
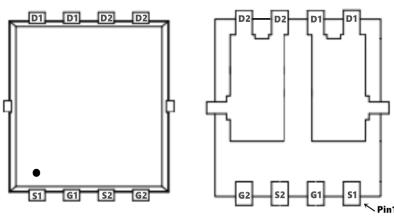


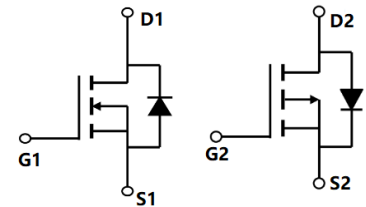
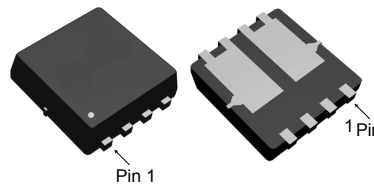
**TM3030DF**

**N+P-Channel Enhancement Mode Mosfet**

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><b>N Channel</b>  <math>V_{DS} = 30V, I_D = 30A</math>  <math>R_{DS(ON)} = 9m\Omega @ V_{GS} = 10V</math></p> <p><b>P Channel</b>  <math>V_{DS} = -30V, I_D = -30A</math>  <math>R_{DS(ON)} = 19m\Omega @ V_{GS} = -10V</math></p> <p>100% UIS Tested                  100% <math>R_g</math> Tested</p> 
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DF:DFN3x3\_8L



Marking :30G03 OR Z4616A

**Absolute Maximum Ratings:** ( $T_c = 25^\circ C$  unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
$V_{DS}$	Drain-Source Voltage	30	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	$\pm 20$	V
$I_D$	Continuous Drain Current- $T_c = 25^\circ C$	30	-30	A
	Continuous Drain Current- $T_c = 100^\circ C$	7.2	-7.2	
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	44	-44	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	20	25	mJ
$P_D$	Power Dissipation - $T_c = 25^\circ C$	3.3	5.6	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

**Thermal Characteristics:**

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	38	22	$^\circ C/W$

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N+P-Channel Enhancement Mode Mosfet

N-Channel Electrical Characteristics: ( $T_C=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	30	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1	1.4	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance <sup>note3</sup>	$V_{GS}=10V, I_D=10A$	---	9	15	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	16	22	
<b>Dynamic Characteristics<sup>4</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	580	---	pF
$C_{oss}$	Output Capacitance		---	110	---	
$C_{rss}$	Reverse Transfer Capacitance		---	92	---	
$Q_g$	Gate Charge	$V_{GS}=10V, V_{DS}=15V, I_D=10A$	---	13	---	nC
$Q_{gs}$	Gate-Source Charge		---	4.5	---	
$Q_{gd}$	Gate-Drain Charge		---	3.3	---	
<b>Switching Characteristics<sup>4</sup></b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=30V, I_D=10A, R_{REN}=3\ \Omega, V_{GS}=10V$	---	3	---	ns
$t_r$	Rise Time		---	6	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	19	---	ns
$t_f$	Fall Time		---	5	---	ns
<b>Drain-Source Diode Characteristics</b>						
$I_S$	Continuous Drain to Source Diode	---	---	---	30	A
$I_{SM}$	Pulsed Drain to Source Diode	---	---	---	44	A
$V_{SD}$	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=11A$	---	0.8	1.2	V
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=11A, dI/dt=100A/\ \mu\text{s}$	---	7	---	ns
$Q_{rr}$	Body Diode Reverse Recovery		---	5.9	---	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition :  $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega, I_{AS}=9A$   
 $T_J=25^\circ\text{C}, V_{DD}= -15V, V_G= -10V, L=0.5\text{mH}, R_g=25\Omega, I_{AS}= -10A$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 0.5\%$



