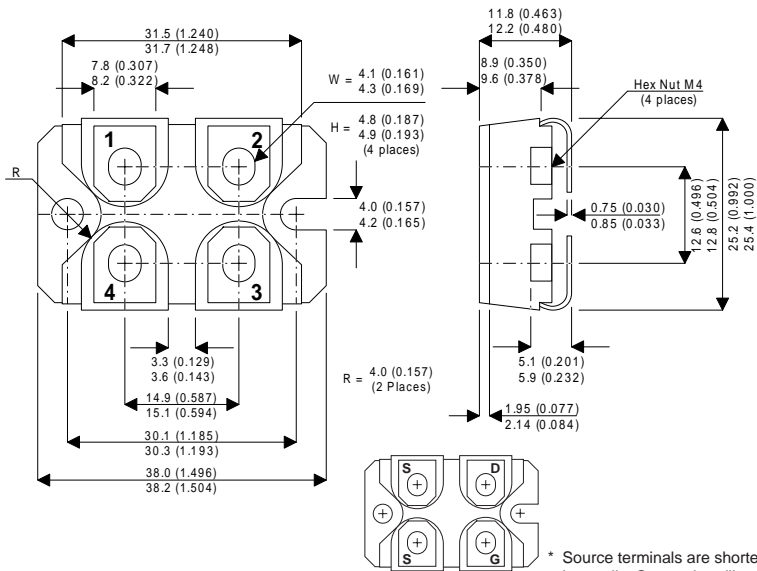


SOT-227 Package Outline.
Dimensions in mm (inches)

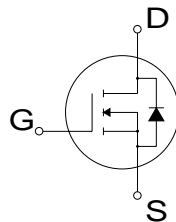


**N-CHANNEL
ENHANCEMENT MODE
HIGH VOLTAGE
POWER FREDFET**

V_{DSS} 500V
I_{D(cont)} 44A
R_{DS(on)} 0.100Ω

- **Faster Switching**
- **Lower Leakage**
- **100% Avalanche Tested**
- **Popular SOT-227 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	44	A
I _{DM}	Pulsed Drain Current ¹	176	A
V _{GS}	Gate – Source Voltage	±30	V
V _{GSM}	Gate – Source Voltage Transient	±40	
P _D	Total Power Dissipation @ T _{case} = 25°C	450	W
	Derate Linearly	3.6	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)	44	A
E _{AR}	Repetitive Avalanche Energy ¹	50	mJ
E _{AS}	Single Pulse Avalanche Energy ²	2500	

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

2) Starting T_J = 25°C, L = 2.58mH, R_G = 25Ω, Peak I_L = 44A

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

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain – Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	500			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0V$)	$V_{DS} = V_{DSS}$			250	μA
		$V_{DS} = 0.8V_{DSS}, T_C = 125^{\circ}C$			1000	
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 2.5mA$	2		4	V
$I_{D(ON)}$	On State Drain Current ²	$V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}$ $V_{GS} = 10V$	44			A
$R_{DS(ON)}$	Drain – Source On State Resistance ²	$V_{GS} = 10V, I_D = 0.5 I_D [\text{Cont.}]$			0.100	Ω

DYNAMIC CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		7400	8900	pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		1000	1400	
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		380	570	
Q_g	Total Gate Charge ³	$V_{GS} = 10V$		312	470	nC
Q_{gs}	Gate – Source Charge	$V_{DD} = 0.5 V_{DSS}$		50	75	
Q_{gd}	Gate – Drain (“Miller”) Charge	$I_D = I_D [\text{Cont.}] @ 25^{\circ}C$		127	190	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		14	30	ns
t_r	Rise Time	$V_{DD} = 0.5 V_{DSS}$		16	32	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [\text{Cont.}] @ 25^{\circ}C$		54	80	
t_f	Fall Time	$R_G = 0.6\Omega$		5	10	

SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	(Body Diode)			44	A
I_{SM}	Pulsed Source Current ¹	(Body Diode)			176	
V_{SD}	Diode Forward Voltage ²	$V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$			1.3	V
dv / dt	Peak Diode Recovery	$I_S \leq I_D [\text{cont}]$ $V_{DD} \leq V_{DSS}$ $T_J \leq 150^{\circ}C$			5	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -I_D [\text{Cont.}]$ $dl / dt = 100A/\mu s$	$T_J = 25^{\circ}C$		250	ns
			$T_J = 125^{\circ}C$		500	
Q_{rr}	Reverse Recovery Charge	$I_S = -I_D [\text{Cont.}]$ $dl / dt = 100A/\mu s$	$T_J = 25^{\circ}C$	1.6		μC
			$T_J = 125^{\circ}C$	5.5		
I_{rrm}	Peak Recovery Current	$I_S = -I_D [\text{Cont.}]$ $dl / dt = 100A/\mu s$	$T_J = 25^{\circ}C$	15		A
			$T_J = 125^{\circ}C$	27		

THERMAL/PACKAGE CHARACTERISTICS

	Characteristic	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case			0.28	°C/W
$R_{\theta JA}$	Junction to Ambient			40	
$V_{isolation}$	RMS Voltage (50 - 60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min)	2500			V
Torque	Maximum Torque for Device Mounting Screws and Electrical Terminations.			13	lb in

- 1) Repetitive Rating: Pulse Width limited by maximum junction temperature.
- 2) Pulse Test: Pulse Width < 380µS , Duty Cycle < 2%
- 3) See MIL-STD-750 Method 3471

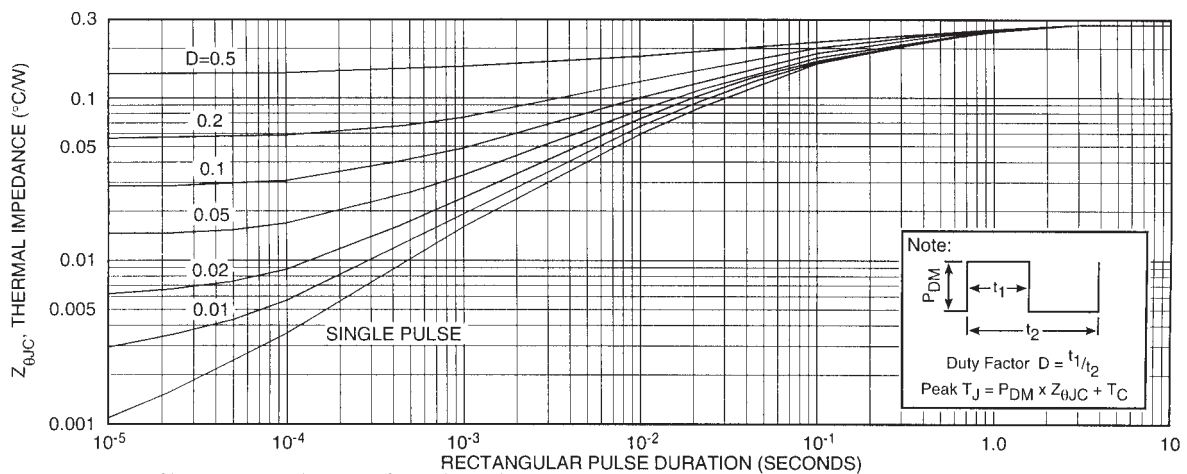


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

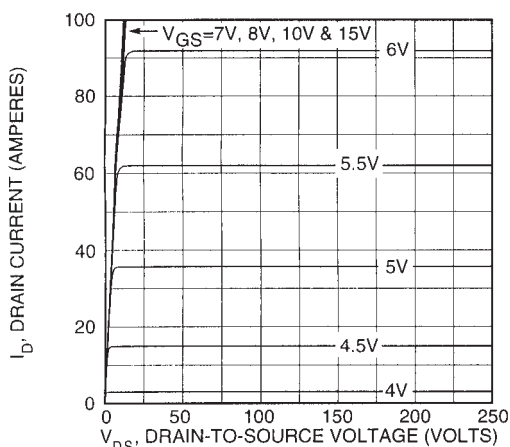


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

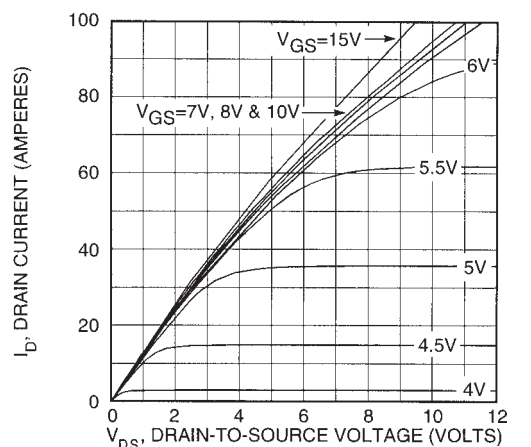


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

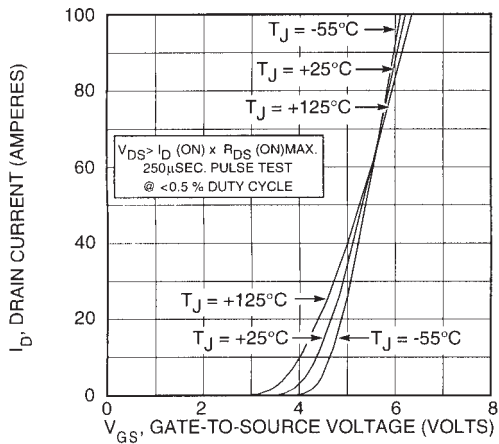


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

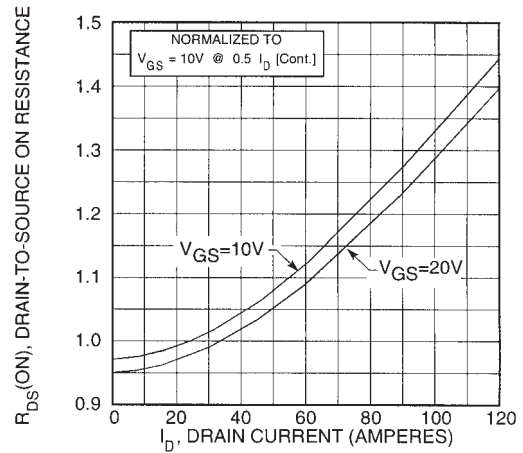


FIGURE 5, $R_{DS}(ON)$ vs DRAIN CURRENT

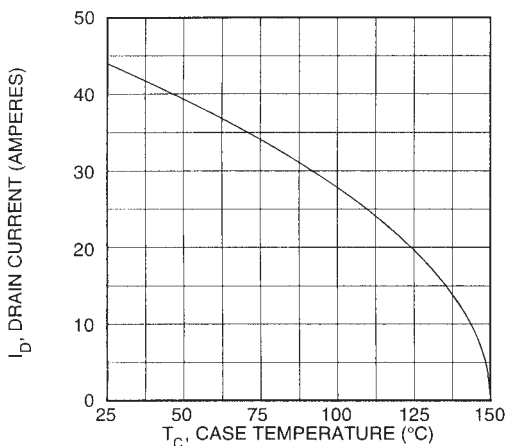


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

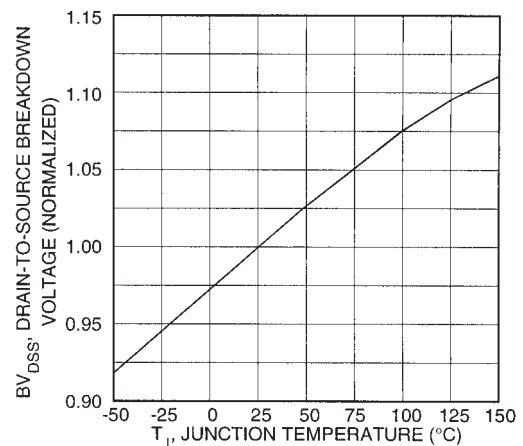


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

