
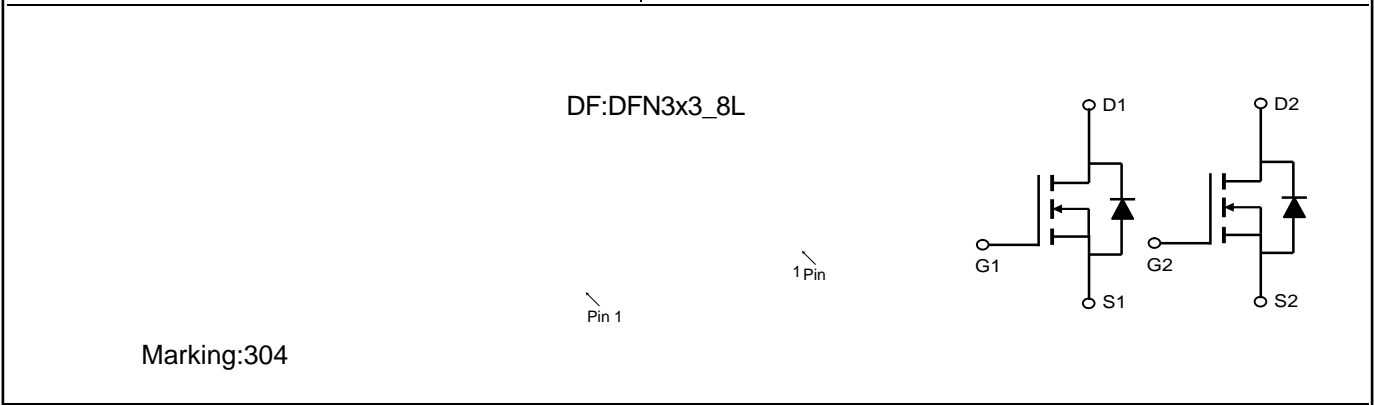




**TM25H03DF**

**N+N-Channel Enhancement Mosfet**

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low R<sub>DS(ON)</sub></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>Product Summary</b></p> <p>V<sub>DS</sub> = 30V I<sub>D</sub> =25A</p> <p>R<sub>DS(ON)</sub> = 14 mΩ (Typ.) @ V<sub>GS</sub>=10V</p> <p>100% UIS Tested</p> <p>100% R<sub>g</sub> Tested</p> 
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**Absolute Maximum Ratings** (T<sub>A</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	25	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	14	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	76	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	12.1	mJ
I <sub>AS</sub>	Avalanche Current	48	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	6.0	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	---	75	°C/W

**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	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=10V, I_D=5A$	-	14	17	m $\Omega$
		$V_{GS}=4.5V, I_D=3A$	-	18	26	m $\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1.0MHz$	-	520	-	pF
$C_{oss}$	Output Capacitance		-	79	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	61	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=15V, I_D=5.8A,$ $V_{GS}=10V$	-	5.2	-	nC
$Q_{gs}$	Gate-Source Charge		-	0.9	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	1.3	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V, I_D=3A,$ $V_{GS}=10V, R_{REN}=3\Omega$	-	4.5	-	ns
$t_r$	Turn-on Rise Time		-	2.5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	14.5	-	ns
$t_f$	Turn-off Fall Time		-	3.5	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current	-	-	12	-	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current	-	-	48	-	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=12A$	-	-	1.2	V

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	25	A
$I_{SM}$	Pulsed Source Current <sup>2,5</sup>		---	---	56	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.2	V

Note :

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating. The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A$
- The power dissipation is limited by  $150^\circ C$  junction temperature
- The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

