
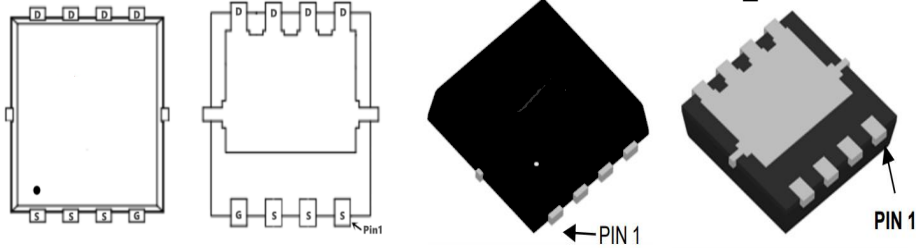
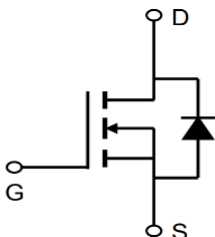


TM23N03DF

N-Channel Enhancement Mosfet

| | |
|--|--|
| <p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM | <p>General Features</p> <p>$V_{DS} = 30V$ $I_D = 23A$</p> <p>$R_{DS(ON)} = 16 m\Omega$ (typ. .) @ $V_{GS}=10V$</p> <p>100% UIS Tested 100% R_g Tested</p>  |
|--|--|

DF:DFN3x3_8L

Marking: 23N03 OR 7410

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

| Symbol | Parameter | Rating | Unit | |
|-------------------|---|------------------|------------|--------------|
| V_{DSS} | Drain-Source Voltage | 30 | V | |
| V_{GSS} | Gate-Source Voltage | ± 20 | | |
| I_D^a | Continuous Drain Current ($V_{GS}=10V$) | $T_A=25^\circ C$ | 7 | A |
| | | $T_A=70^\circ C$ | 5.6 | |
| I_{DM}^a | Pulsed Drain Current ($V_{GS}=10V$) | 28 | | |
| I_D^c | Continuous Drain Current ($V_{GS}=10V$) | $T_C=25^\circ C$ | 23 | |
| | | $T_C=70^\circ C$ | 19 | |
| I_S^a | Diode Continuous Forward Current | 1.5 | | |
| I_{AS}^b | Avalanche Current, Single pulse | $L=0.1mH$ | 13 | |
| | | $L=0.5mH$ | 7 | |
| E_{AS}^b | Avalanche Energy, Single pulse | $L=0.1mH$ | 8.45 | mJ |
| | | $L=0.5mH$ | 12.25 | |
| T_J | Maximum Junction Temperature | 150 | $^\circ C$ | |
| T_{STG} | Storage Temperature Range | -55 to 150 | | |
| P_D^a | Maximum Power Dissipation | $T_A=25^\circ C$ | 1.56 | W |
| | | $T_A=70^\circ C$ | 1 | |
| P_D^c | Maximum Power Dissipation | $T_C=25^\circ C$ | 17.8 | |
| | | $T_C=70^\circ C$ | 11.4 | |
| $R_{\theta JA}^a$ | Thermal Resistance-Junction to Ambient | $t \leq 10s$ | 50 | $^\circ C/W$ |
| | | Steady State | 80 | |
| $R_{\theta JC}^c$ | Thermal Resistance-Junction to Case | Steady State | 7 | |

Note a : Surface Mounted on $1in^2$ pad area, $t \leq 10sec.$
 b : UIS tested and pulse width limited by maximum junction temperature $150^\circ C$ (initial temperature $T_J=25^\circ C$).
 c : The power dissipation P_D is based on $T_{J(MAX)} = 150^\circ C$, and it is useful for reducing junction-to-case thermal resistance ($R_{\theta JC}$) when additional heat sink is used.

