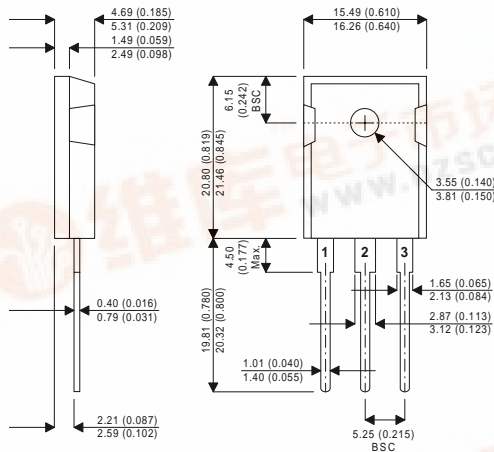




BFC50

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



4TH GENERATION MOSFET

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

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

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 @ $T_{case} = 25^{\circ}C$	310	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	$^{\circ}C$
T_L	Lead Temperature : 0.063" from Case for 10 Sec.	300	

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	$V_{DS} = V_{GS}, I_D = 1.0mA$	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 μS , 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 μ S , 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

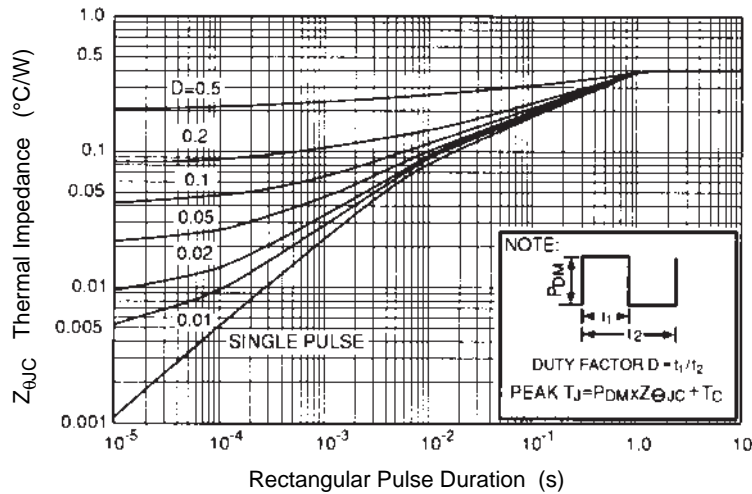


Figure 2
TYPICAL OUTPUT CHARACTERISTICS

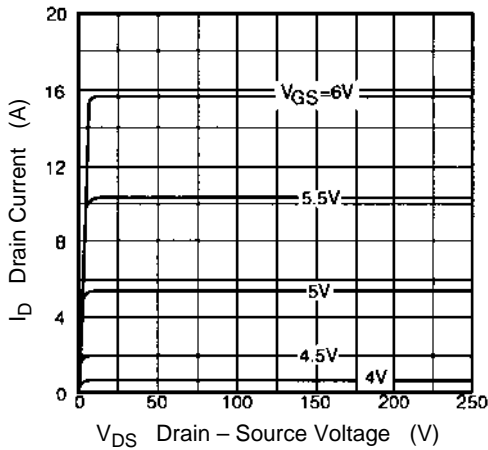


Figure 3
TYPICAL OUTPUT CHARACTERISTICS

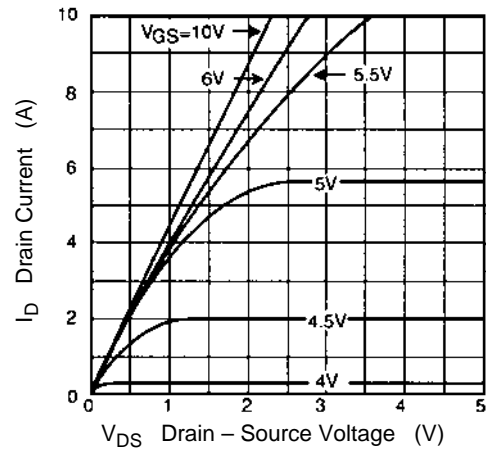


Figure 4
TYPICAL TRANSFER CHARACTERISTICS

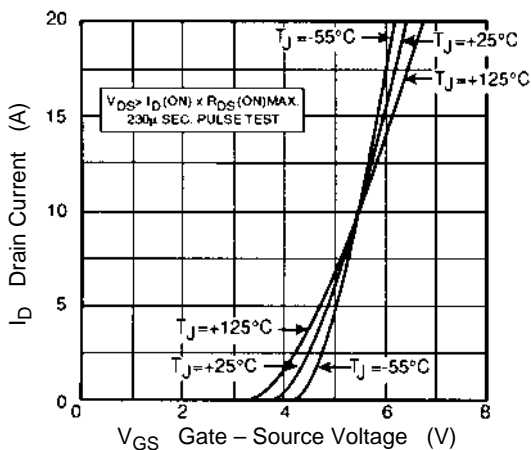


Figure 5
R_DS(ON) vs DRAIN CURRENT

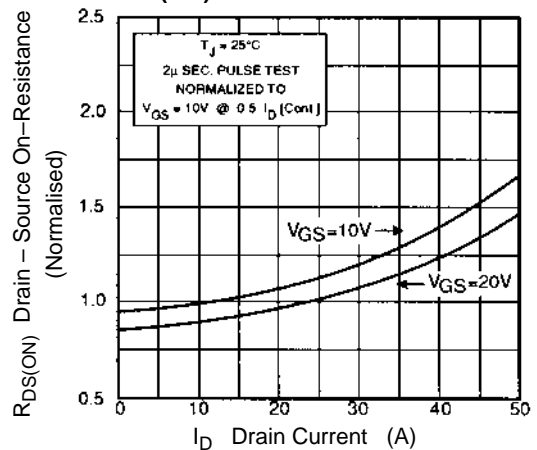


Figure 6
MAXIMUM DRAIN CURRENT vs
CASE TEMPERATURE

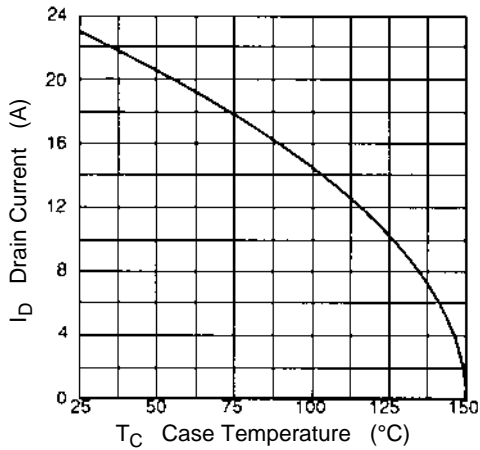