Typical Performance Characteristics

Figure 1: Output Characteristics

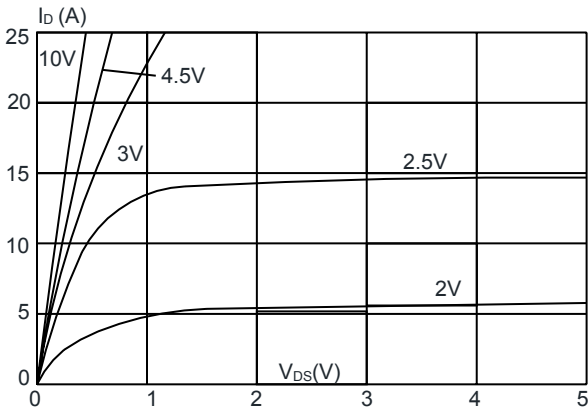


Figure 2: Typical Transfer Characteristics

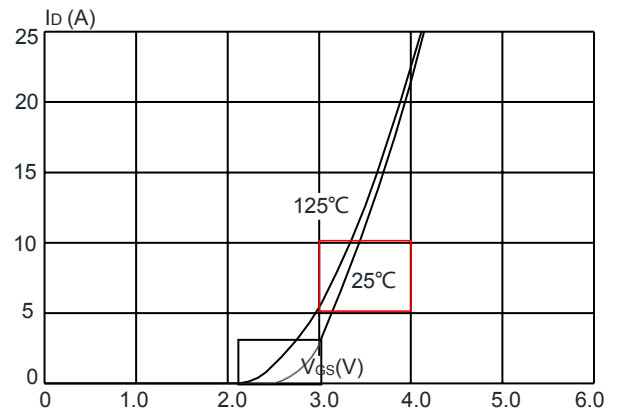


Figure 3: On-resistance vs. Drain Current

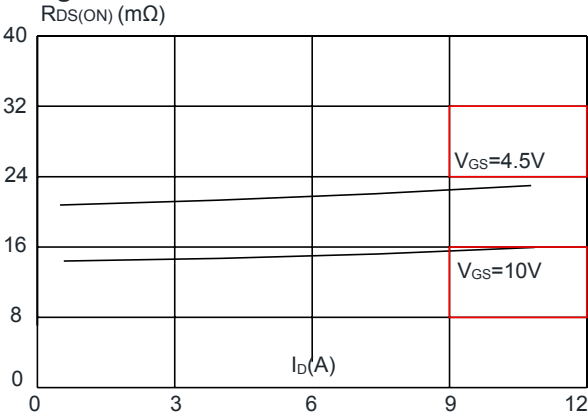


Figure 4: Body Diode Characteristics

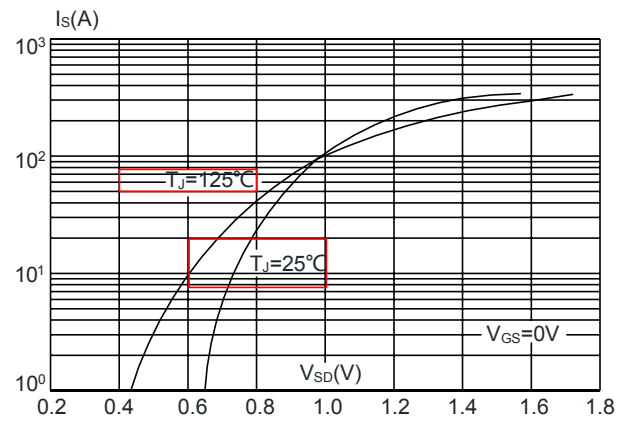


Figure 5: Gate Charge Characteristics

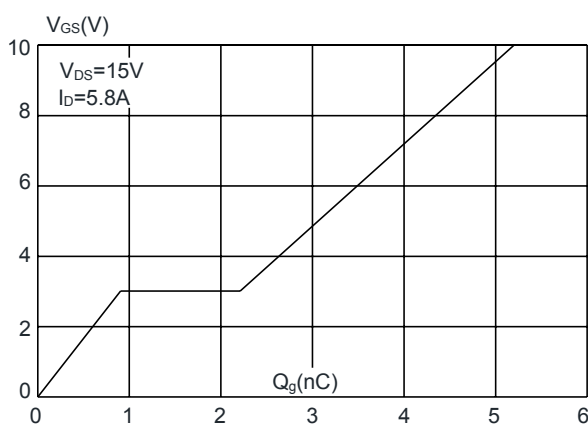
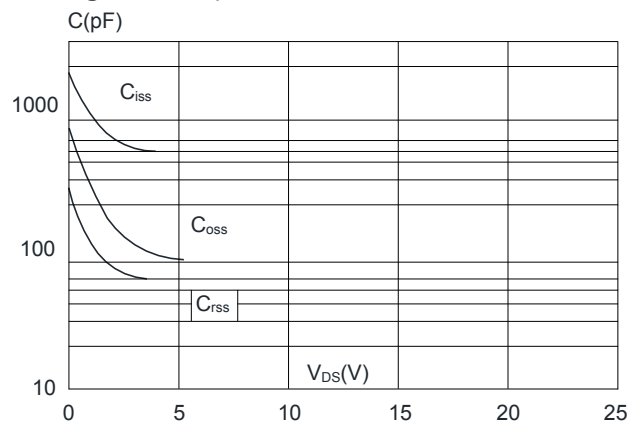
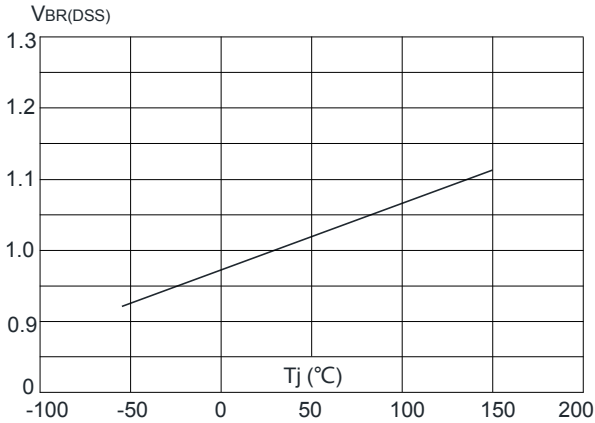