### Typical Performance Characteristics-N

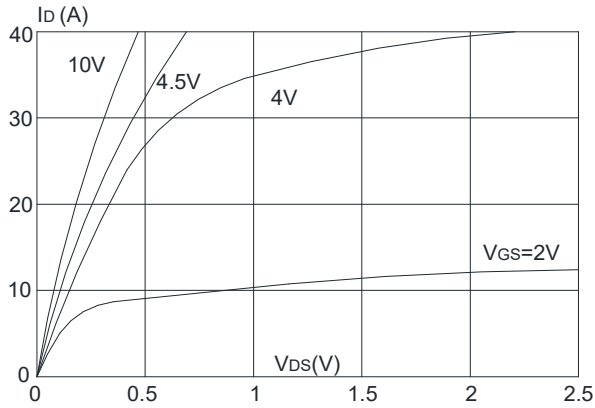


Figure1: Output Characteristics

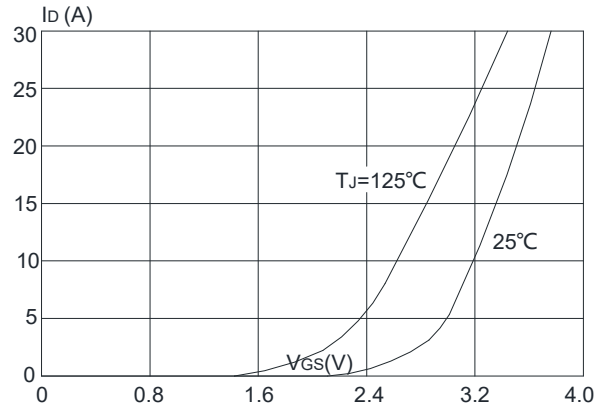


Figure 2: Typical Transfer Characteristics

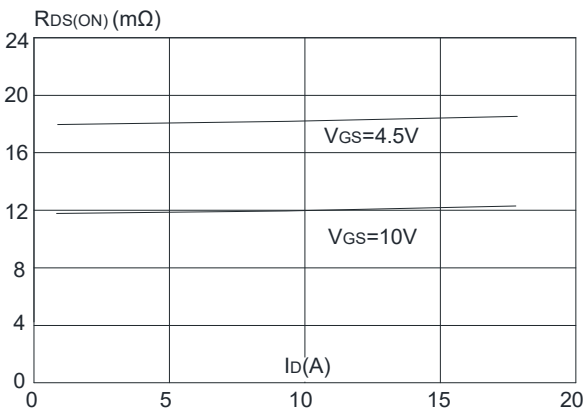


