Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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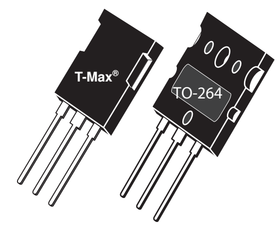
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

APT94N65B2C6
APT94N65LC6

650V 94A 0.035Ω

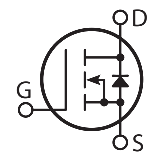
Super Junction MOSFET

APT94N65B2C6



APT94N65LC6

- **Ultra Low $R_{DS(ON)}$**
- **Low Miller Capacitance**
- **Ultra Low Gate Charge, Q_g**
- **Avalanche Energy Rated**
- **Extreme $^{dv}/_{dt}$ Rated**



Unless stated otherwise, Microsemi discrete MOSFETs contain a single MOSFET die. This device is made with two parallel MOSFET die. It is intended for switch-mode operation. It is not suitable for linear mode operation.

MAXIMUM RATINGS

All Ratings per die: T_C = 25°C unless otherwise specified.

Symbol	Parameter	APT94N65B2_LC6	UNIT
V_{DSS}	Drain-Source Voltage	650	Volts
I_D	Continuous Drain Current @ T_C = 25°C [1]	95	Amps
	Continuous Drain Current @ T_C = 100°C	61	
I_{DM}	Pulsed Drain Current [2]	282	
V_{GS}	Gate-Source Voltage Continuous	±20	Volts
P_D	Total Power Dissipation @ T_C = 25°C	833	Watts
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.	260	
I_{AR}	Avalanche Current [2]	9.3	Amps
E_{AR}	Repetitive Avalanche Energy [3] (Id = 9.3A, Vdd = 50V)	1.76	mJ
E_{AS}	Single Pulse Avalanche Energy (Id = 9.3A, Vdd = 50V)	1160	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{(DSS)}$	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 2.0mA)	650			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance [4] (V_{GS} = 10V, I_D = 35.2A)		0.03	0.035	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 650V, V_{GS} = 0V)		1.0	50	μA
	Zero Gate Voltage Drain Current (V_{DS} = 650V, V_{GS} = 0V, T_C = 150°C)		100		
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			±200	nA
$V_{GS(th)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 3.5mA)	2.5	3	3.5	Volts

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

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		8140		pF
C_{oss}	Output Capacitance			5451		
C_{rss}	Reverse Transfer Capacitance			603		
Q_g	Total Gate Charge ⑤	V_{GS} = 10V V_{DD} = 300V I_D = 94A @ 25°C		320		nC
Q_{gs}	Gate-Source Charge			50		
Q_{gd}	Gate-Drain ("Miller") Charge			168		
$t_{d(on)}$	Turn-on Delay Time	**INDUCTIVE SWITCHING** V_{GS} = 15V V_{DD} = 400V I_D = 94A @ 25°C R_G = 4.3Ω		26		ns
t_r	Rise Time			59		
$t_{d(off)}$	Turn-off Delay Time			323		
t_f	Fall Time			172		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 25°C** V_{DD} = 400V, V_{GS} = 15V I_D = 94A, R_G = 4.3Ω		2916		µJ
E_{off}	Turn-off Switching Energy			3257		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 125°C** V_{DD} = 400V, V_{GS} = 15V I_D =94A, R_G = 4.3Ω		3947		
E_{off}	Turn-off Switching Energy			4034		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				92.6	Amps
I_{SM}	Pulsed Source Current ② (Body Diode)				282	
V_{SD}	Diode Forward Voltage ④ (V_{GS} = 0V, I_S = -52.4A)			0.9	1.2	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑦				15	V/ns
t_{rr}	Reverse Recovery Time (I_S = -94A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		1063		ns
Q_{rr}	Reverse Recovery Charge (I_S = -94A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		39		µC
I_{RRM}	Peak Recovery Current (I_S = -94A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		63		Amps

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.15	°C/W
$R_{\theta JA}$	Junction to Ambient			31	

