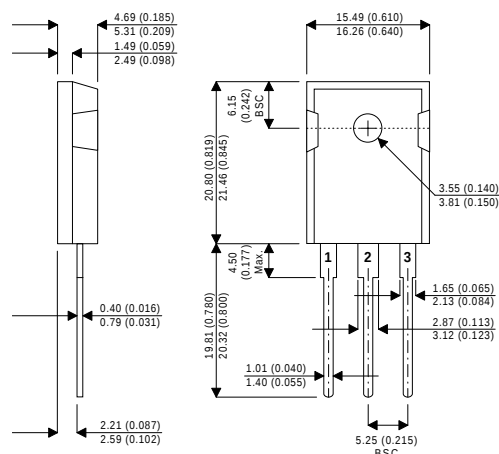


4TH GENERATION MOSFET

TO247-AD Package Outline.
Dimensions in mm (inches)



N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

V_{DSS}	500V
I_{D(cont)}	23.0A
R_{DS(on)}	0.25Ω

Terminal 1	Gate	Terminal 2	Drain
Terminal 3	Source		

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

V _{DSS}	Drain – Source Voltage	500	V
I _D	Continuous Drain Current	23	A
I _{DM}	Pulsed Drain Current ¹	92	A
V _{GS}	Gate – Source Voltage	±30	V
P _D	Total Power Dissipation @ T _{case} = 25°C	310	W
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	

STATIC ELECTRICAL RATINGS (T_{case} = 25°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	$V_{DS} = V_{GS}$, $I_D = 1.0mA$	2		4	V
$I_{D(ON)}$	On State Drain Current ²	$V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max $V_{GS} = 10V$	23			A
$R_{DS(ON)}$	Drain – Source On State Resistance ²	$V_{GS} = 10V$, $I_D = 0.5 I_D$ [Cont.]			0.25	Ω

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

2) Pulse Test: Pulse Width $< 380\mu\text{S}$, Duty Cycle $< 2\%$

DYNAMIC CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		2380	2950	pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		522	730	
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		196	290	
Q_g	Total Gate Charge ³	$V_{GS} = 10V$		83	130	nC
Q_{gs}	Gate – Source Charge	$V_{DD} = 0.5 V_{DSS}$		12.6	19	
Q_{gd}	Gate – Drain (“Miller”) Charge	$I_D = I_D [Cont.] @ 25^\circ C$		51	76	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		14	28	ns
t_r	Rise Time	$V_{DD} = 0.5 V_{DSS}$		27	55	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [Cont.] @ 25^\circ C$		61	92	
t_f	Fall Time	$R_G = 1.8\Omega$		36	71	

SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	(Body Diode)			23	A
I_{SM}	Pulsed Source Current ¹	(Body Diode)			92	
V_{SD}	Diode Forward Voltage ²	$V_{GS} = 0V, I_S = -I_D [Cont.]$			1.3	V
t_{rr}	Reverse Recovery Time	$I_S = -I_D [Cont.], di_S / dt = 100A/\mu s$	160	320	640	ns
Q_{rr}	Reverse Recovery Charge		2.7	5.5	11	μC

SAFE OPERATING AREA CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
SOA1	Safe Operating Area	$V_{DS} = 0.4V_{DSS}, t = 1 \text{ Sec.}$ $I_{DS} = P_D / 0.4V_{DSS}$	310			W
SOA2	Safe Operating Area	$V_{DS} = P_D / I_D [Cont.]$ $I_{DS} = I_D [Cont.], t = 1 \text{ Sec.}$	310			W
I_{LM}	Inductive Current Clamped		92			A

THERMAL CHARACTERISTICS

	Characteristic	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction to Case			0.40	$^\circ C/W$
$R_{\theta JA}$	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 – CASE vs PULSE DURATION