Figure 3: On-resistance vs. Drain Current

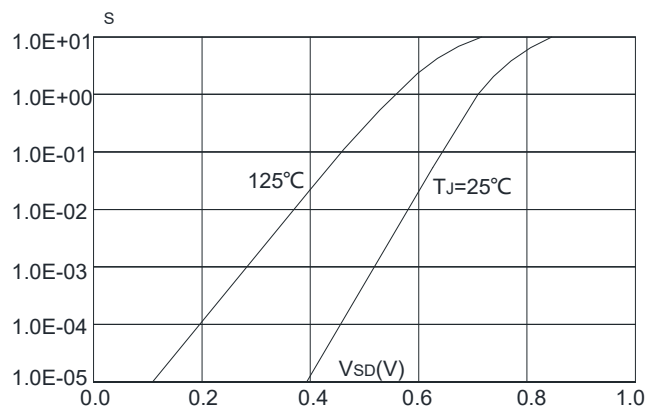


Figure 4: Body Diode Characteristics

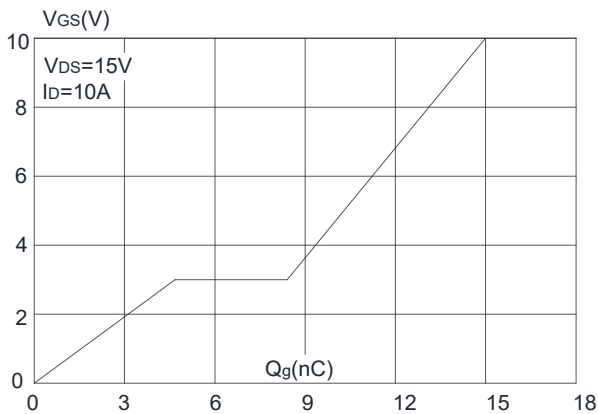


Figure 5: Gate Charge Characteristics

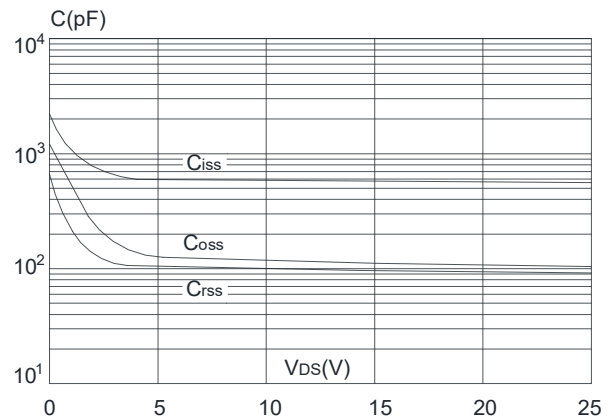
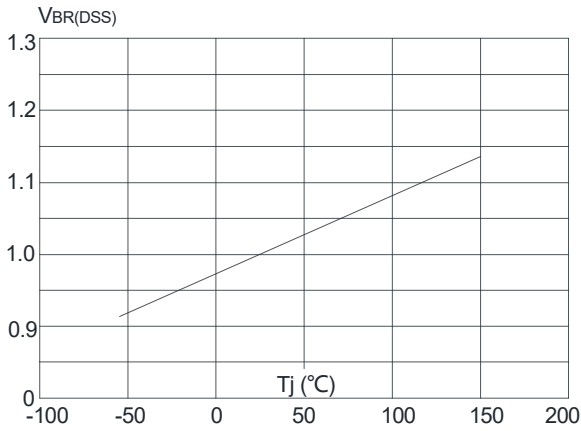


