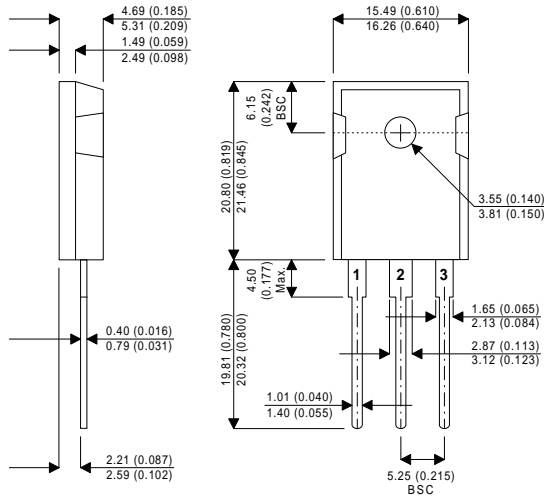


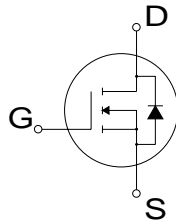
TO-247AD Package Outline.
Dimensions in mm (inches)



Pin 1 – Gate

Pin 2 – Drain

Pin 3 – Source



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

V_{DSS} 500V
 $I_{D(cont)}$ 30A
 $R_{DS(on)}$ 0.170Ω

- **Faster Switching**
- **Lower Leakage**
- **100% Avalanche Tested**
- **Popular TO-247 Package**

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

V_{DSS}	Drain – Source Voltage	500	V
I_D	Continuous Drain Current	30	A
I_{DM}	Pulsed Drain Current ¹	120	A
V_{GS}	Gate – Source Voltage	±20	V
V_{GSM}	Gate – Source Voltage Transient	±30	
P_D	Total Power Dissipation @ $T_{case} = 25^{\circ}C$	370	W
	Derate Linearly	2.96	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)	30	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 $T_J = 25^{\circ}C$, $L = 2.89mH$, $R_G = 25\Omega$, Peak $I_L = 30A$

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 ($V_{GS} = 0V$)	$V_{DS} = V_{DSS}$			25	μA
		$V_{DS} = 0.8V_{DSS}, T_C = 125^{\circ}C$			250	
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 1.0mA$	2		4	V
$I_{D(ON)}$	On State Drain Current ²	$V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}$ $V_{GS} = 10V$	30			A
$R_{DS(ON)}$	Drain – Source On State Resistance ²	$V_{GS} = 10V, I_D = 0.5 I_D [\text{Cont.}]$			0.170	Ω

DYNAMIC CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		4400	5280	pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		600	840	
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		230	350	
Q_g	Total Gate Charge ³	$V_{GS} = 10V$		200	300	nC
Q_{gs}	Gate – Source Charge	$V_{DD} = 0.5 V_{DSS}$		30	45	
Q_{gd}	Gate – Drain (“Miller”) Charge	$I_D = I_D [\text{Cont.}] @ 25^{\circ}C$		80	120	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		12	25	ns
t_r	Rise Time	$V_{DD} = 0.5 V_{DSS}$		14	30	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [\text{Cont.}] @ 25^{\circ}C$		55	80	
t_f	Fall Time	$R_G = 1.6\Omega$		11	20	

SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	(Body Diode)			30	A
I_{SM}	Pulsed Source Current ¹	(Body Diode)			120	
V_{SD}	Diode Forward Voltage ²	$V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$			1.3	V
t_{rr}	Reverse Recovery Time	$I_S = -I_D [\text{Cont.}], di_S / dt = 100A/\mu s$		510		ns
Q_{rr}	Reverse Recovery Charge	$I_S = -I_D [\text{Cont.}], di_S / dt = 100A/\mu s$		10.2		μC

THERMAL CHARACTERISTICS

	Characteristic	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case			0.34	$^{\circ}C/W$
$R_{\theta JA}$	Junction to Ambient			40	