1 Continuous current limited by package lead temperature.
2 Repetitive Rating: Pulse width limited by maximum junction temperature
3 Repetitive avalanche causes additional power losses that can be calculated as ***$P_{AV} = E_{AR}$*f . Pulse width tp limited by Tj max.***
4 Pulse Test: Pulse width < 380 µs, Duty Cycle < 2%
5 See MIL-STD-750 Method 3471
6 Eon includes diode reverse recovery.
7 Maximum diode commutation speed = di/dt 300A/µs

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

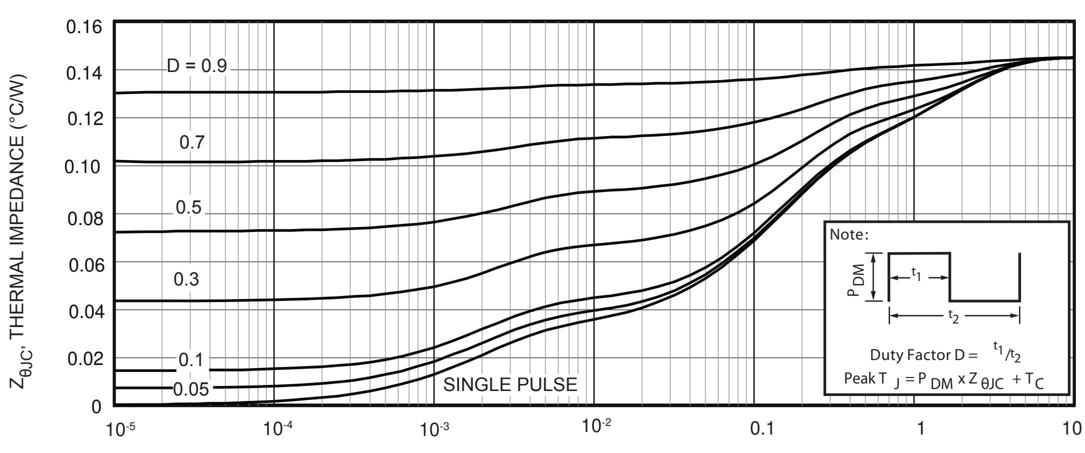


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

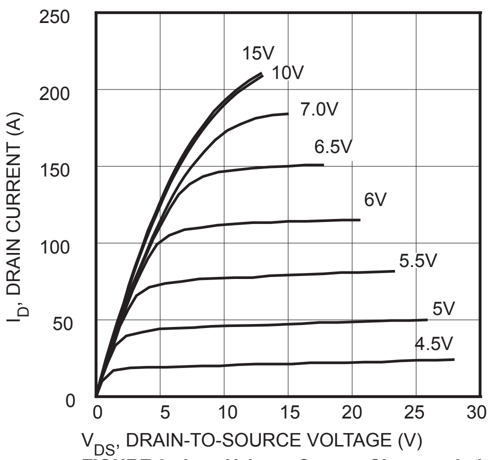


FIGURE 2, Low Voltage Output Characteristics

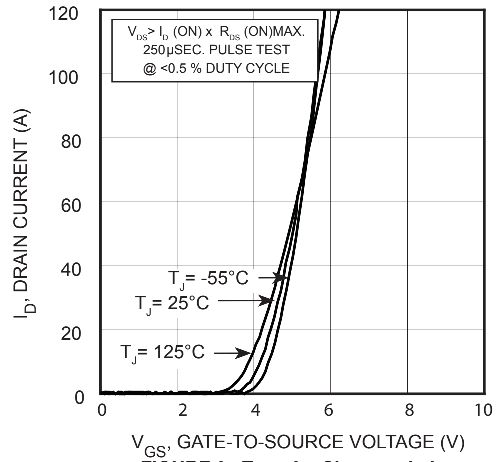


FIGURE 3, Transfer Characteristics

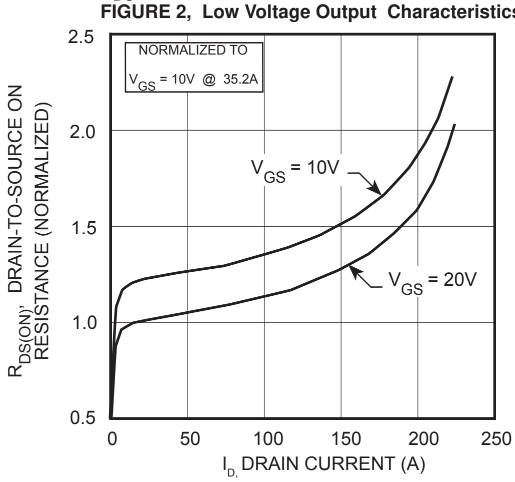


FIGURE 4, R_{DS}(ON) vs Drain Current

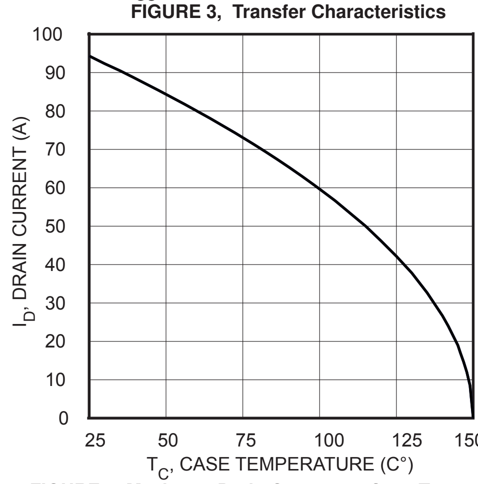


FIGURE 5, Maximum Drain Current vs Case Temperature

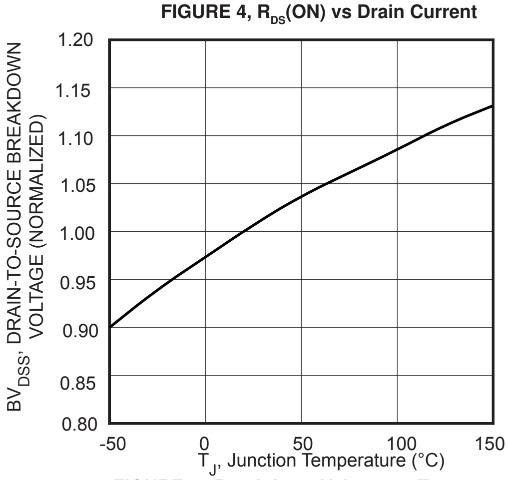