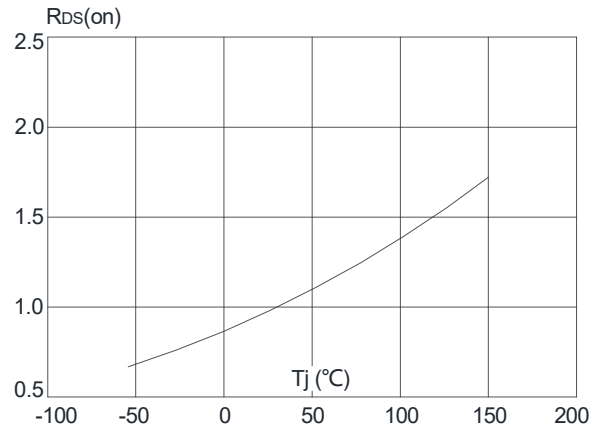
Figure 6: Capacitance Characteristics

**TM3030DF**

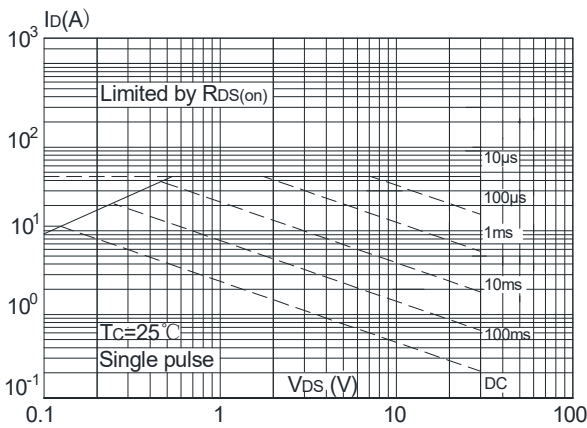
**N+P-Channel Enhancement Mode Mosfet**



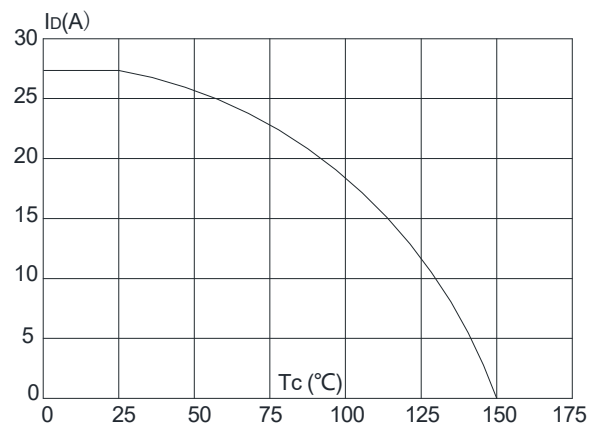
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



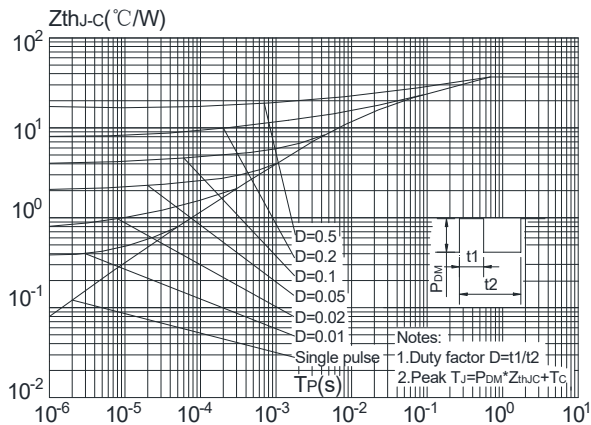
**Figure 8:** Normalized on Resistance vs. Junction Temperature



**Figure 9:** Maximum Safe Operating Area



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



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

**TM3030DF**

**N+P-Channel Enhancement Mode Mosfet**

**P-Channel Electrical Characteristics:** ( $T_C=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250 \mu A$	-30	---	---	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-30V$	---	---	-1	$\mu A$
<b>I<sub>GSS</sub></b>	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
<b>V<sub>GS(th)</sub></b>	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250 \mu A$	-1	-1.5	-2.5	V
<b>R<sub>DS(ON)</sub></b>	Drain-Source On Resistance <sup>note3</sup>	$V_{GS}=-10V, I_D=-10A$	---	19	25	m $\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	---	25	38	
<b>Dynamic Characteristics</b>						
<b>C<sub>iss</sub></b>	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	1150	---	pF
<b>C<sub>oss</sub></b>	Output Capacitance		---	150	---	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		---	135	---	
<b>Switching Characteristics<sup>4</sup></b>						
<b>t<sub>d(on)</sub></b>	Turn-On Delay Time	$V_{DD}=-15V, I_D=-1A,$ $V_{GS}=-10V, R_{GEN}=6 \Omega$ $R_D=15 \Omega$	---	12	---	ns
<b>t<sub>r</sub></b>	Rise Time		---	13	---	ns
<b>t<sub>d(off)</sub></b>	Turn-Off Delay Time		---	195	---	ns
<b>t<sub>f</sub></b>	Fall Time		---	95	---	ns
<b>Q<sub>g</sub></b>	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-15V, I_D=-8A$	---	50	---	nC
<b>Q<sub>gs</sub></b>	Gate-Source Charge		---	9.5	---	nC
<b>Q<sub>gd</sub></b>	Gate-Drain "Miller" Charge		---	8.3	---	nC
<b>Drain-Source Diode Characteristics</b>						
<b>I<sub>S</sub></b>	Continuous Drain to Source Diode	---	---	---	-30	A
<b>I<sub>SM</sub></b>	Pulsed Drain to Source Diode	---	---	---	-44	---
<b>V<sub>SD</sub></b>	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=-11A$	---	-0.8	-1.2	V
<b>T<sub>rr</sub></b>	Reverse Recovery Time	$T_J=25^\circ\text{C},$	---	37	---	ns
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	$I_F=-2A, di/dt=-100A/\mu s$	---	36	---	nC