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

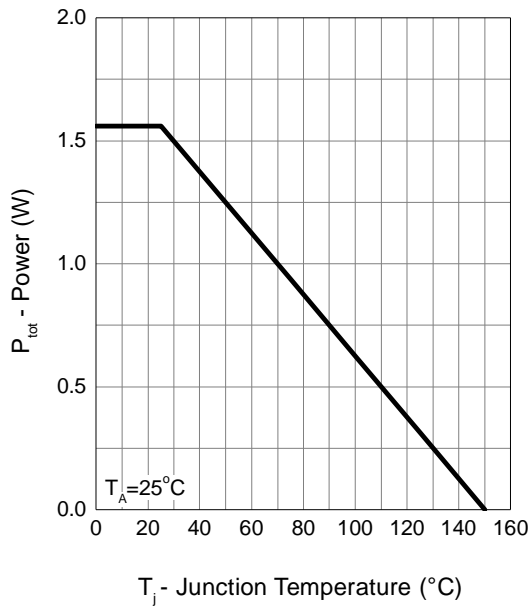
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--|----------------------------------|---|------|------------|-----------|------------|
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=24V, V_{GS}=0V$ $T_J=85^\circ\text{C}$ | - | - | 1 30 | μA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 1.0 | 1.8 | 2.5 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| $R_{DS(ON)}^d$ | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=8A$ $T_J=125^\circ\text{C}$ | - | 16 25.5 | 21 - | m Ω |
| | | $V_{GS}=4.5V, I_{DS}=5A$ | - | 21 | 26 | |
| Diode Characteristics | | | | | | |
| V_{SD}^d | Diode Forward Voltage | $I_{SD}=1A, V_{GS}=0V$ | - | 0.75 | 1.1 | V |
| t_{rr}^e | Reverse Recovery Time | $I_{SD}=8A, dI_{SD}/dt=100A/\mu s$ | - | 12 | - | ns |
| t_a | Charge Time | | - | 6.2 | - | |
| t_b | Discharge Time | | - | 5.8 | - | |
| Q_{rr}^e | Reverse Recovery Charge | | - | 3.7 | - | |
| Dynamic Characteristics^e | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | 1 | 1.5 | 3 | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz | 300 | 415 | 550 | pF |
| C_{oss} | Output Capacitance | | 50 | 70 | 100 | |
| C_{rss} | Reverse Transfer Capacitance | | 30 | 40 | 60 | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$ | - | 5.5 | 9 | ns |
| t_r | Turn-on Rise Time | | - | 9 | 18 | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 14 | 25 | |
| t_f | Turn-off Fall Time | | - | 3.6 | 7 | |
| Gate Charge Characteristics^e | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=8A$ | - | 3.8 | 5.5 | nC |
| Q_g | Total Gate Charge | $V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=8A$ | - | 8 | 13 | |
| Q_{gth} | Threshold Gate Charge | | - | 0.4 | 0.7 | |
| Q_{gs} | Gate-Source Charge | | - | 1.1 | 1.8 | |
| Q_{gd} | Gate-Drain Charge | | - | 1.6 | 2.1 | |

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

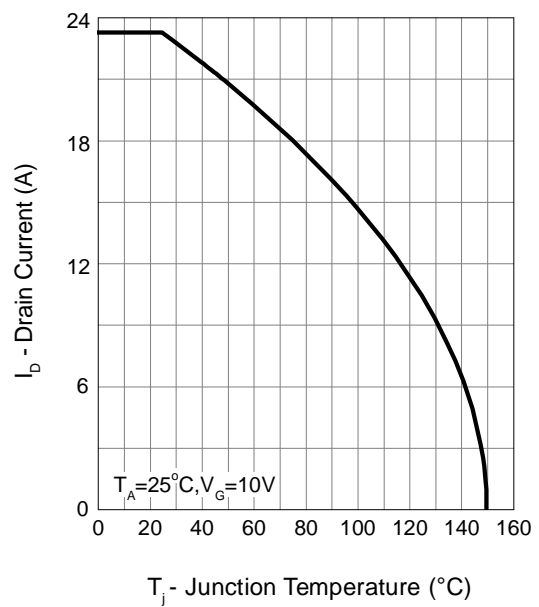
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

