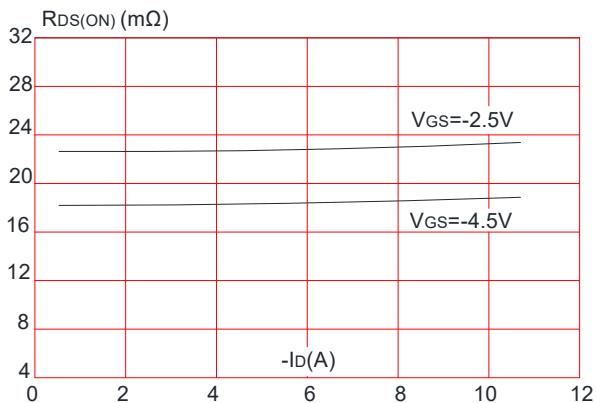


Figure 4: Body Diode Characteristics

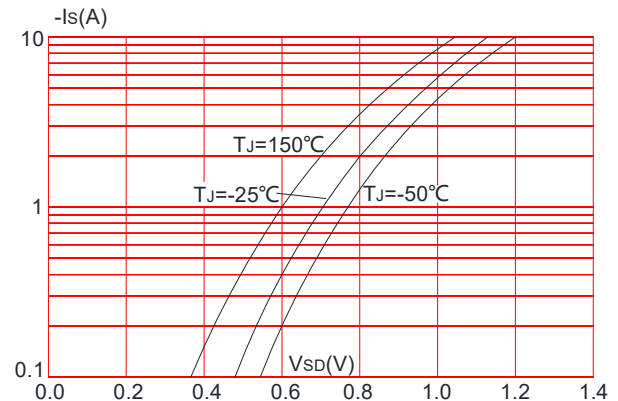


Figure 5: Gate Charge Characteristics

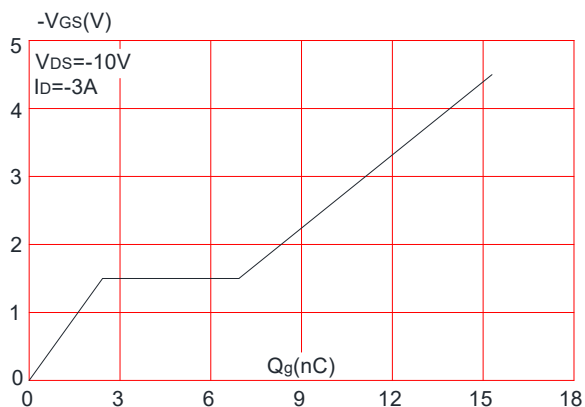
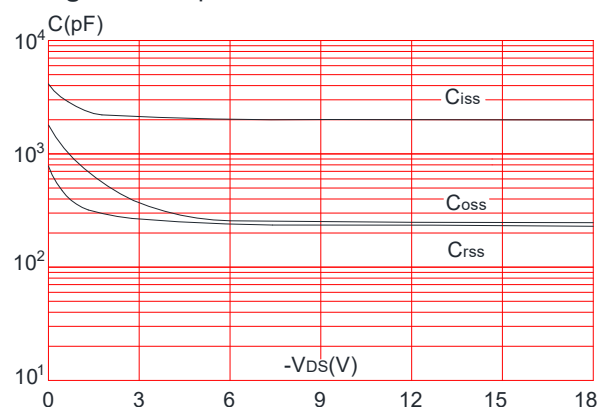


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

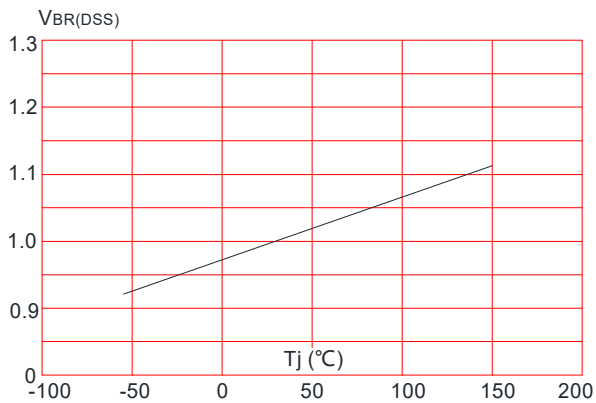


Figure 8: Normalized on Resistance vs. Junction Temperature

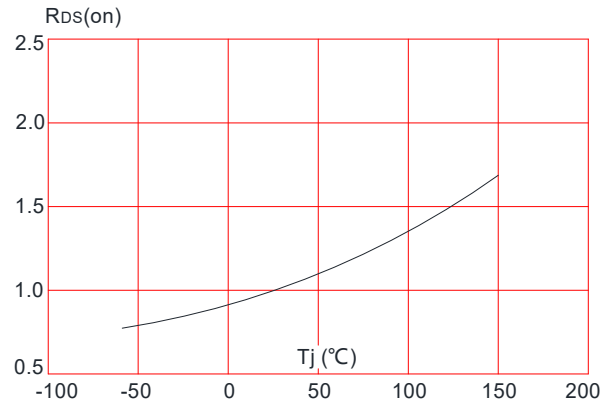


Figure 9: Maximum Safe Operating Area

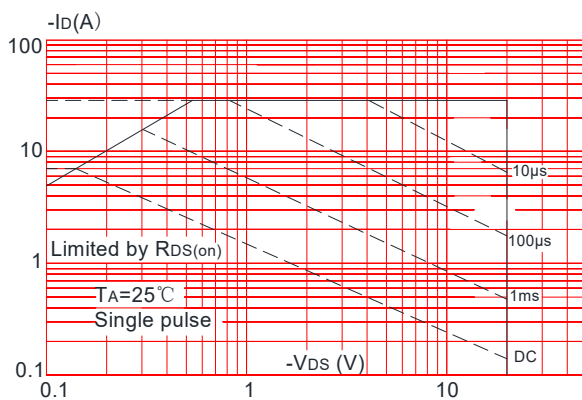


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

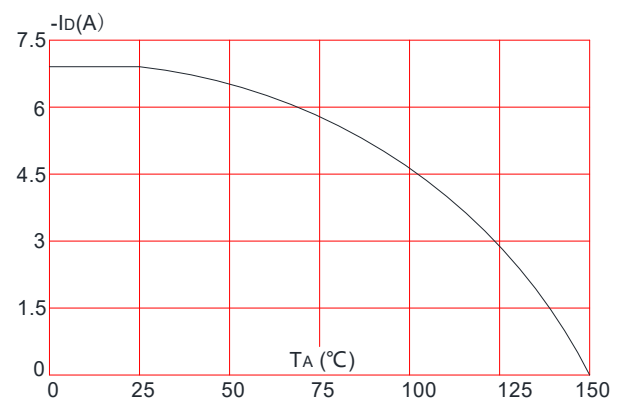
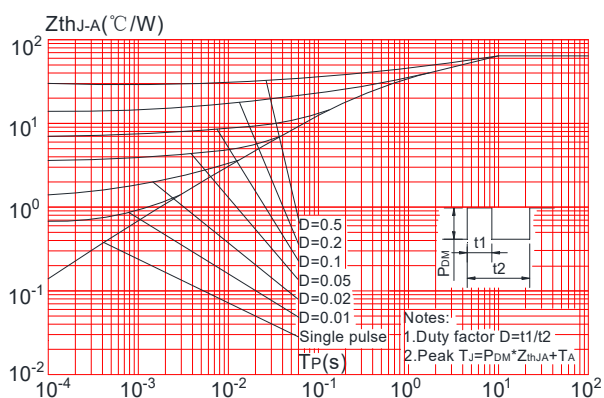
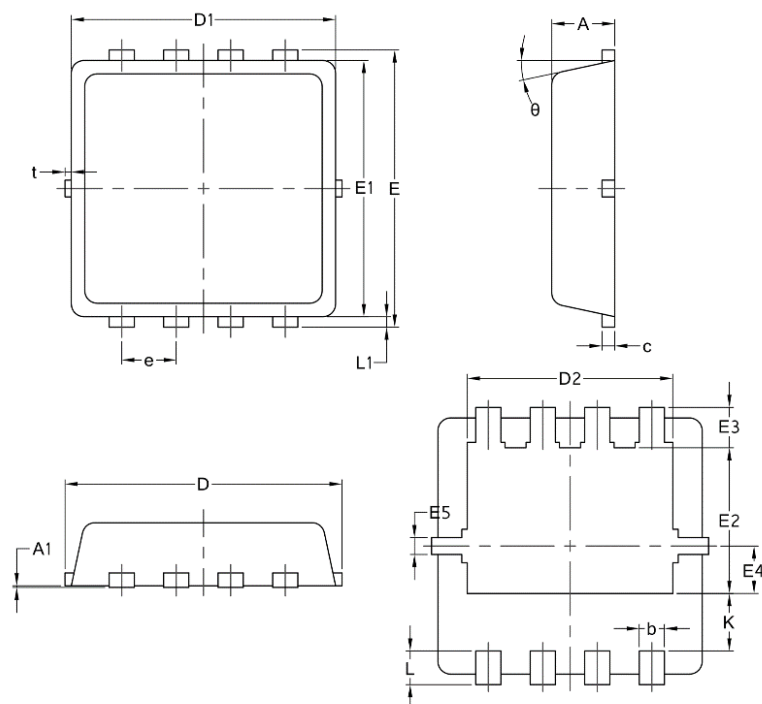


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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