

**TM30P02DF**

**P -Channel Enhancement Mosfet**

**General Description**

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

**Applications**

- Load switch
- PWM

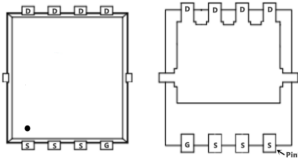
**General Features**

$V_{DS} = -20V$   $I_D = -30A$   
 $R_{DS(ON)} = 15m\Omega(\text{typ.}) @ V_{GS} = -4.5V$

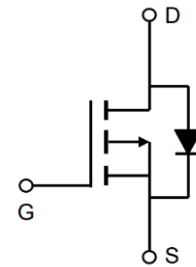
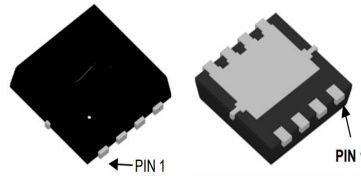
- 100% UIS Tested
- 100%  $R_g$  Tested



DF:DFN3x3\_8L



Marking 30P02



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

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	-20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current	$T_A = 25^\circ\text{C}$	-30
		$T_A = 100^\circ\text{C}$	-17
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	-98	A
$P_D$	Power Dissipation	5	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	$^\circ\text{C}/\text{W}$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

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

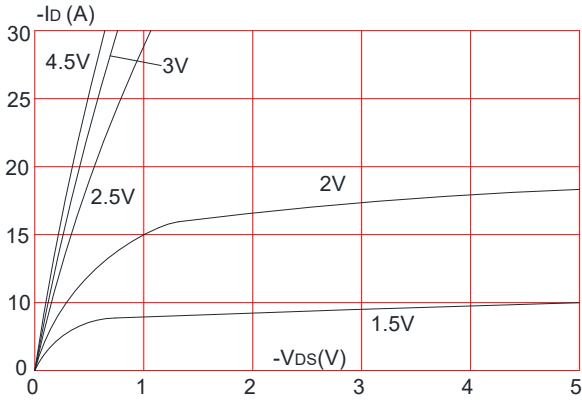
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V,$	-	-	-1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=-4.5V, I_D=-7A$	-	15	20	m $\Omega$
		$V_{GS}=-2.5V, I_D=-5A$	-	21.	28	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V,$ $f=1.0MHz$	-	1800	-	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
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-10V, I_D=-7A,$ $V_{GS}=-4.5V,$ $R_{GEN}=2.5\Omega$	-	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
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	-30	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

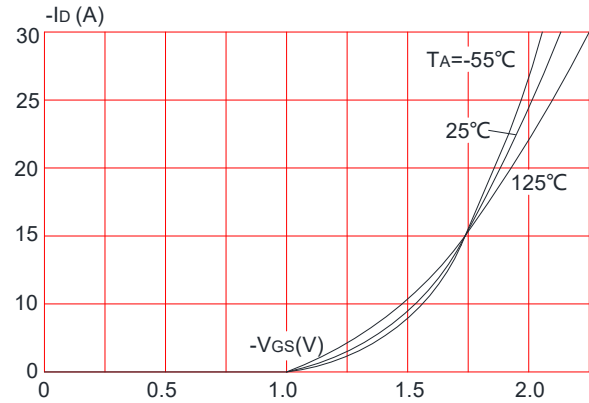
 2. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$