FIGURE 6, Breakdown Voltage vs Temperature

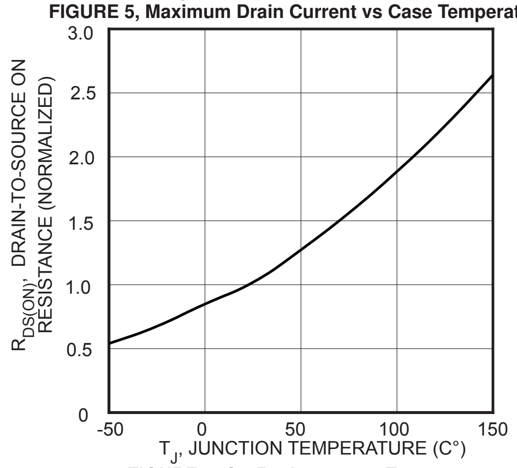


FIGURE 7, On-Resistance vs Temperature

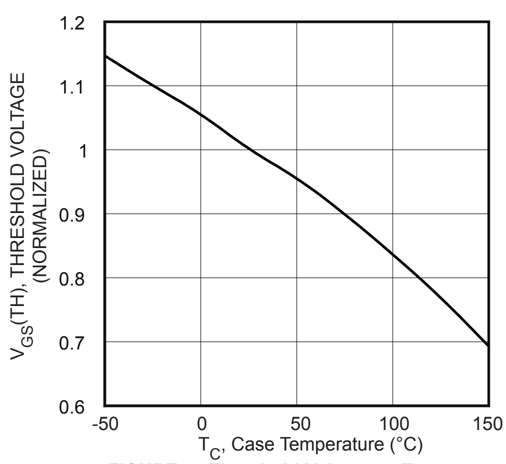


FIGURE 8, Threshold Voltage vs Temperature

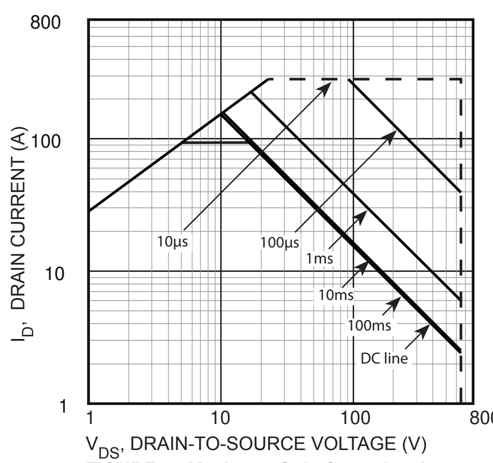


FIGURE 9, Maximum Safe Operating Area

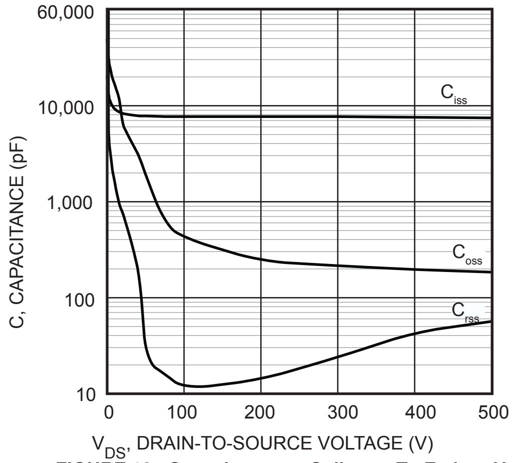


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

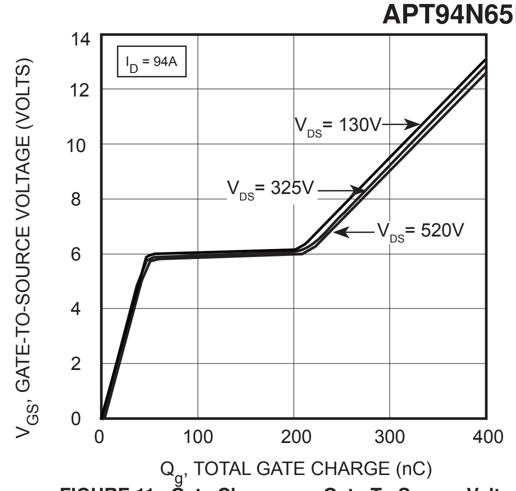


FIGURE 11, Gate Charges vs Gate-To-Source Voltage

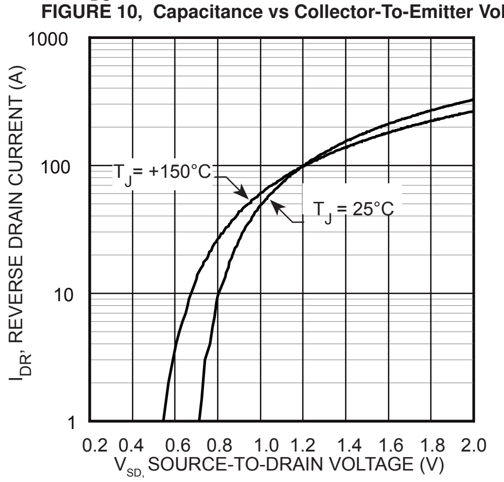


FIGURE 12, Source-Drain Diode Forward Voltage

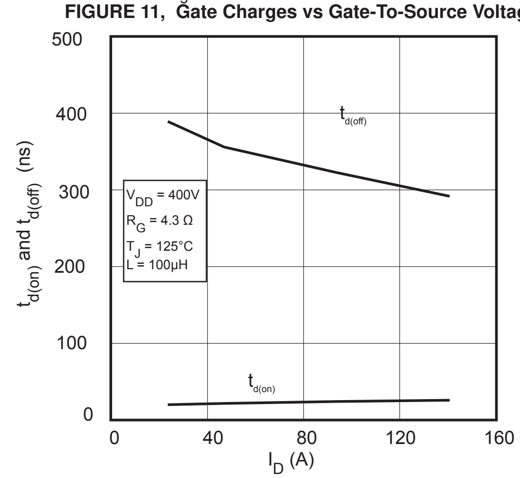


FIGURE 13, Delay Times vs Current

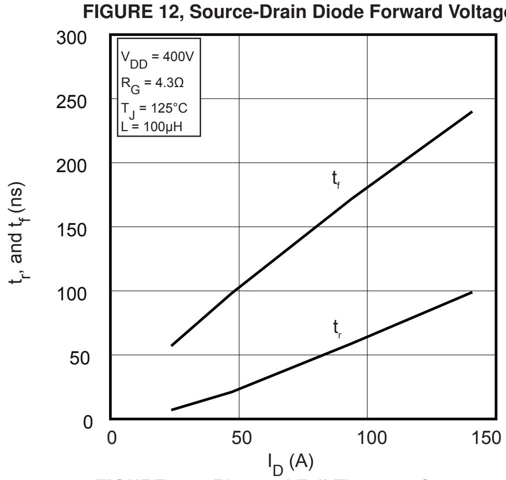


FIGURE 14 , Rise and Fall Times vs Current

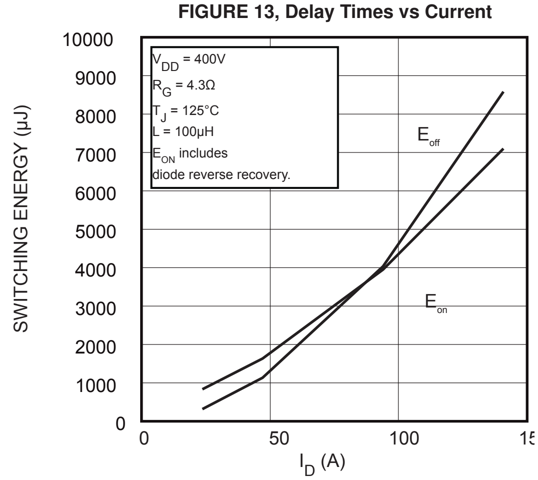


FIGURE 15, Switching Energy vs Current

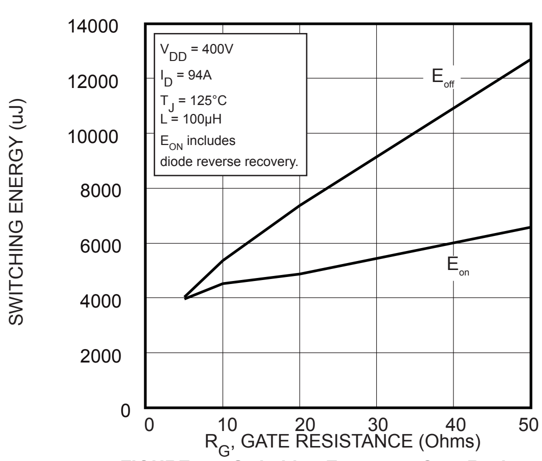


FIGURE 16, Switching Energy vs Gate Resistance

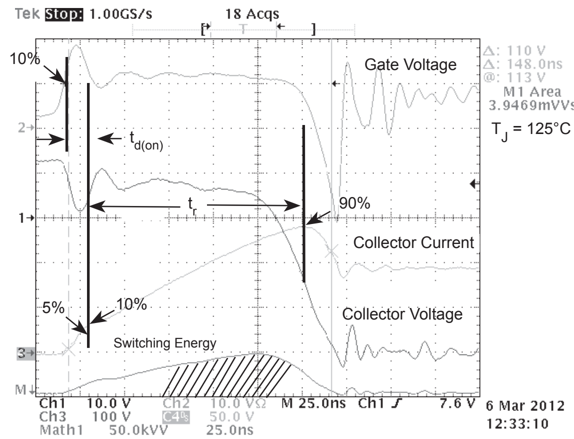


Figure 17, Turn-on Switching Waveforms and Definitions