### Typical Performance Characteristics-P

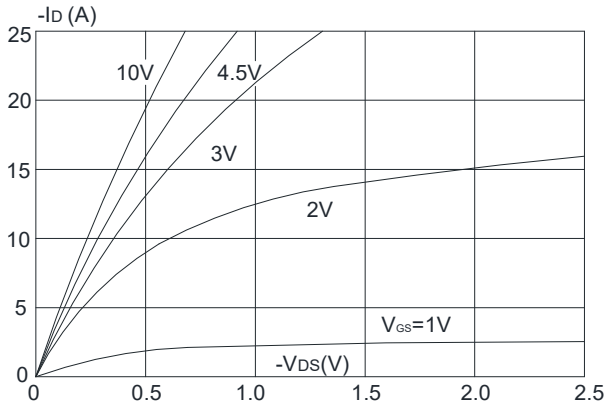


Figure 1: Output Characteristics

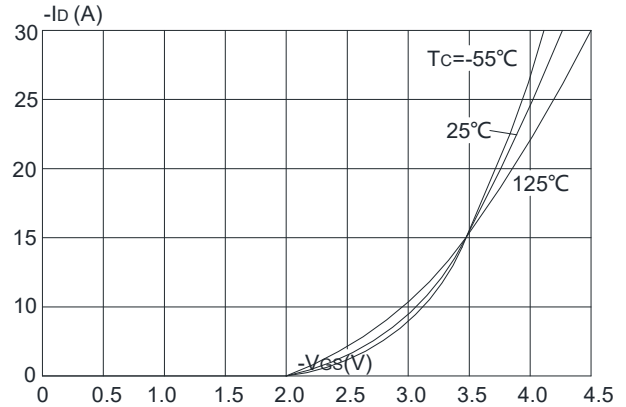


Figure 2: Typical Transfer Characteristics

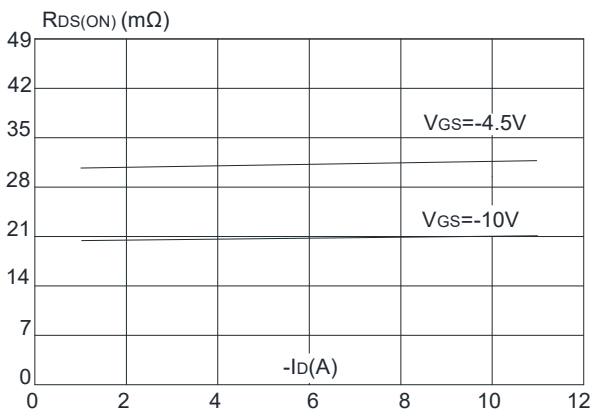


Figure 3: On-resistance vs. Drain Current

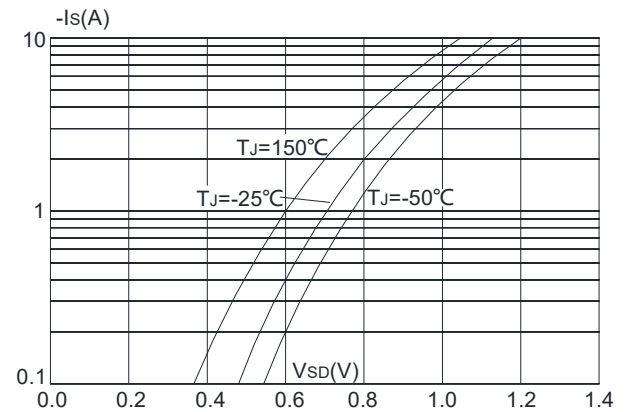


Figure 4: Body Diode Characteristics

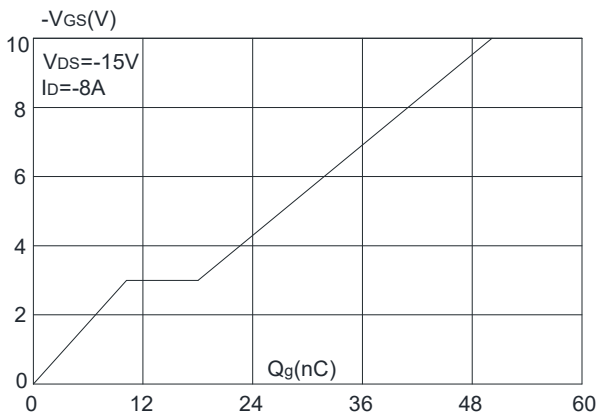


Figure 5: Gate Charge Characteristics