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

2) Pulse Test: Pulse Width < 380 μs , Duty Cycle < 2%

3) See MIL-STD-750 Method 3471



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

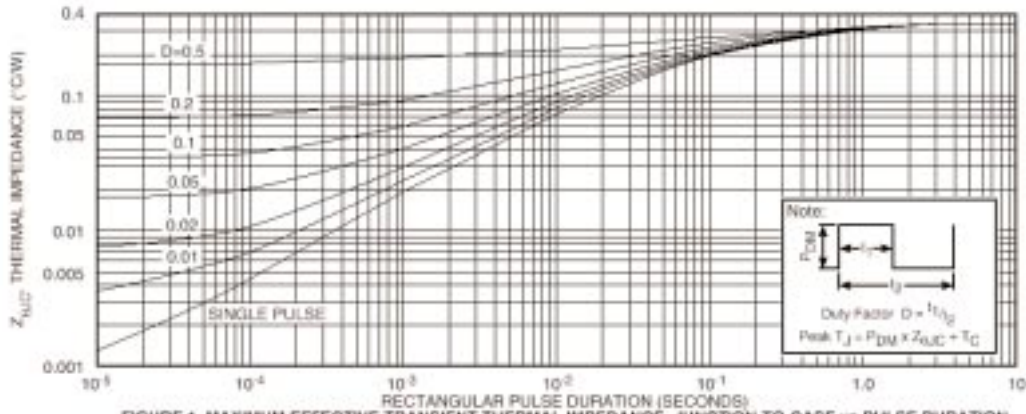


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

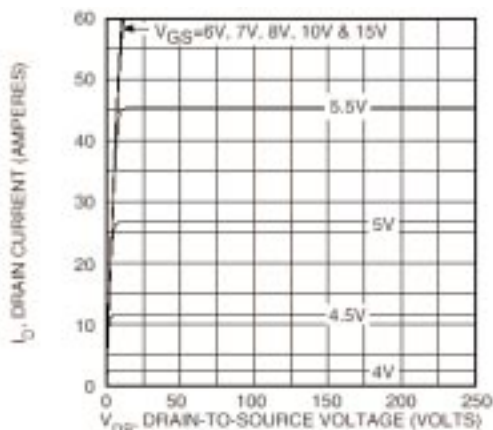


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

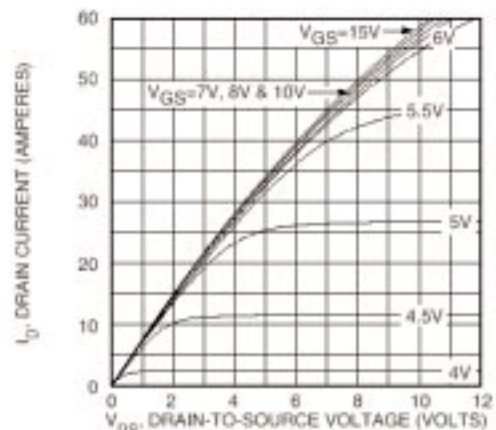


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

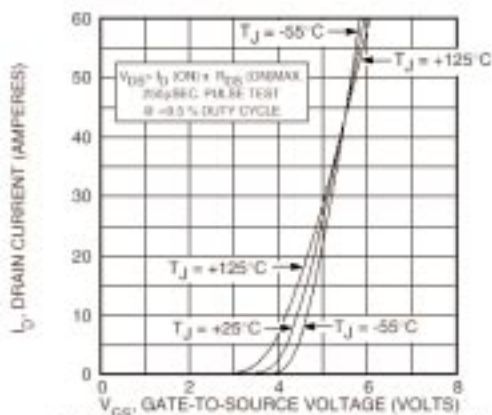


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

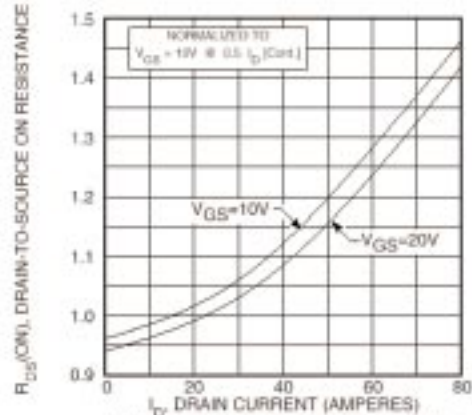


FIGURE 5, $R_{DS(on)}$ vs DRAIN CURRENT

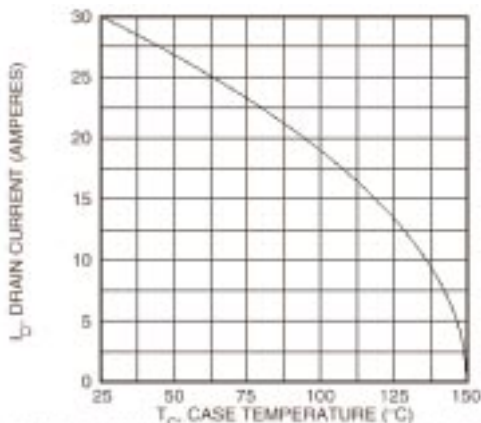