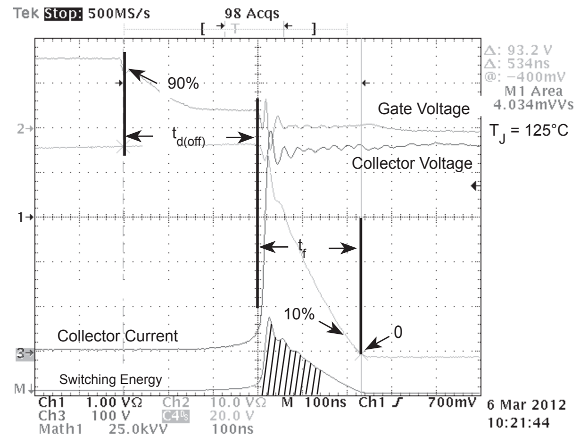


Figure 18, Turn-off Switching Waveforms and Definitions

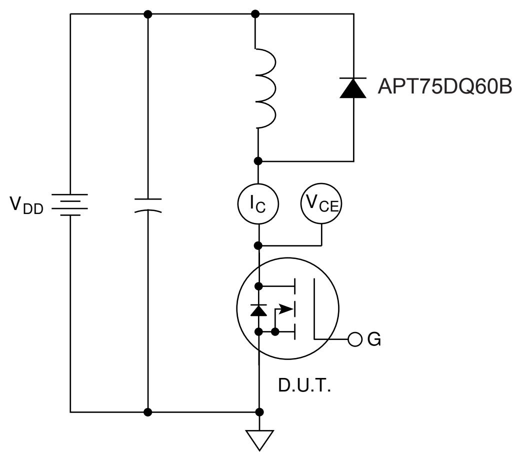
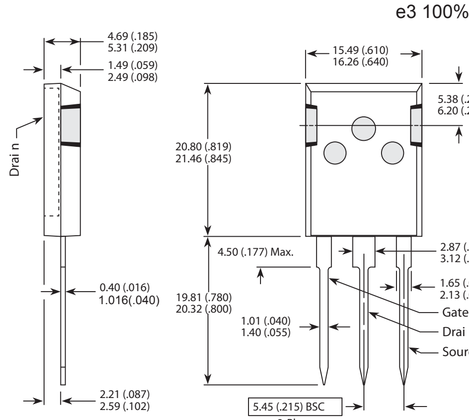


Figure 19, Inductive Switching Test Circuit

T-MAX® (B2) Package Outline

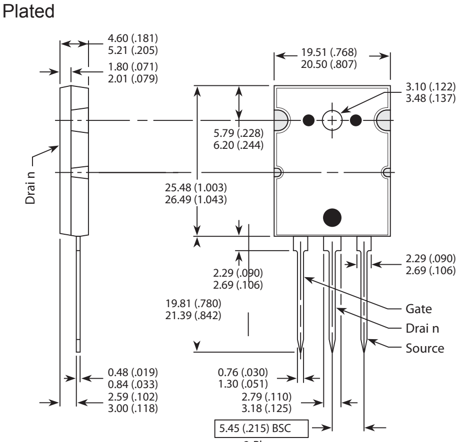
TO-264 (L) Package Outline

e3 100% Sn Plated



These dimensions are equal to the TO-247 without the mounting hole.

Dimensions in Millimeters and (Inches)



Dimensions in Millimeters and (Inches)