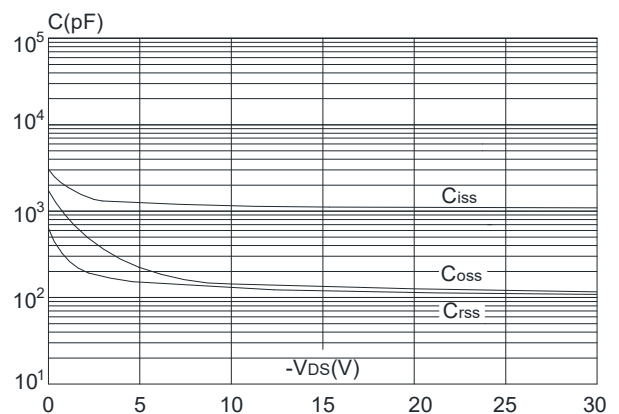


Figure 6: Capacitance Characteristics

TM3030DF

N+P-Channel Enhancement Mode Mosfet

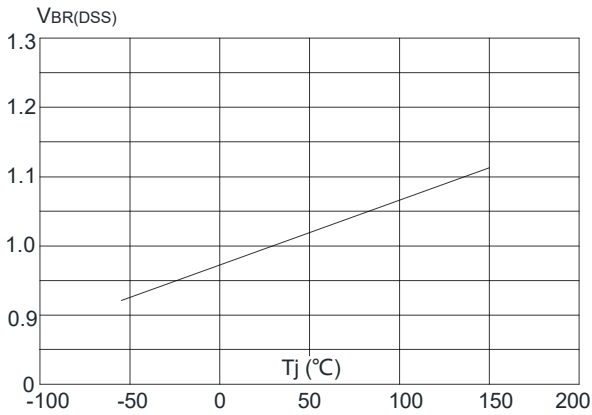


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

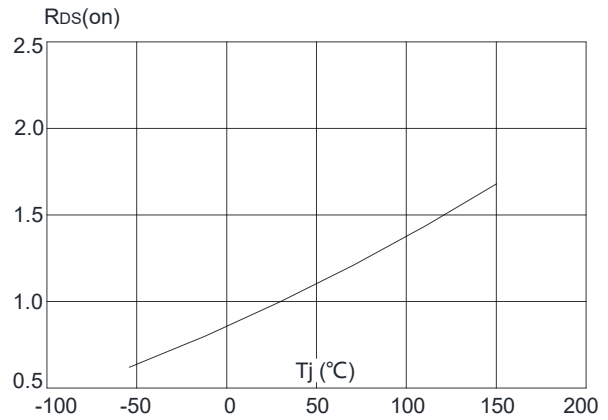


Figure 8: Normalized on Resistance vs. Junction Temperature

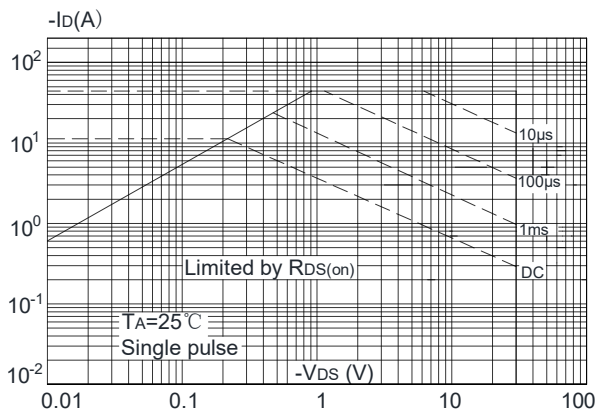


Figure 9: Maximum Safe Operating Area

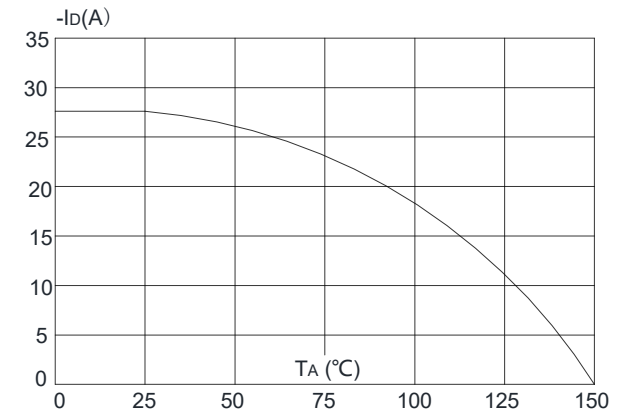