FIGURE 6. MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

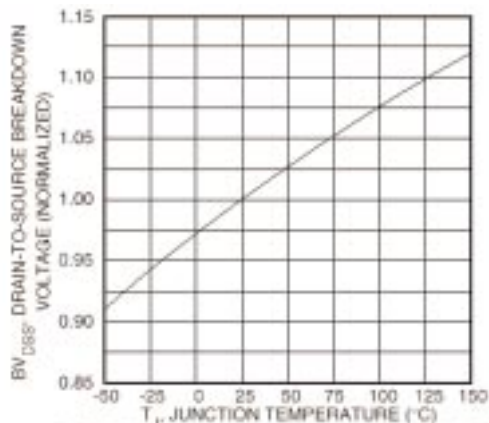


FIGURE 7. BREAKDOWN VOLTAGE vs TEMPERATURE

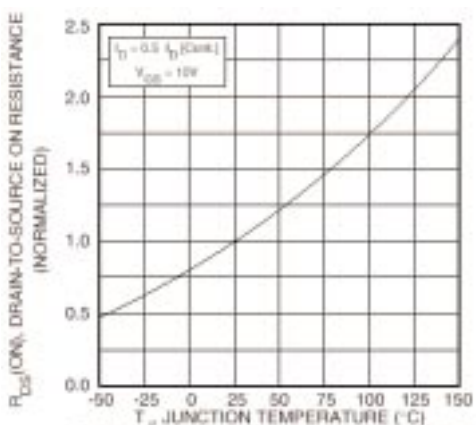


FIGURE 8. ON-RESISTANCE vs. TEMPERATURE

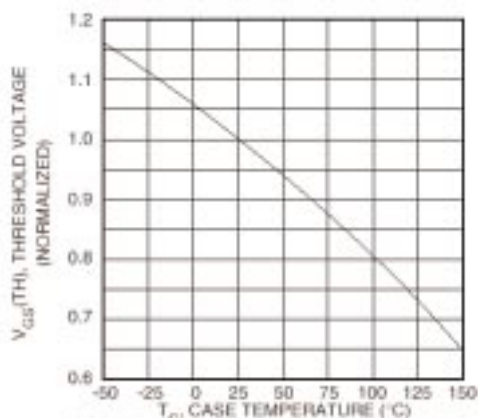


FIGURE 9. THRESHOLD VOLTAGE vs TEMPERATURE

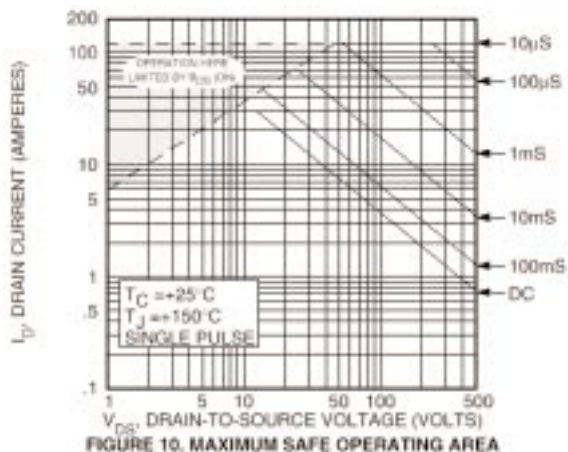


FIGURE 10. MAXIMUM SAFE OPERATING AREA

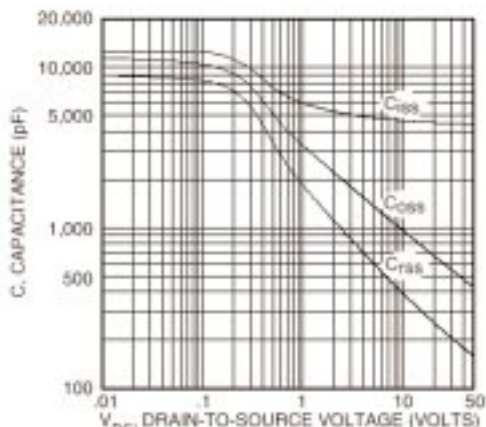


FIGURE 11. TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

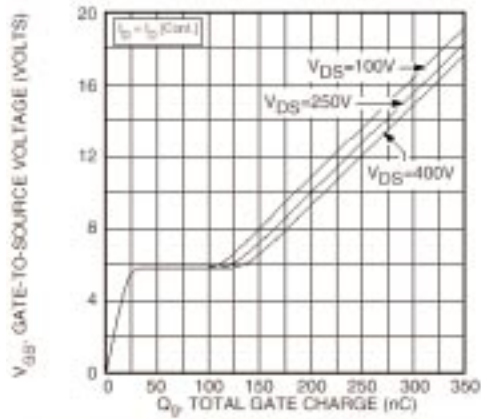


FIGURE 12. GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

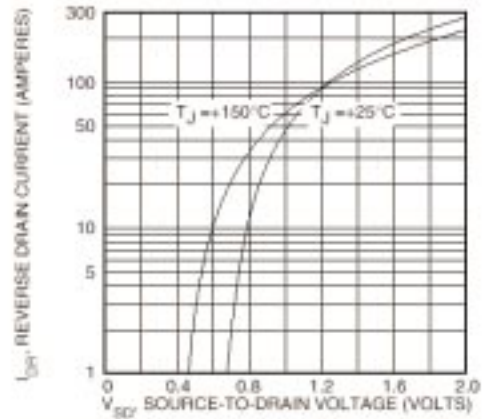


FIGURE 13. TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE