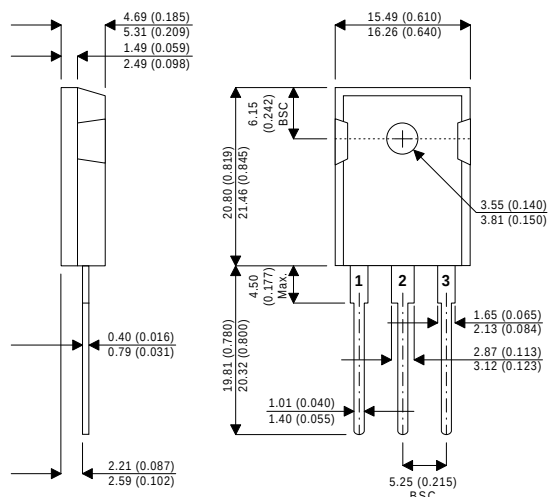


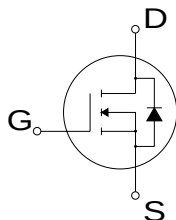
TO-247AD Package Outline.
Dimensions in mm (inches)



Pin 1 – Gate

Pin 2 – Drain

Pin 3 – Source



**N-CHANNEL
ENHANCEMENT MODE
HIGH VOLTAGE
POWER FREDFET**

V_{DSS}	500V
I_{D(cont)}	26A
R_{DS(on)}	0.200Ω

- **Faster Switching**
- **Lower Leakage**
- **100% Avalanche Tested**
- **Popular TO-247 Package**
- **Fast Recovery Body Diode**

StarMOS is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimises the JFET effect, increases packing density and reduces the on-resistance. StarMOS also achieves faster switching speeds through optimised gate layout.

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C unless otherwise stated)

V _{DSS}	Drain – Source Voltage	500	V
I _D	Continuous Drain Current	26	A
I _{DM}	Pulsed Drain Current ¹	104	A
V _{GS}	Gate – Source Voltage	±20	V
V _{GSM}	Gate – Source Voltage Transient	±30	
P _D	Total Power Dissipation @ T _{case} = 25°C	300	W
	Derate Linearly	2.4	W/°C
T _J , T _{STG}	Operating and Storage Junction Temperature Range	–55 to 150	°C
T _L	Lead Temperature : 0.063” from Case for 10 Sec.	300	
I _{AR}	Avalanche Current ¹ (Repetitive and Non-Repetitive)	26	A
E _{AR}	Repetitive Avalanche Energy ¹	30	mJ
E _{AS}	Single Pulse Avalanche Energy ²	1300	

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.

2) Starting $T_J = 25^\circ\text{C}$, $L = 3.85\text{mH}$, $R_G = 25\Omega$, Peak $I_L = 26\text{A}$

STATIC ELECTRICAL RATINGS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise stated)

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain – Source Breakdown Voltage	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	500			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0\text{V}$)	$V_{DS} = V_{DSS}$			25	μA
		$V_{DS} = 0.8V_{DSS}$, $T_C = 125^{\circ}\text{C}$			250	
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}$, $V_{DS} = 0\text{V}$			± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 1.0\text{mA}$	2		4	V
$I_{D(ON)}$	On State Drain Current ²	$V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max $V_{GS} = 10\text{V}$	26			A
$R_{DS(ON)}$	Drain – Source On State Resistance ²	$V_{GS} = 10\text{V}$, $I_D = 0.5 I_D [\text{Cont.}]$			0.20	Ω

DYNAMIC CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$		3700	4440	pF
C_{oss}	Output Capacitance			510	715	
C_{rss}	Reverse Transfer Capacitance			200	300	
Q_g	Total Gate Charge ³	$V_{GS} = 10\text{V}$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^{\circ}\text{C}$		150	225	nC
Q_{gs}	Gate – Source Charge			25	37	
Q_{gd}	Gate – Drain (“Miller”) Charge			70	105	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15\text{V}$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^{\circ}\text{C}$ $R_G = 1.8\Omega$		12	25	ns
t_r	Rise Time			10	20	
$t_{d(off)}$	Turn-off Delay Time			50	75	
t_f	Fall Time			8	15	

SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	(Body Diode)			26	A
I_{SM}	Pulsed Source Current ¹	(Body Diode)			104	
V_{SD}	Diode Forward Voltage ²	$V_{GS} = 0\text{V}$, $I_S = -I_D [\text{Cont.}]$			1.3	V
dv / dt	Peak Diode Recovery	$I_S \leq I_D [\text{cont}]$ $dl / dt = 100\text{A}/\mu\text{s}$ $V_{DD} \leq V_{DSS}$ $V_R = 200\text{V}$ $T_J \leq 150^{\circ}\text{C}$ $R_G = 2.0\Omega$			5	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -I_D [\text{Cont.}]$ $dl / dt = 100\text{A}/\mu\text{s}$	$T_J = 25^{\circ}\text{C}$		250	ns
			$T_J = 125^{\circ}\text{C}$		500	
Q_{rr}	Reverse Recovery Charge	$I_S = -I_D [\text{Cont.}]$ $dl / dt = 100\text{A}/\mu\text{s}$	$T_J = 25^{\circ}\text{C}$	1.3		μC
			$T_J = 125^{\circ}\text{C}$	4.5		
I_{rrm}	Peak Recovery Current	$I_S = -I_D [\text{Cont.}]$ $dl / dt = 100\text{A}/\mu\text{s}$	$T_J = 25^{\circ}\text{C}$	12		A
			$T_J = 125^{\circ}\text{C}$	18		

THERMAL CHARACTERISTICS

	Characteristic	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case			0.42	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	

- 1) Repetitive Rating: Pulse Width limited by maximum junction temperature.
- 2) Pulse Test: Pulse Width $< 380\mu\text{S}$, Duty Cycle $< 2\%$
- 3) See MIL-STD-750 Method 3471

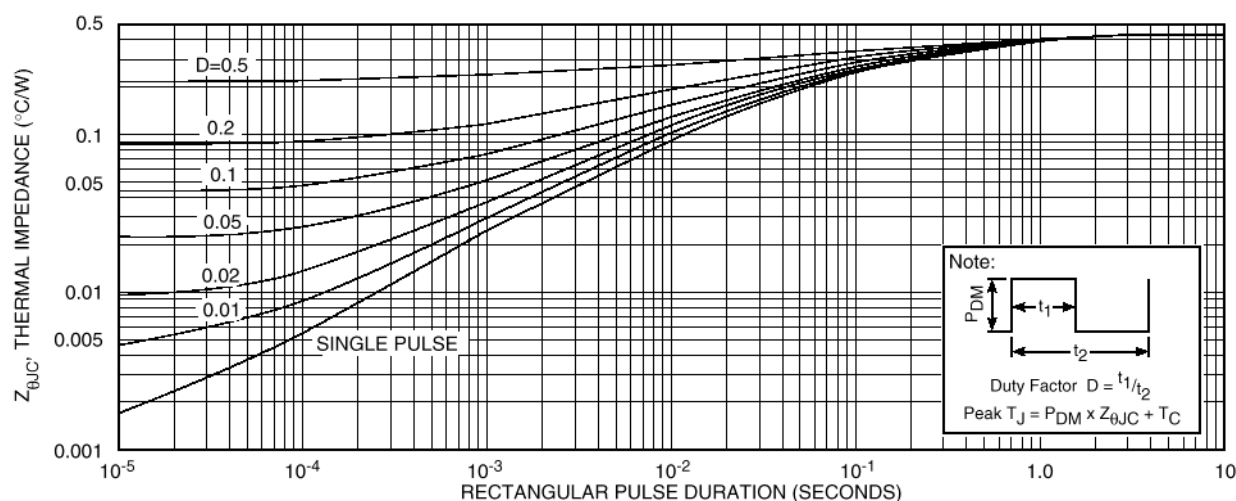


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

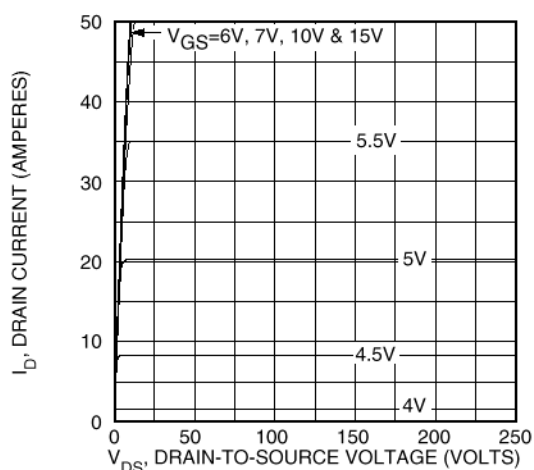


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

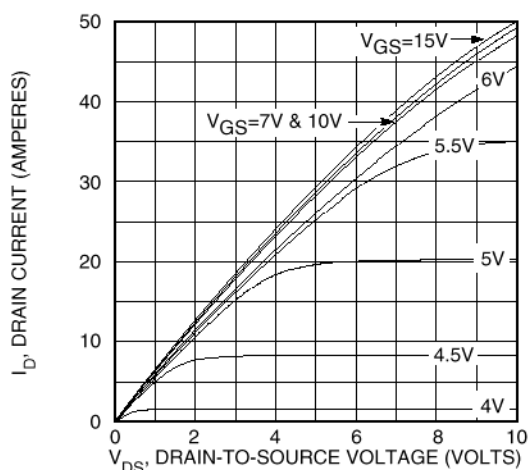


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

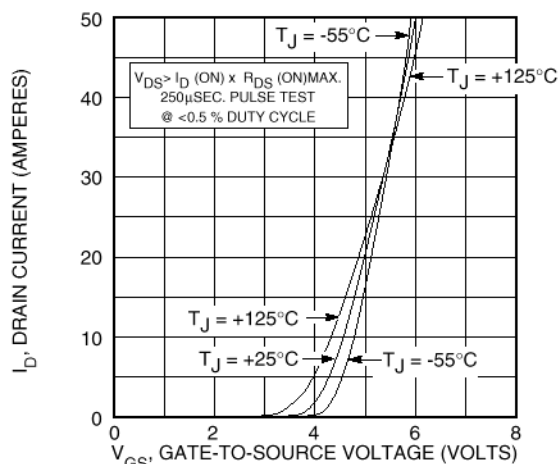


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

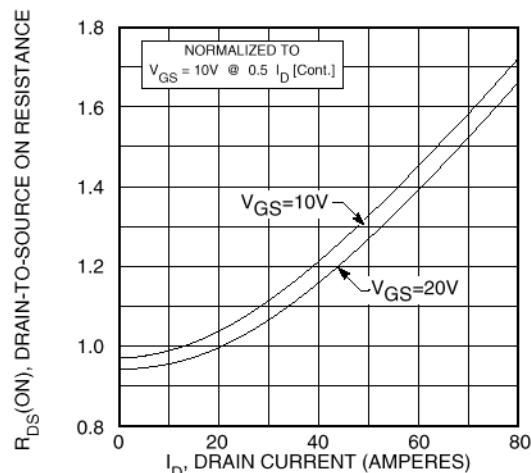


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

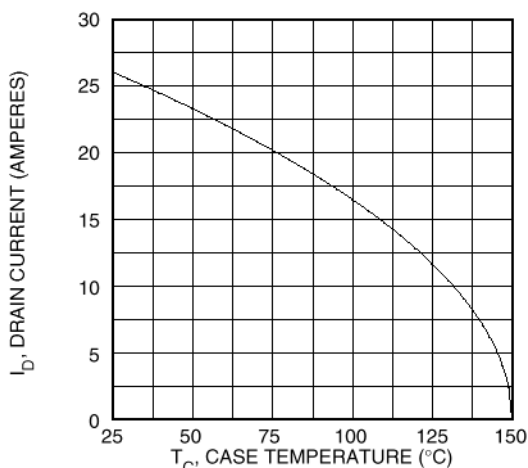


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

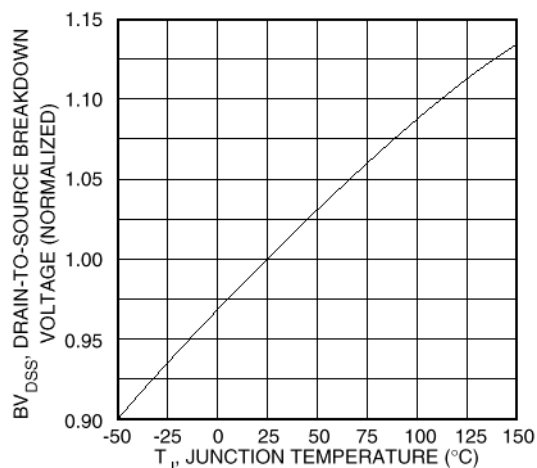


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

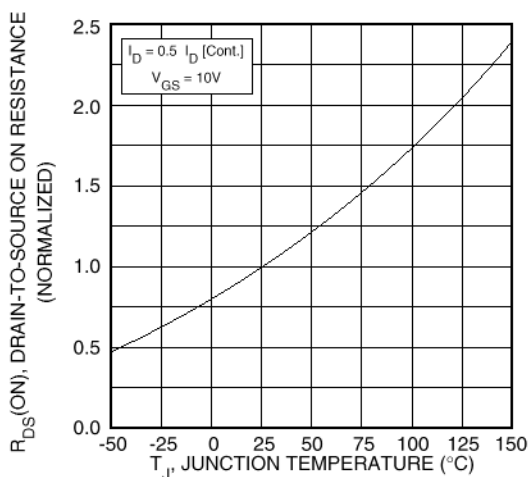


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

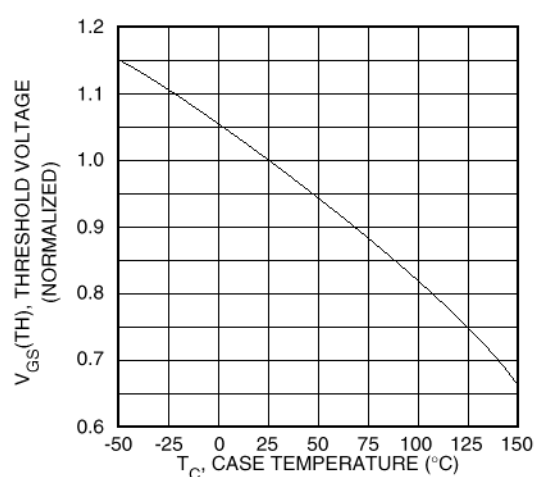


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

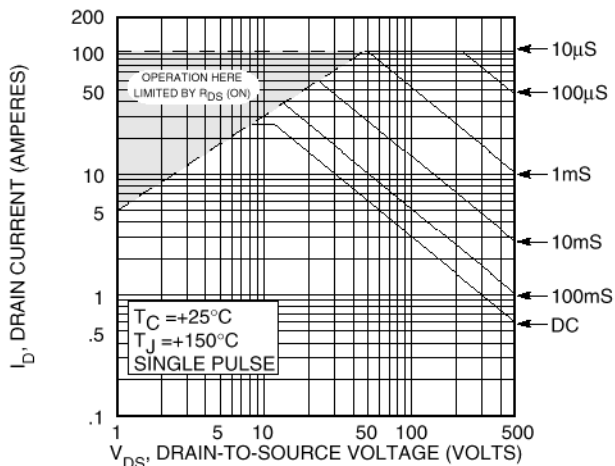


FIGURE 10, MAXIMUM SAFE OPERATING AREA

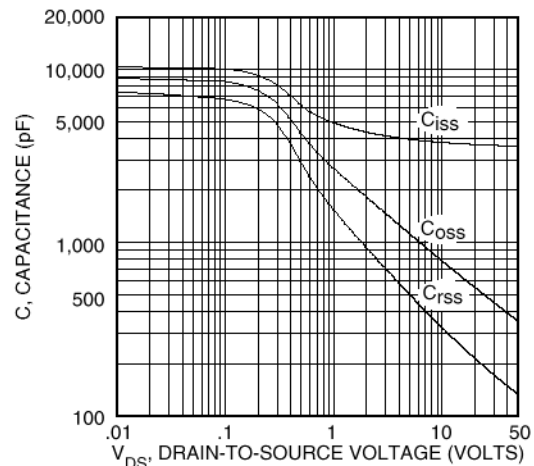


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

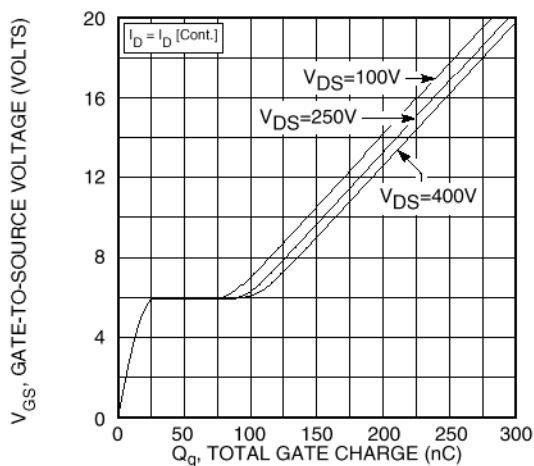


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

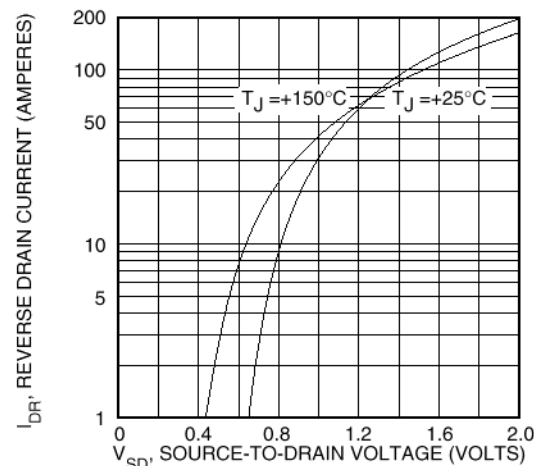


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE



CAUTION — Electrostatic Sensitive Devices. Anti-Static Procedures Must Be Followed.

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