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

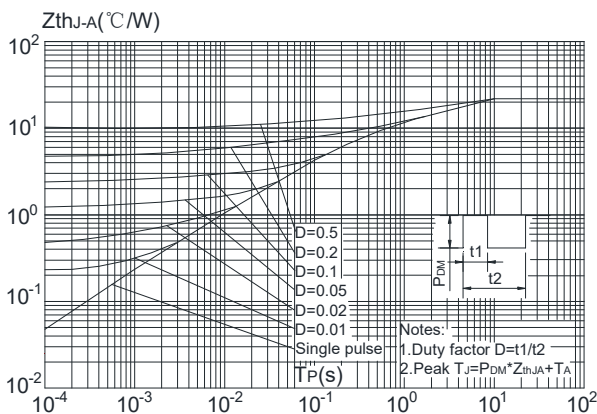
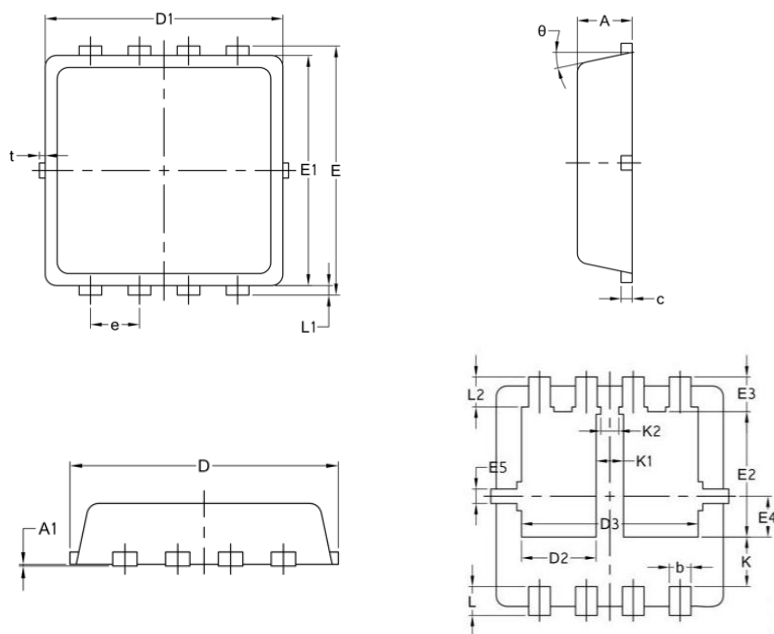


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

## Package Mechanical Data:DFN3x3-8L



Symbol	Common		
	Mm		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
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	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
Φ	10°	12°	14°