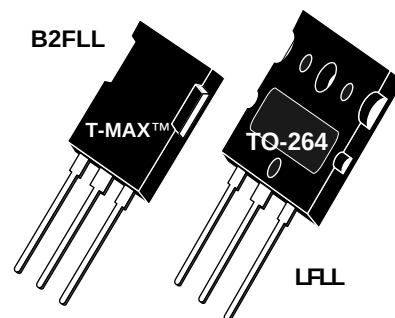
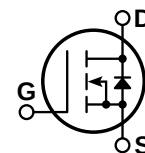


POWER MOS 7® FREDFET

Power MOS 7® is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7® by significantly lowering $R_{DS(ON)}$ and Q_g . Power MOS 7® combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with APT's patented metal gate structure.



- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge, Q_g
- Increased Power Dissipation
- Easier To Drive
- Popular T-MAX™ or TO-264 Package
- **FAST RECOVERY BODY DIODE**



MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	APT10035	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	28	Amps
I_{DM}	Pulsed Drain Current ①	112	
V_{GS}	Gate-Source Voltage Continuous	± 30	Volts
V_{GSM}	Gate-Source Voltage Transient	± 40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	690	Watts
	Linear Derating Factor	5.5	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	300	
I_{AR}	Avalanche Current ① (Repetitive and Non-Repetitive)	28	Amps
E_{AR}	Repetitive Avalanche Energy ①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ④	3000	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu A$)	1000			Volts
$I_{D(on)}$	On State Drain Current ② ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$)	28			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance ② ($V_{GS} = 10V, 14A$)			0.37	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 1000V, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 800V, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 2.5mA$)	3		5	Volts

 **CAUTION:** These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

APT Website - <http://www.advancedpower.com>

DYNAMIC CHARACTERISTICS

APT10035B2FLL -LFL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		5185		pF
C_{oss}	Output Capacitance			881		
C_{rss}	Reverse Transfer Capacitance			160		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 500V$ $I_D = 28A @ 25^\circ C$		186		nC
Q_{gs}	Gate-Source Charge			24		
Q_{gd}	Gate-Drain ("Miller") Charge			122		
$t_{d(on)}$	Turn-on Delay Time	RESISTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 500V$ $I_D = 28A @ 25^\circ C$ $R_G = 0.6\Omega$		12		ns
t_r	Rise Time			10		
$t_{d(off)}$	Turn-off Delay Time			36		
t_f	Fall Time			9		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 670V, V_{GS} = 15V$ $I_D = 28A, R_G = 5\Omega$		900		μJ
E_{off}	Turn-off Switching Energy			623		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 670V, V_{GS} = 15V$ $I_D = 28A, R_G = 5\Omega$		1423		
E_{off}	Turn-off Switching Energy			779		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			28	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			112	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -28A$)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⑤			18	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -28A, di/dt = 100A/\mu s$)	$T_j = 25^\circ C$		320	ns
		$T_j = 125^\circ C$		650	
Q_{rr}	Reverse Recovery Charge ($I_S = -28A, di/dt = 100A/\mu s$)	$T_j = 25^\circ C$	3.60		μC
		$T_j = 125^\circ C$	9.72		
I_{RRM}	Peak Recovery Current ($I_S = -28A, di/dt = 100A/\mu s$)	$T_j = 25^\circ C$	16.5		Amps
		$T_j = 125^\circ C$	24.7		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.18	$^\circ C/W$
$R_{\theta JA}$	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

④ Starting $T_j = +25^\circ C$, $L = 7.65mH$, $R_G = 25\Omega$, Peak $I_L = 28A$

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_{D28A}$ $di/dt \leq 700A/\mu s$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ C$

⑥ E_{on} includes diode reverse recovery. See figures 18, 20.

APT Reserves the right to change, without notice, the specifications and information contained herein.

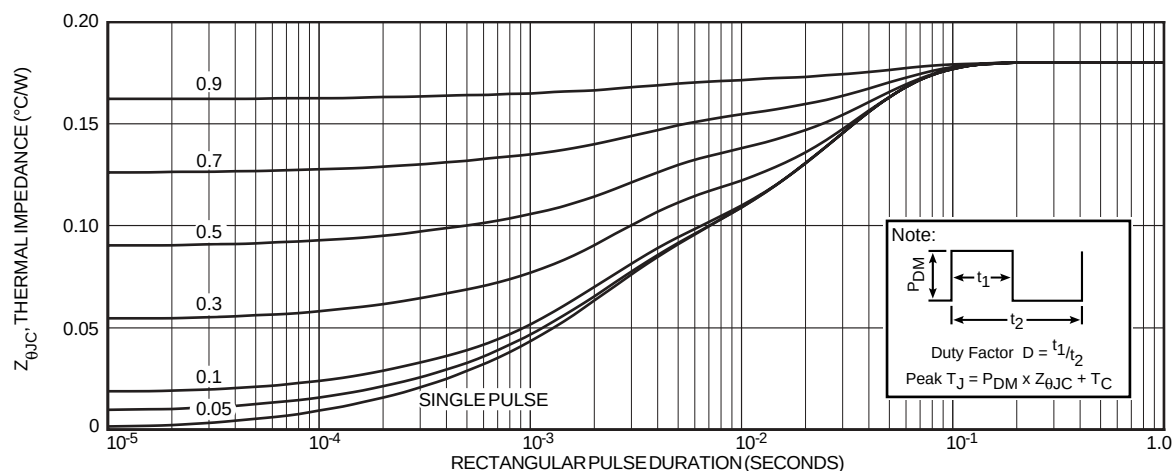


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

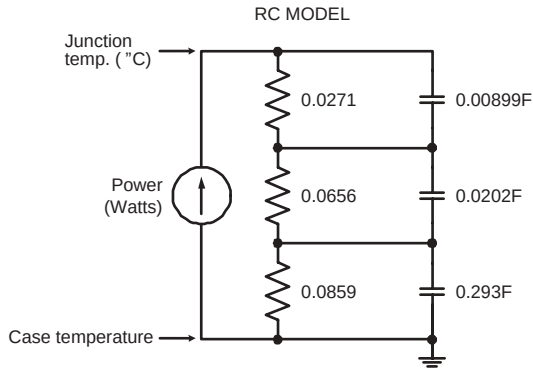


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

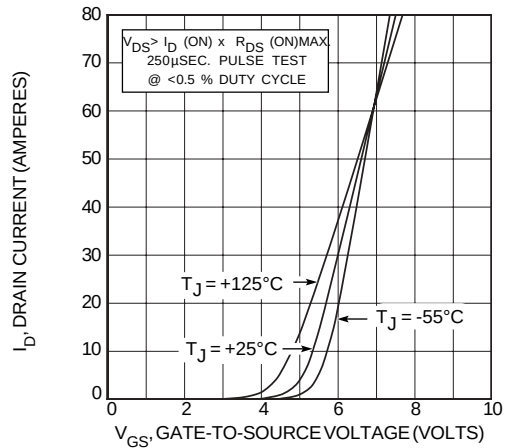


FIGURE 4, TRANSFER CHARACTERISTICS

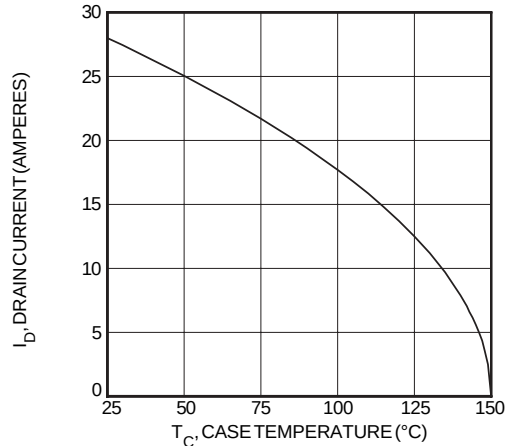


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

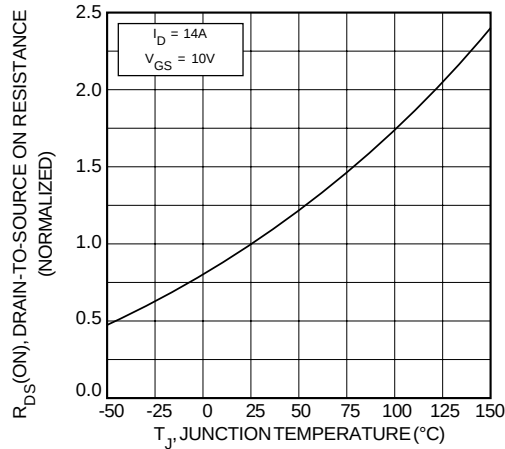


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

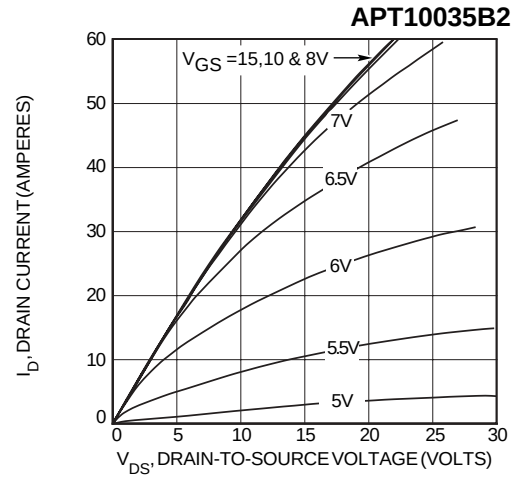


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

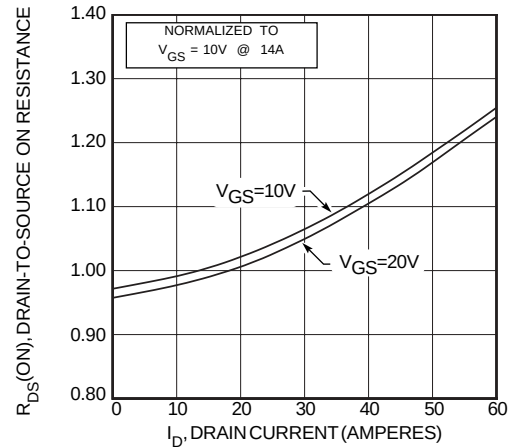


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

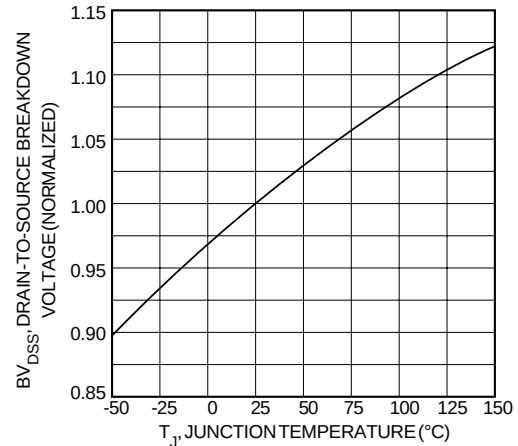


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

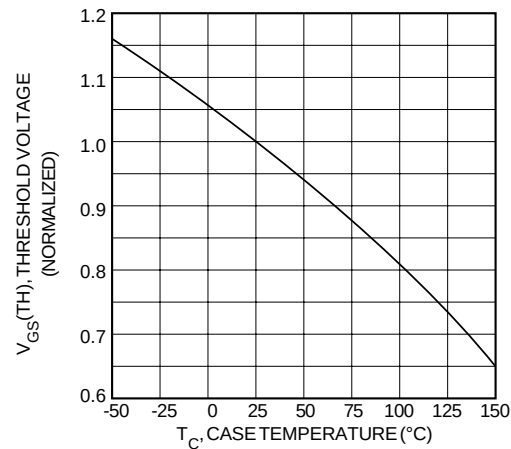


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

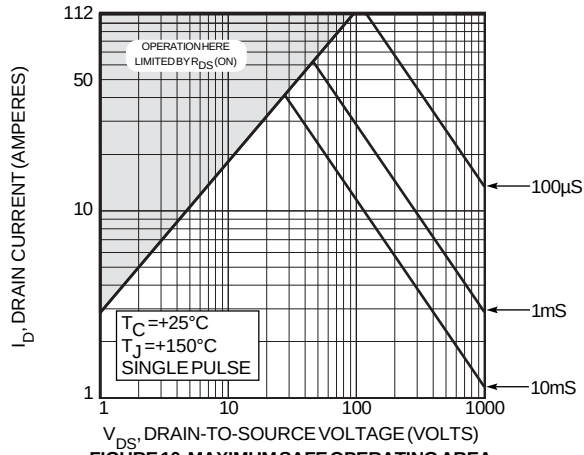


FIGURE 10, MAXIMUM SAFE OPERATING AREA

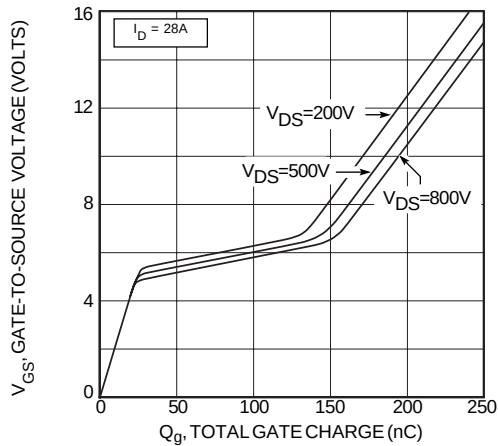


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

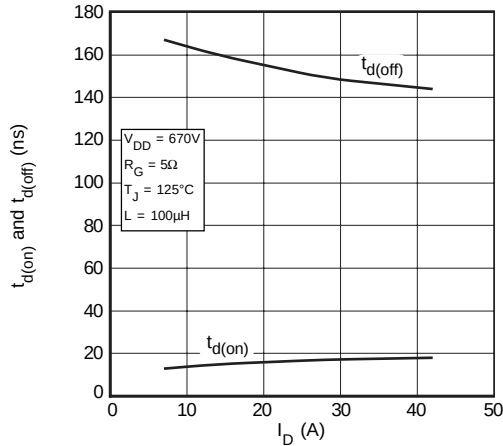


FIGURE 14, DELAY TIMES vs CURRENT

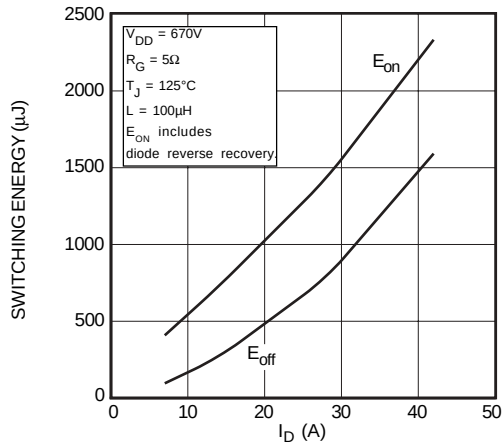


FIGURE 16, SWITCHING ENERGY vs CURRENT

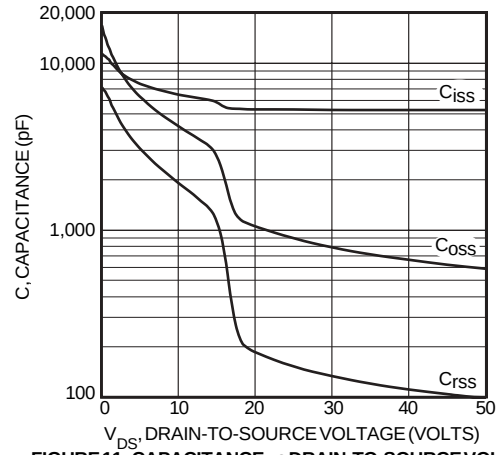


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

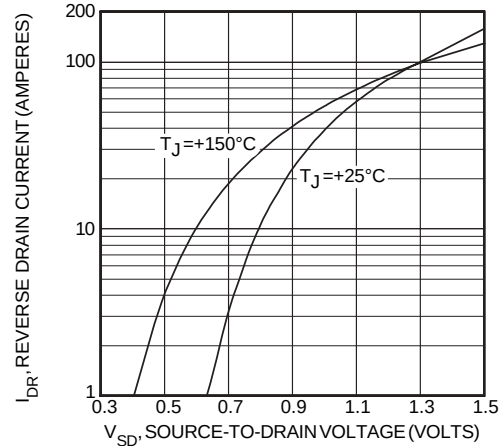


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

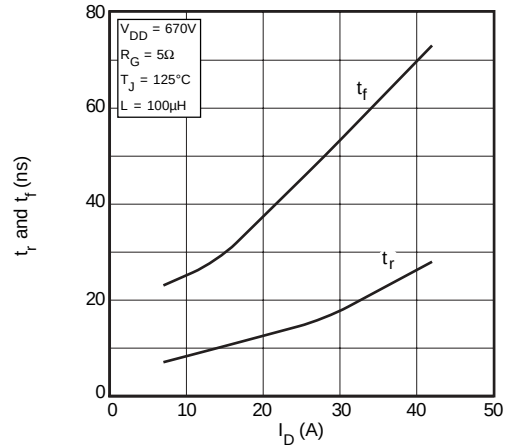


FIGURE 15, RISE AND FALL TIMES vs CURRENT

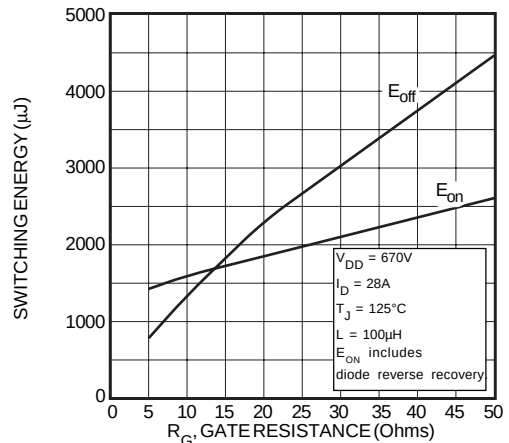


FIGURE 17, SWITCHING ENERGY VS. GATE RESISTANCE

AP110035B2FLL-LFEL

Top: 20.0 V, 1.00 V/div, 20.0 ns/div

Gate Voltage

Drain Voltage

Drain Current

Switching Energy

$t_{d(off)}$

t_f

90%

10%

0

$V_{gs} = 27.2 \text{ V}$
 $V_{ds} = 20.8 \text{ V}$
 $I_d = 0 \text{ A}$
 $T_j = 125 \text{ C}$

24 feb 2003 15:16:53

The drawing shows the mechanical specifications for the BSC-2 package. The top view (right) shows a square body with a width of 15.49 (610) and 16.26 (640). The height is 5.38 (212) and 6.20 (244). The distance between the centers of the three pins is 2.87 (113) and 3.12 (123). The distance