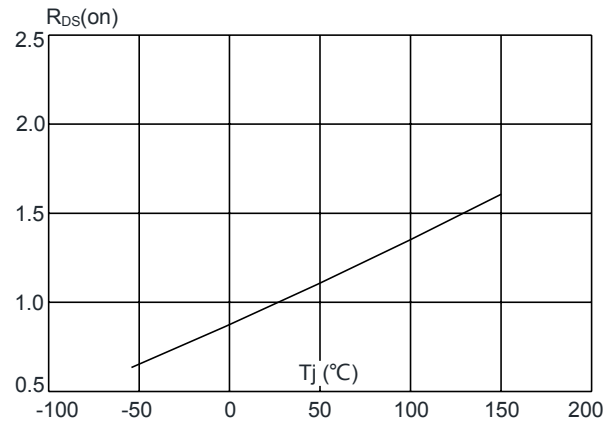
Figure 6: Capacitance Characteristics



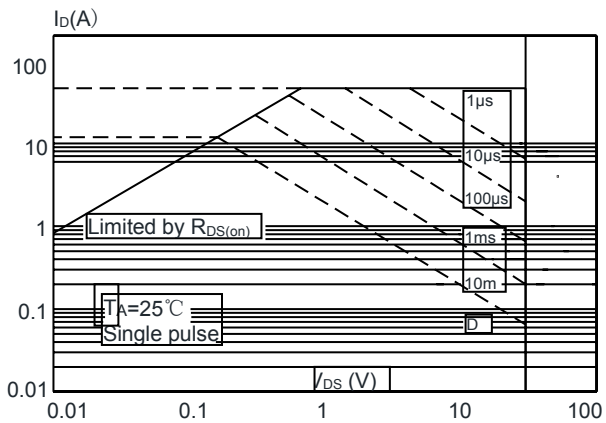
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



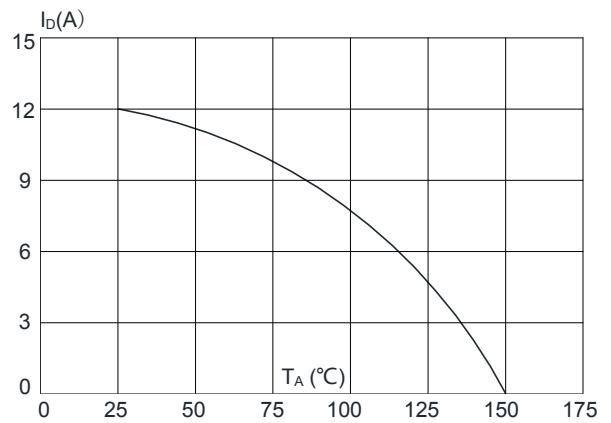
**Figure 8:** Normalized on Resistance vs. Junction Temperature



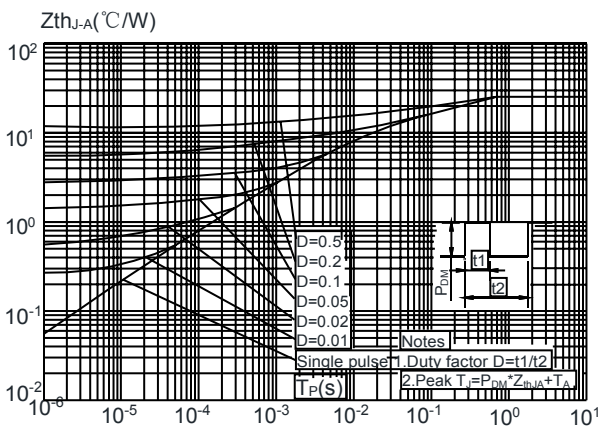
**Figure 9:** Maximum Safe Operating Area



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



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



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