Figure 7
BREAKDOWN VOLTAGE vs TEMPERATURE

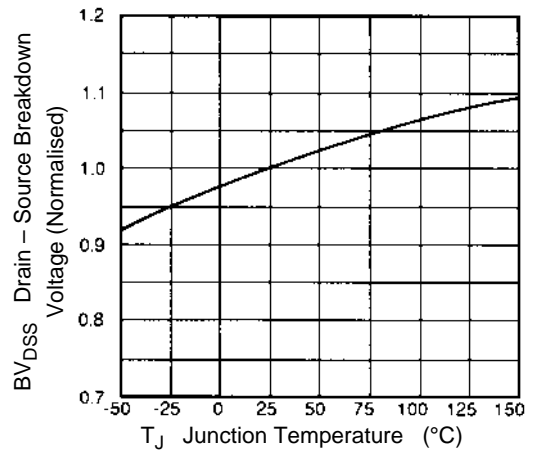


Figure 8
ON RESISTANCE vs TEMPERATURE

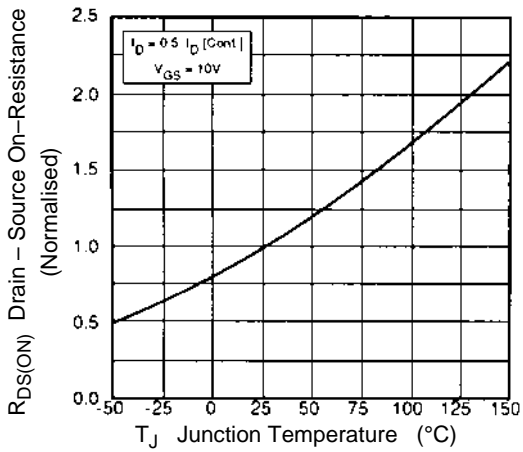


Figure 9
THRESHOLD VOLTAGE vs TEMPERATURE

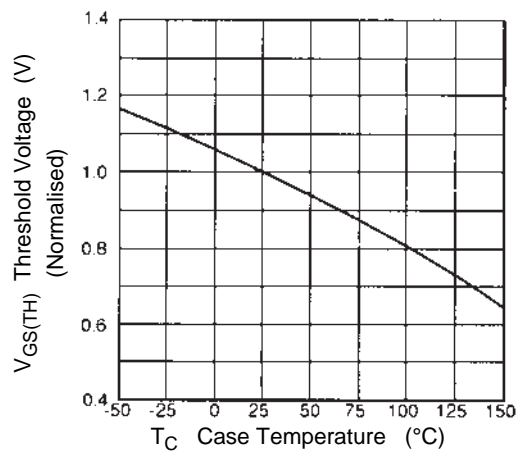


Figure 10
MAXIMUM SAFE OPERATING AREA

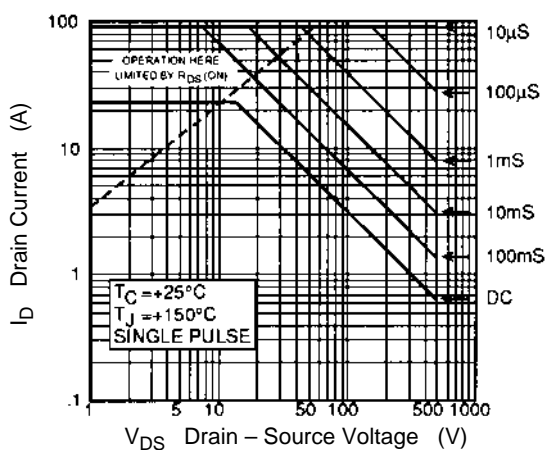


Figure 11
TYPICAL CAPACITANCE vs
DRAIN - SOURCE VOLTAGE

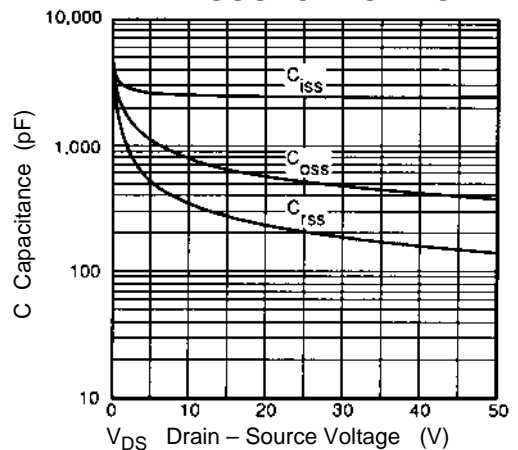


Figure 12
GATE CHARGES vs GATE – SOURCE VOLTAGE

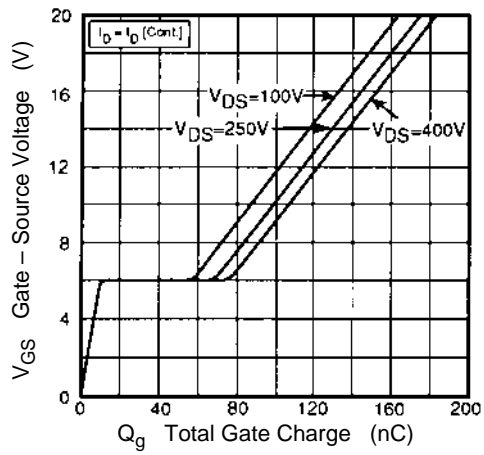


Figure 13
**TYPICAL SOURCE – DRAIN
DIODE FORWARD VOLTAGE**