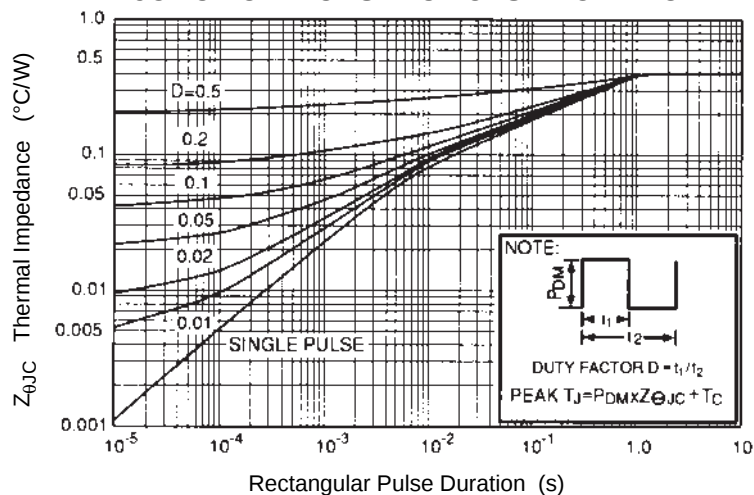


Figure 2
TYPICAL OUTPUT CHARACTERISTICS

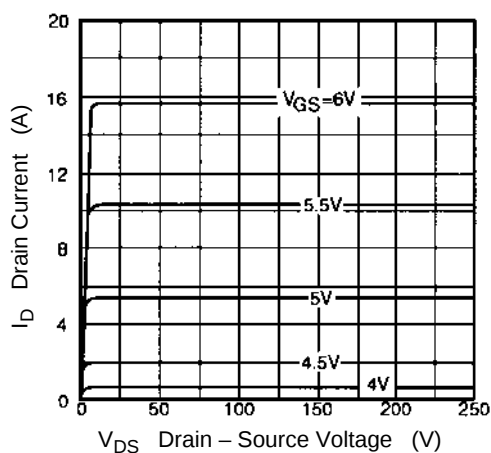


Figure 3
TYPICAL OUTPUT CHARACTERISTICS

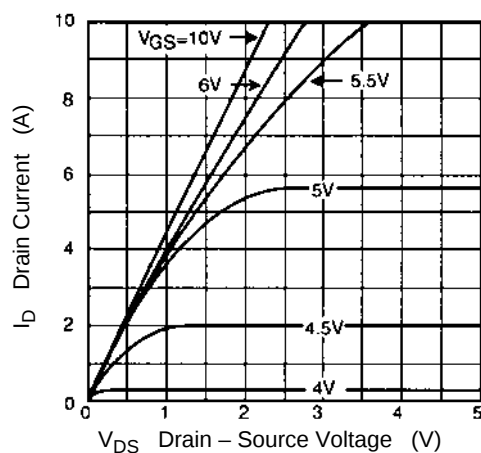


Figure 4
TYPICAL TRANSFER CHARACTERISTICS

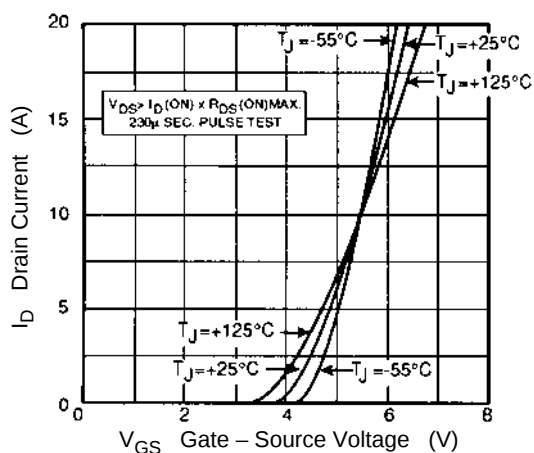


Figure 5
R_DS(ON) vs DRAIN CURRENT

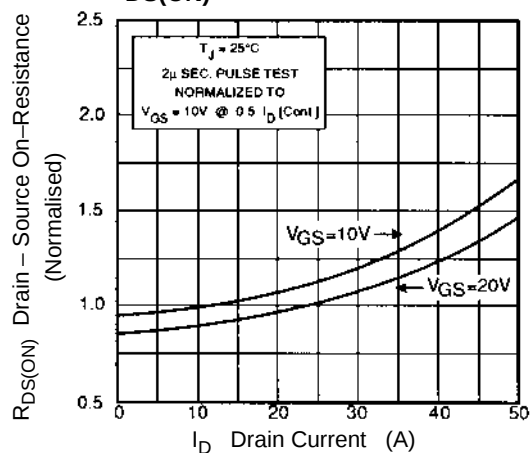


Figure 6
MAXIMUM DRAIN CURRENT vs
CASE TEMPERATURE

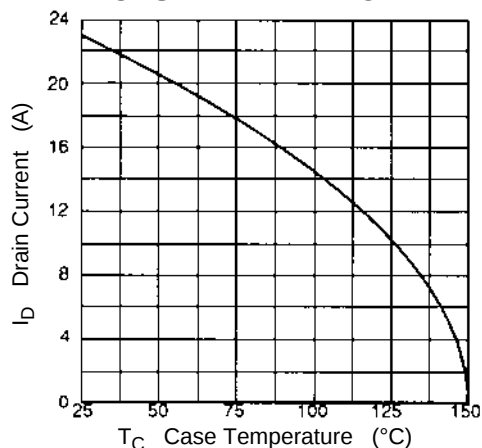


Figure 7
BREAKDOWN VOLTAGE vs TEMPERATURE

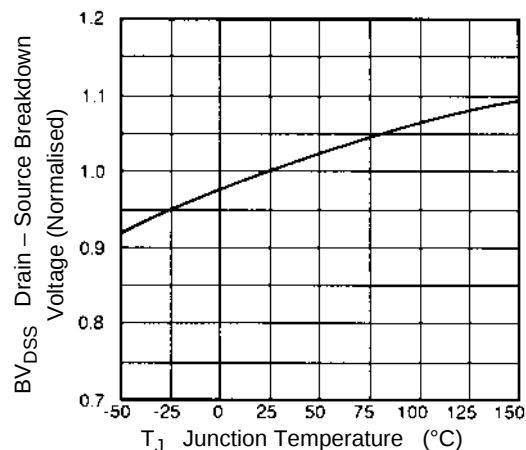


Figure 8
ON RESISTANCE vs TEMPERATURE

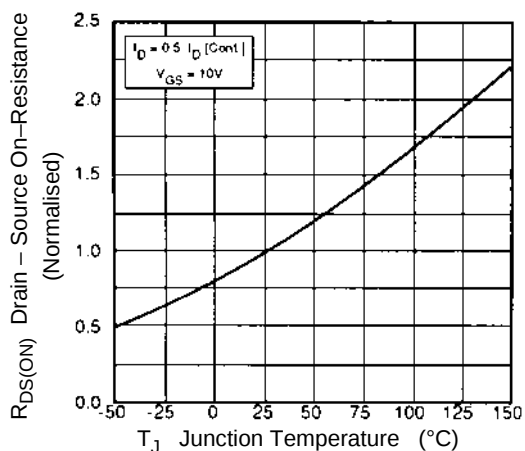


Figure 9
THRESHOLD VOLTAGE vs TEMPERATURE

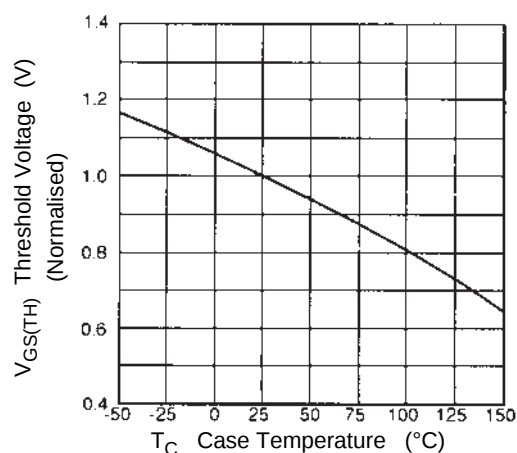


Figure 10
MAXIMUM SAFE OPERATING AREA

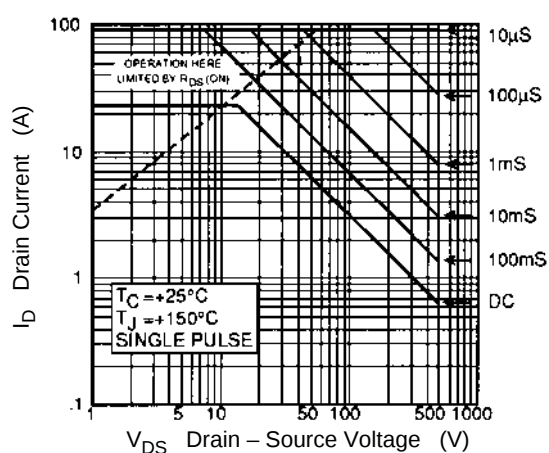


Figure 11
TYPICAL CAPACITANCE vs
DRAIN - SOURCE VOLTAGE

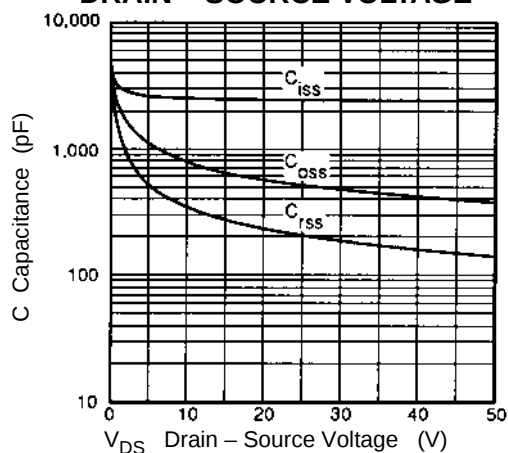


Figure 12
GATE CHARGES vs GATE – SOURCE VOLTAGE

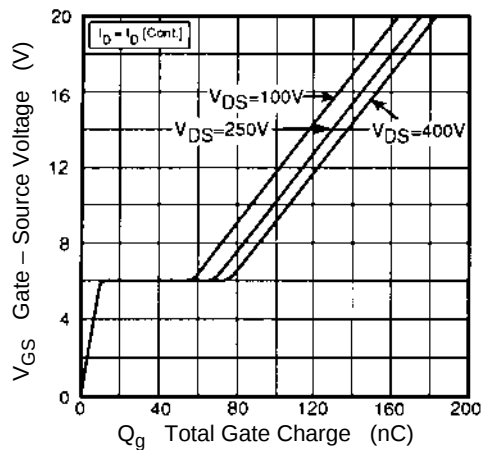


Figure 13
TYPICAL SOURCE – DRAIN
DIODE FORWARD VOLTAGE