from the center of the pins to the edge is 1.65 (065) and 2.13 (084). The distance from the center of the pins to the edge is 1.01 (040) and 1.40 (055). The distance from the center of the pins to the edge is 4.50 (177) Max. The distance from the center of the pins to the edge is 19.81 (790) and 20.32 (800). The distance from the center of the pins to the edge is 2.21 (087) and 2.59 (102). The distance from the center of the pins to the edge is 4.69 (185) and 5.31 (209). The distance from the center of the pins to the edge is 1.49 (059) and 2.49 (098). The distance from the center of the pins to the edge is 20.80 (819) and 21.46 (845). The distance from the center of the pins to the edge is 5.45 (215) BSC. The distance from the center of the pins to the edge is 2-Plcs.

Top View Dimensions:

- Overall Width: 15.49 (610) / 16.26 (640)
- Overall Height: 5.38 (212) / 6.20 (244)
- Pin Pitch (Center-to-Center): 2.87 (113) / 3.12 (123)
- Pin Width: 1.65 (065) / 2.13 (084)
- Pin Spacing (Center-to-Edge): 1.01 (040) / 1.40 (055)
- Pin Length: 4.50 (177) Max.
- Pin Diameter: 19.81 (790) / 20.32 (800)
- Pin Thickness: 2.21 (087) / 2.59 (102)
- Pin Hole Diameter: 4.69 (185) / 5.31 (209)
- Pin Hole Spacing: 1.49 (059) / 2.49 (098)
- Pin Hole Diameter: 20.80 (819) / 21.46 (845)
- Pin Hole Diameter: 5.45 (215) BSC
- Pin Hole Diameter: 2-Plcs.

Side View Dimensions:

- Overall Height: 20.80 (819) / 21.46 (845)
- Pin Length: 4.50 (177) Max.
- Pin Diameter: 19.81 (790) / 20.32 (800)
- Pin Thickness: 2.21 (087) / 2.59 (102)
- Pin Hole Diameter: 4.69 (185) / 5.31 (209)
- Pin Hole Spacing: 1.49 (059) / 2.49 (098)
- Pin Hole Diameter: 20.80 (819) / 21.46 (845)
- Pin Hole Diameter: 5.45 (215) BSC
- Pin Hole Diameter: 2-Plcs.

Labels:

- Gate
- Drain
- Source

4.60 (.181)
5.21 (.205)
1.80 (.071)
2.01 (.079)

19.51 (.769)
20.50 (.807)

3.10 (.122)
3.48 (.137)

5.79 (.228)
6.20 (.244)

25.48 (1.003)
26.49 (1.043)

2.29 (.090)
2.69 (.106)

19.81 (.780)
21.39 (.842)

0.48 (.019)
0.84 (.033)
2.59 (.102)
3.00 (.118)

0.76 (.030)
1.30 (.051)
2.79 (.110)
3.18 (.125)

5.45 (.215) BSC

2.Pins

Drain

Gate

Drain

Source

050-7037 Rev C 2-2009