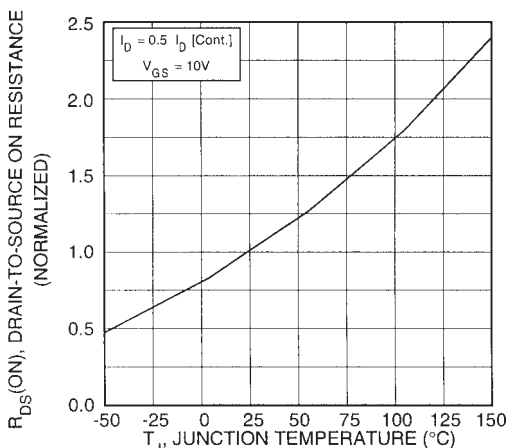


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

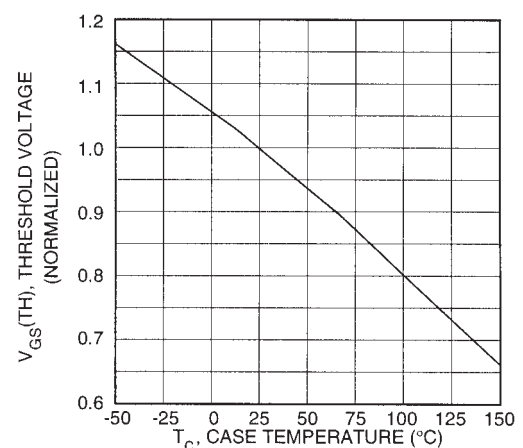


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

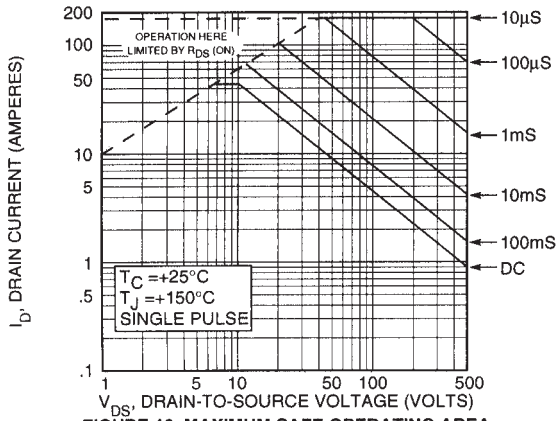


FIGURE 10, MAXIMUM SAFE OPERATING AREA

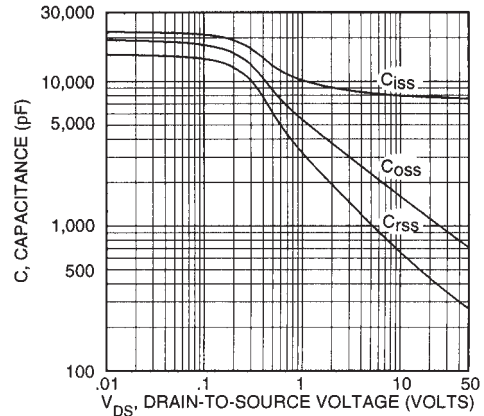


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

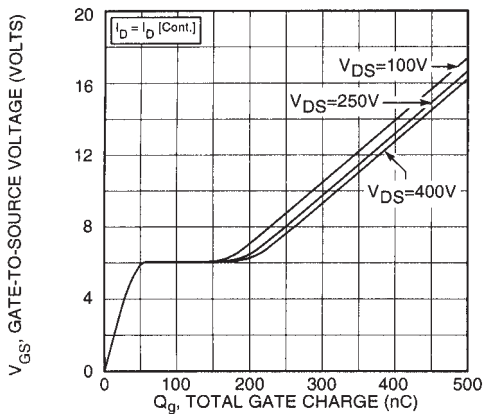


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

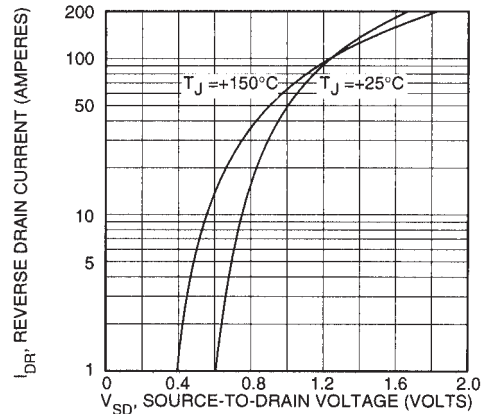


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE



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