## Typical Performance Characteristics

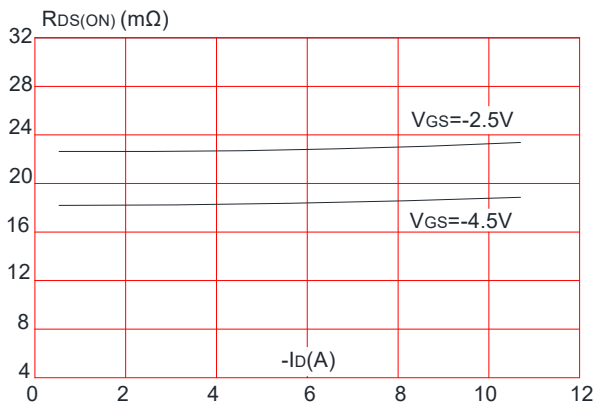
**Figure 1: Output Characteristics**



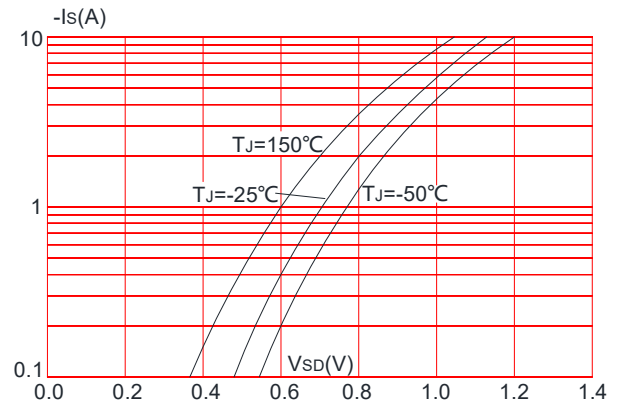
**Figure 2: Typical Transfer Characteristics**



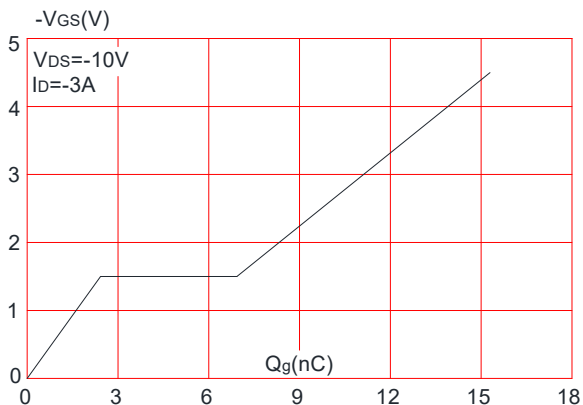
**Figure 3: On-resistance vs. Drain Current**



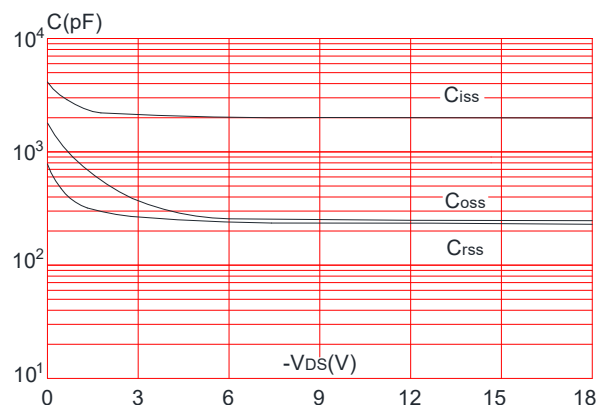
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

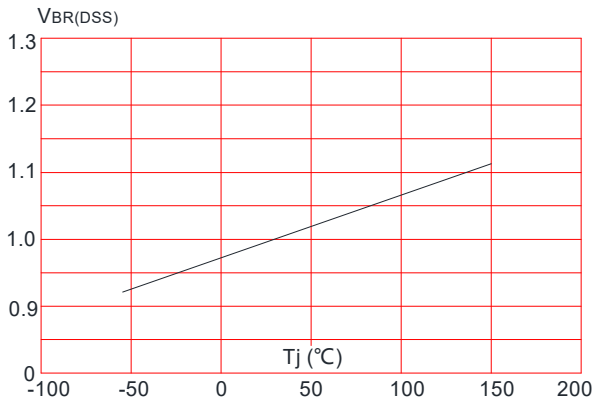


**Figure 6: Capacitance Characteristics**

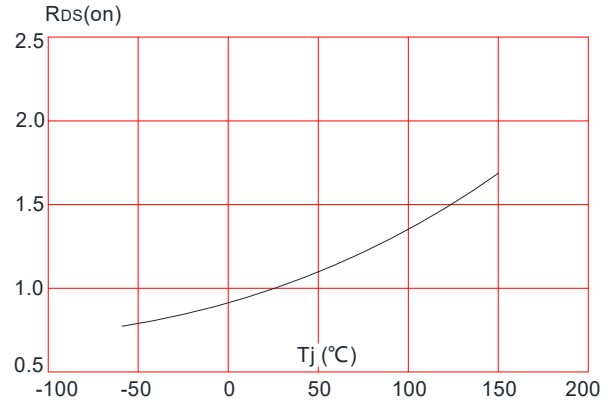


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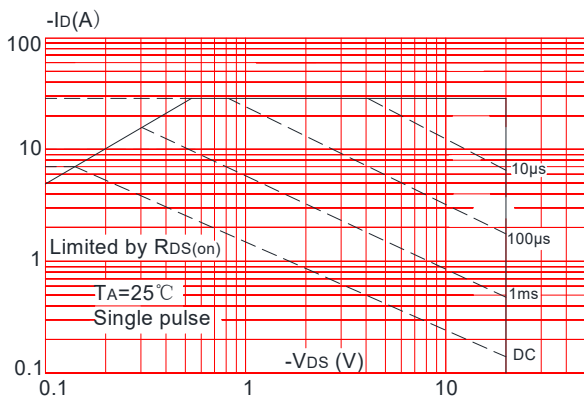
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



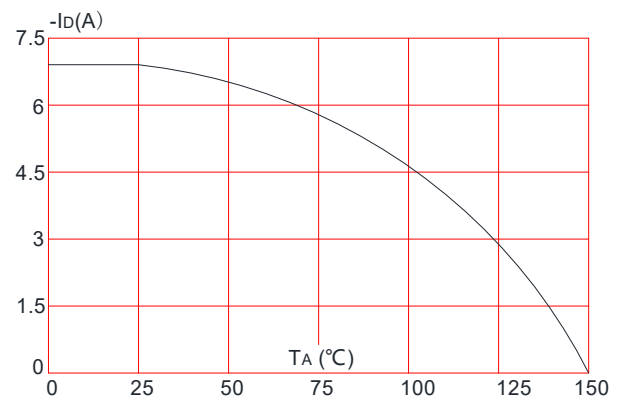
**Figure 8: Normalized on Resistance vs. Junction Temperature**



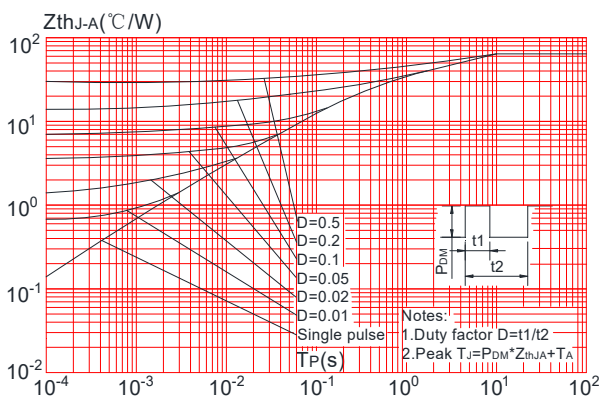
**Figure 9: Maximum Safe Operating Area**



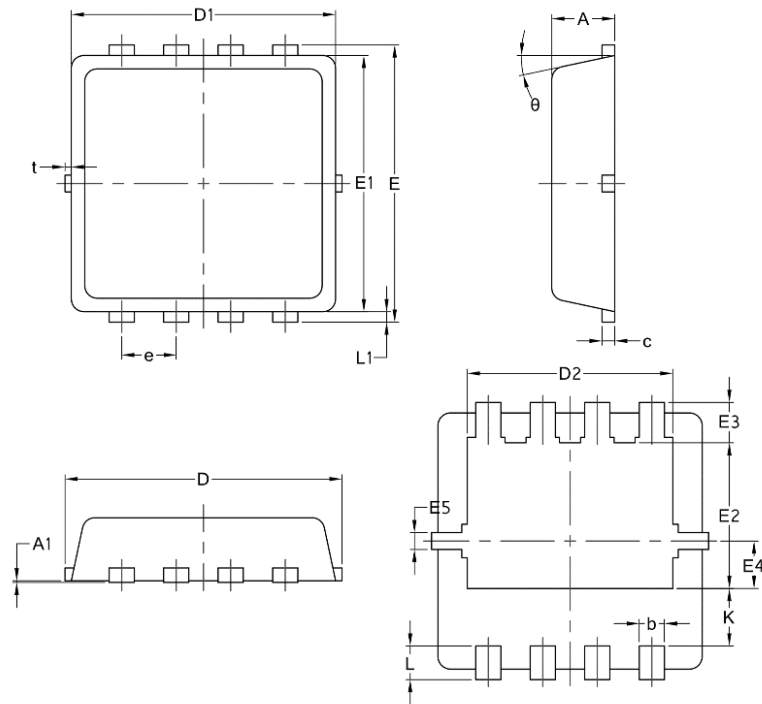
**Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature**



**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
$\Phi$	10	12	14