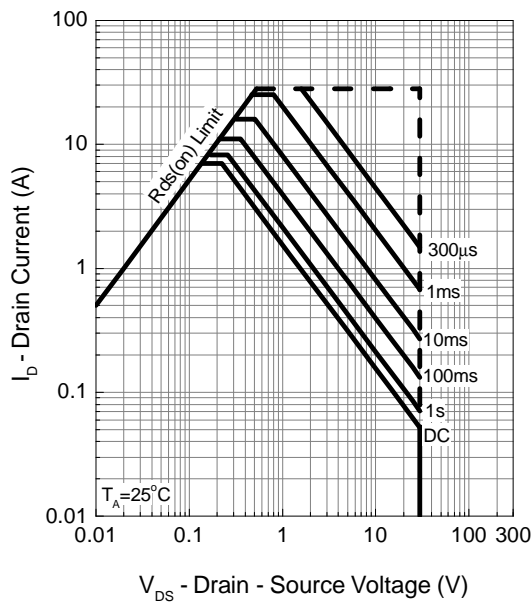
Power Dissipation



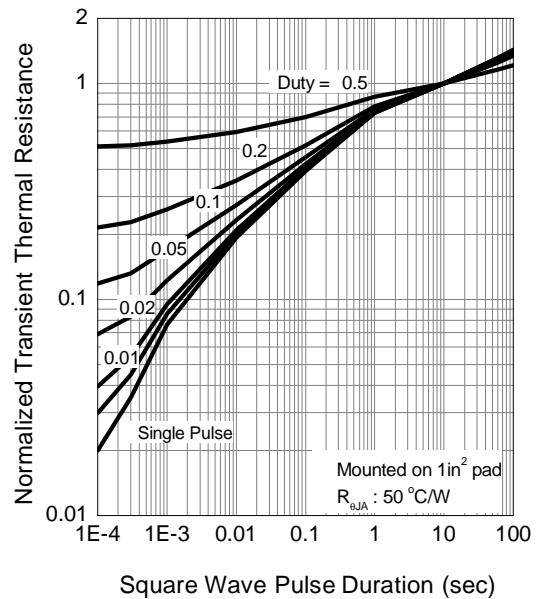
Drain Current



Safe Operation Area



Thermal Transient Impedance

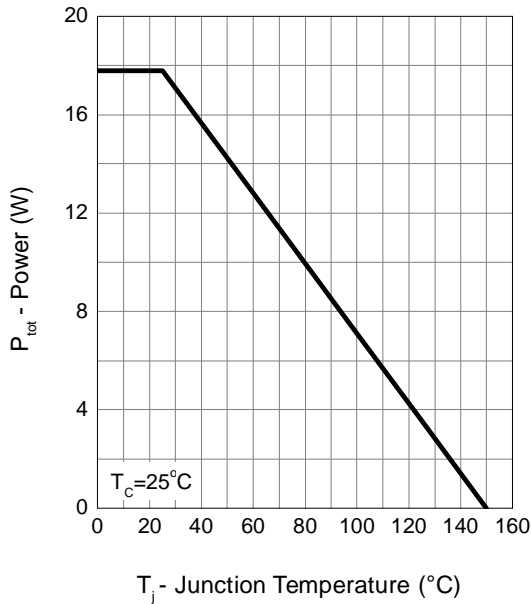




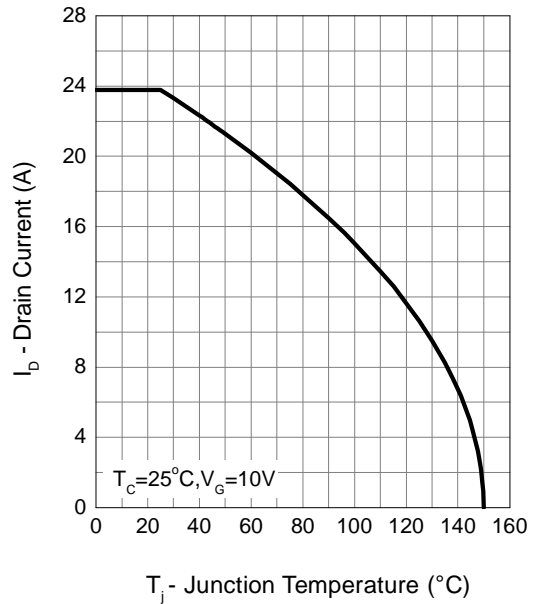
TM23N03DF

N-Channel Enhancement Mosfet

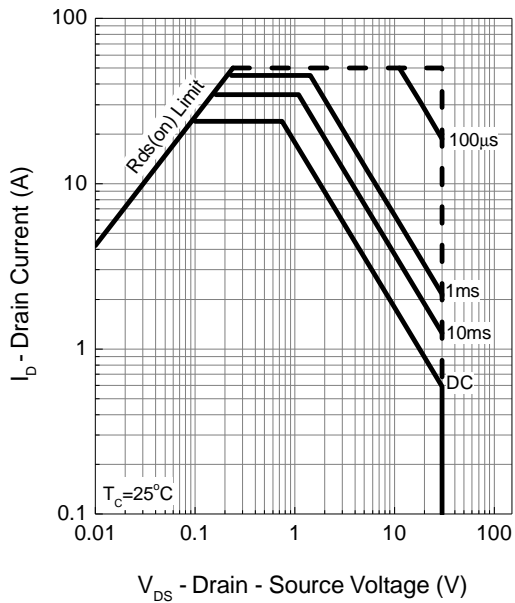
Power Dissipation



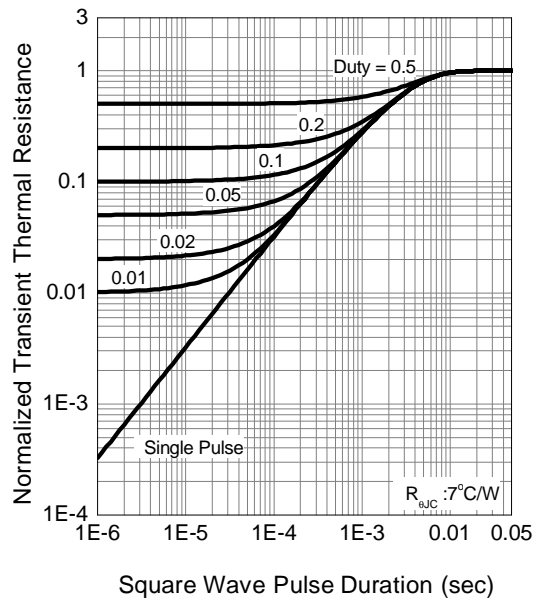
Drain Current



Safe Operation Area



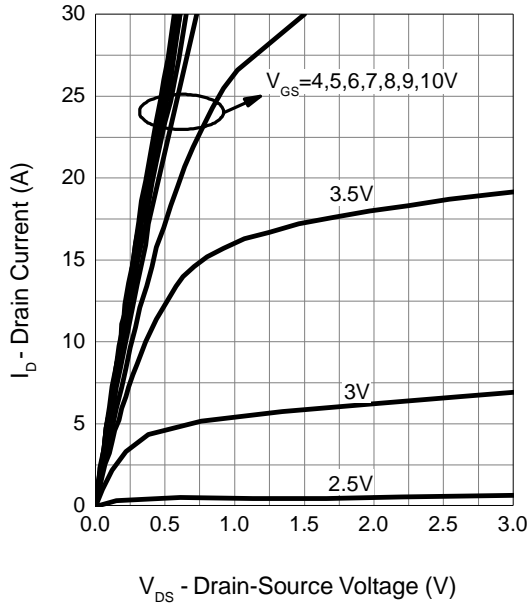
Thermal Transient Impedance



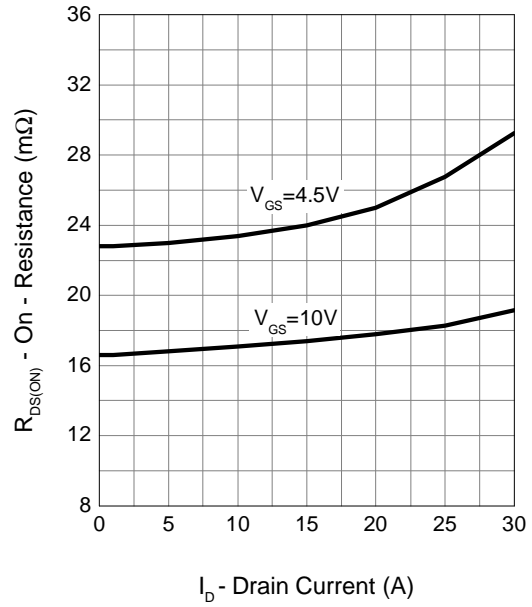
TM23N03DF

N-Channel Enhancement Mosfet

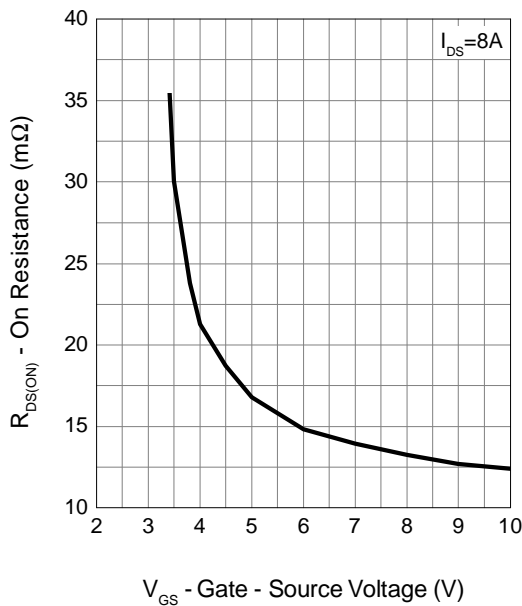
Output Characteristics



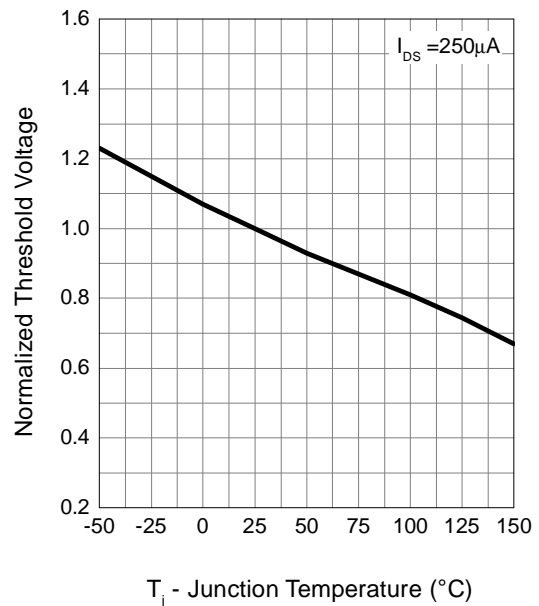
Drain-Source On Resistance



Gate-Source On Resistance



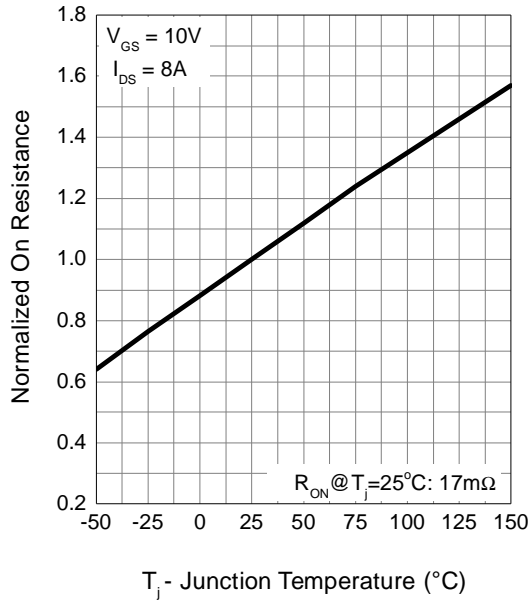
Gate Threshold Voltage



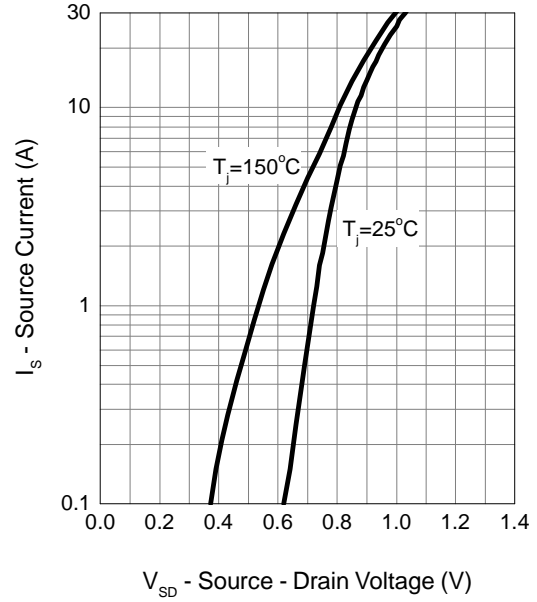
TM23N03DF

N-Channel Enhancement Mosfet

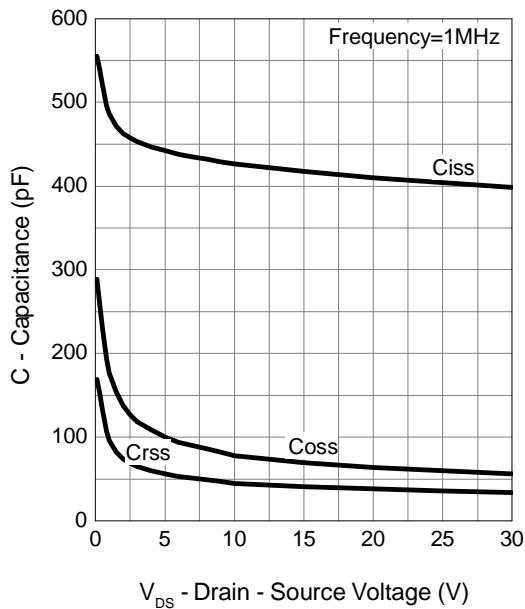
Drain-Source On Resistance



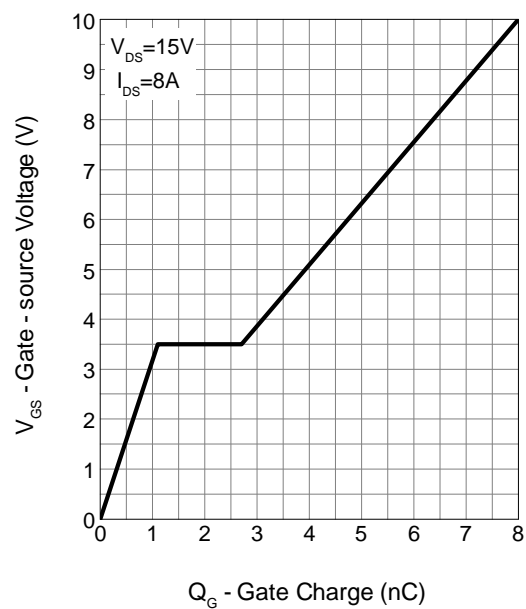
Source-Drain Diode Forward



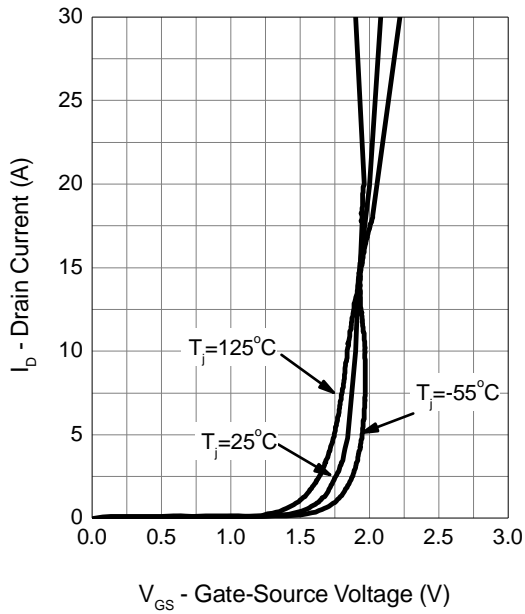
Capacitance



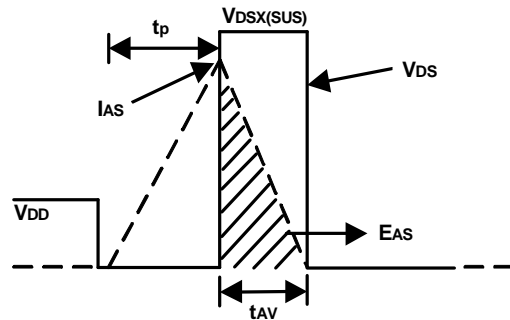
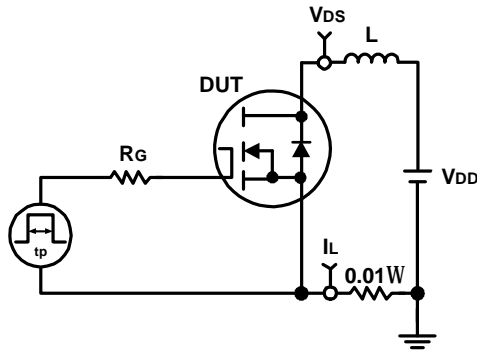
Gate Charge



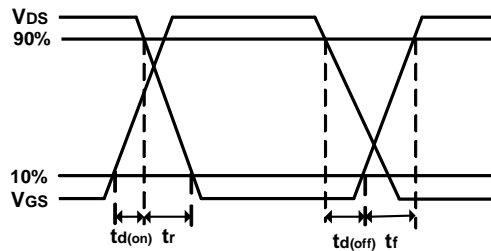
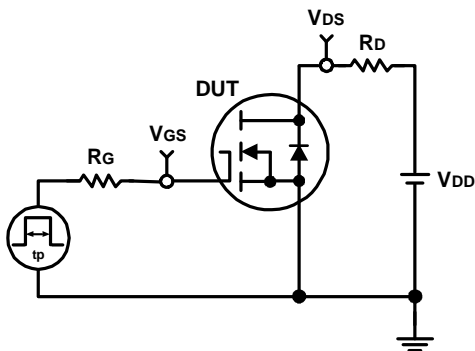
Transfer Characteristics



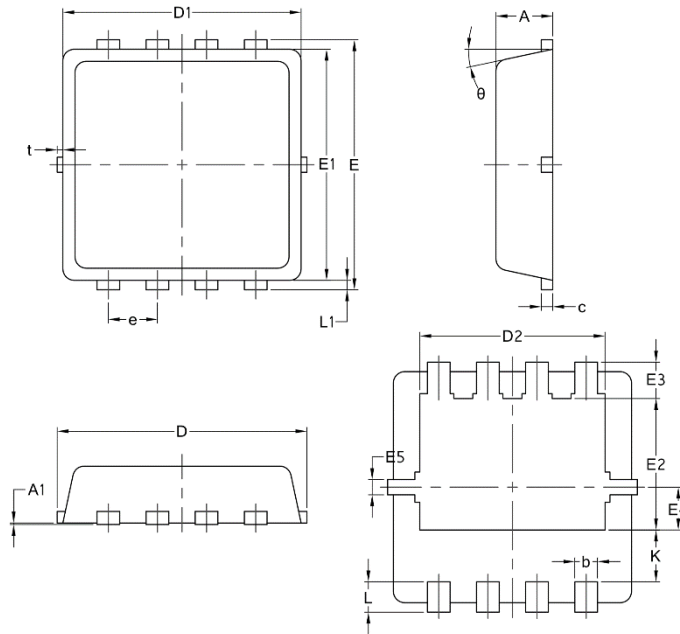
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



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 |

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [Tritech-MOS](#) manufacturer:

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [BUK455-60A/B](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#) [IPS70R2K0CEAKMA1](#) [SQD23N06-31L-GE3](#)
[TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#) [DMN1017UCP3-7](#) [DMN1053UCP4-7](#) [SQJ469EP-T1-GE3](#) [NTE2384](#) [DMC2700UDMQ-7](#)
[DMN2080UCB4-7](#) [DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#)
[STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [DMN2990UFB-7B](#)
[IPB80P04P405ATMA2](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [MCQ7328-TP](#) [NTMC083NP10M5L](#) [BXP7N65D](#) [BXP4N65F](#) [AOL1454G](#)
[WMJ80N60C4](#) [BXP2N20L](#) [BXP2N65D](#) [BXT1150N10J](#) [BXT1700P06M](#) [TSM60NB380CP](#) [ROG](#) [RQ7L055BGTGR](#) [DMNH15H110SK3-13](#)
[SLF10N65ABV2](#) [BSO203SP](#) [BSO211P](#) [IPA60R230P6](#)