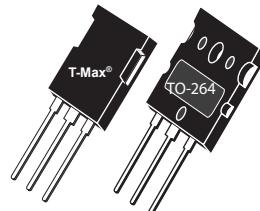
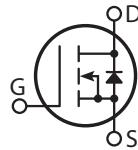



**Super Junction MOSFET**

- Ultra Low  $R_{DS(ON)}$
- Low Miller Capacitance
- Ultra Low Gate Charge,  $Q_g$
- Avalanche Energy Rated
- Extreme  $dv/dt$  Rated
- Dual die (parallel)
- Popular T-MAX and TO-264 Packages

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.

**APT106N60B2C6**

**APT106N60LC6**

**MAXIMUM RATINGS**

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

Symbol	Parameter	APT106N60B2_LC6	UNIT
$V_{DSS}$	Drain-Source Voltage	600	Volts
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$ <sup>①</sup>	106	Amps
	Continuous Drain Current @ $T_C = 100^\circ\text{C}$	68	
$I_{DM}$	Pulsed Drain Current <sup>②</sup>	318	
$V_{GS}$	Gate-Source Voltage Continuous	$\pm 20$	Volts
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	833	Watts
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 - to 150	$^\circ\text{C}$
$T_L$	Lead Temperature: 0.063" from Case for 10 Sec.	260	
$I_{AR}$	Avalanche Current <sup>②</sup>	18.6	Amps
$E_{AR}$	Repetitive Avalanche Energy <sup>③</sup> ( $I_D = 18.6\text{A}$ , $V_{dd} = 50\text{V}$ )	3.4	
$E_{AS}$	Single Pulse Avalanche Energy ( $I_D = 18.6\text{A}$ , $V_{dd} = 50\text{V}$ )	2200	mJ

**STATIC ELECTRICAL CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{(DSS)}$	Drain-Source Breakdown Voltage ( $V_{GS} = 0\text{V}$ , $I_D = 500\mu\text{A}$ )	650			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance <sup>④</sup> ( $V_{GS} = 10\text{V}$ , $I_D = 53\text{A}$ )			0.035	Ohms
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = 600\text{V}$ , $V_{GS} = 0\text{V}$ )			50	$\mu\text{A}$
	Zero Gate Voltage Drain Current ( $V_{DS} = 600\text{V}$ , $V_{GS} = 0\text{V}$ , $T_C = 150^\circ\text{C}$ )			500	
$I_{GSS}$	Gate-Source Leakage Current ( $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$ )			$\pm 200$	nA
$V_{GS(th)}$	Gate Threshold Voltage ( $V_{DS} = V_{GS}$ , $I_D = 3.4\text{mA}$ )	2.5	3	3.5	Volts

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

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## DYNAMIC CHARACTERISTICS

APT106N60B2\_LC6

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 MHz$		8390		pF
$C_{oss}$	Output Capacitance			7115		
$C_{rss}$	Reverse Transfer Capacitance			229		
$Q_g$	Total Gate Charge <sup>⑤</sup>	$V_{GS} = 10V$ $V_{DD} = 300V$ $I_D = 106A @ 25^\circ C$		308		nC
$Q_{gs}$	Gate-Source Charge			50		
$Q_{gd}$	Gate-Drain ("Miller") Charge			160		
$t_{d(on)}$	Turn-on Delay Time			25		
$t_r$	Rise Time	$V_{GS} = 15V$ $V_{DD} = 400V$ $I_D = 106A @ 25^\circ C$ $R_G = 4.3\Omega$		79		ns
$t_{d(off)}$	Turn-off Delay Time			277		
$t_f$	Fall Time			164		
$E_{on}$	Turn-on Switching Energy <sup>⑥</sup>	$INDUCTIVE SWITCHING @ 25^\circ C$ $V_{DD} = 400V, V_{GS} = 15V$ $I_D = 106A, R_G = 4.3\Omega$		2995		$\mu J$
$E_{off}$	Turn-off Switching Energy			3775		
$E_{on}$	Turn-on Switching Energy <sup>⑥</sup>			4055		
$E_{off}$	Turn-off Switching Energy	$INDUCTIVE SWITCHING @ 125^\circ C$ $V_{DD} = 400V, V_{GS} = 15V$ $I_D = 106A, R_G = 4.3\Omega$		4200		

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$I_s$	Continuous Source Current (Body Diode)			92	
$I_{SM}$	Pulsed Source Current <sup>②</sup> (Body Diode)			318	Amps
$V_{SD}$	Diode Forward Voltage <sup>④</sup> ( $V_{GS} = 0V, I_s = -106A$ )		0.9	1.2	Volts
$\frac{dv}{dt}$	Peak Diode Recovery $\frac{dv}{dt}$ <sup>⑦</sup>			15	V/ns
$t_{rr}$	Reverse Recovery Time ( $I_s = -106A, \frac{di}{dt} = 100A/\mu s$ )	$T_j = 25^\circ C$		1400	ns
$Q_{rr}$	Reverse Recovery Charge ( $I_s = -106A, \frac{di}{dt} = 100A/\mu s$ )	$T_j = 25^\circ C$		45	$\mu C$
$I_{RRM}$	Peak Recovery Current ( $I_s = -106A, \frac{di}{dt} = 100A/\mu s$ )	$T_j = 25^\circ C$		47	Amps

## THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.15	$^\circ C/W$
$R_{\theta JA}$	Junction to Ambient			40	
$W_T$	Package Weight		0.22		oz
			6.2		g
Torque	Mounting Torque (TO-264 Package), 4-40 or M3 screw			10	in-lbf
				1.1	N·m

1 Continuous current limited by package lead temperature.

4 Pulse Test: P

2 Repetitive Rating: Pulse width limited by maximum junction temperature

5 See MIL-STD-750 Method 3471

3 Repetitive avalanche causes additional power losses that can be calculated

6 Eon includes diode reverse recovery.

as  $P_{AV} = E_{AR} * f$ . Pulse width tp limited by  $T_j$  max.

7 Maximum  $125^\circ C$  diode commutation speed =  $di/dt$  600A/ $\mu s$

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

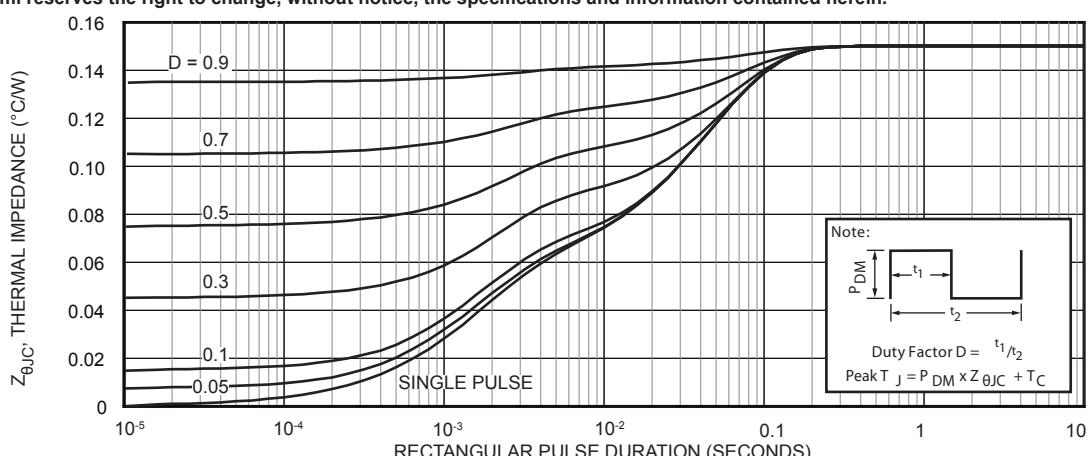


FIGURE 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

## TYPICAL PERFORMANCE CURVES

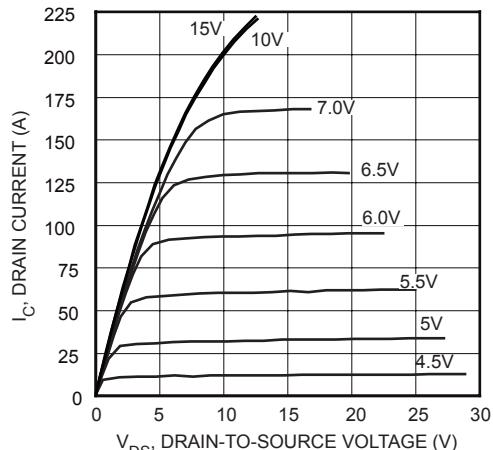


FIGURE 2, Low Voltage Output Characteristics

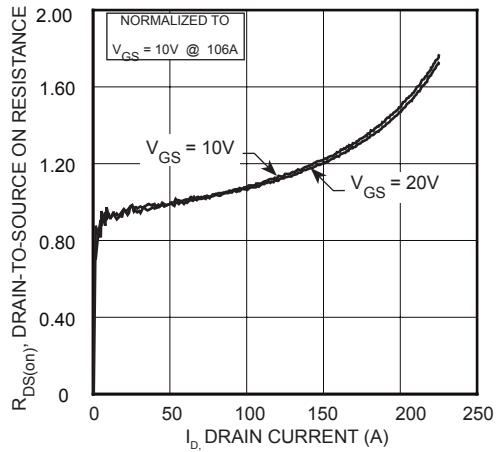


FIGURE 4,  $R_{DS(ON)}$  vs Drain Current

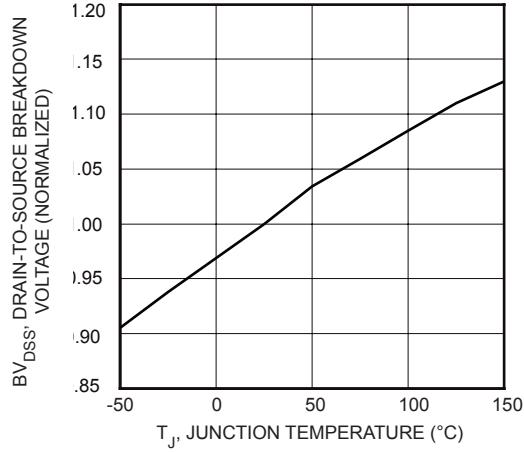


FIGURE 6, Breakdown Voltage vs Temperature

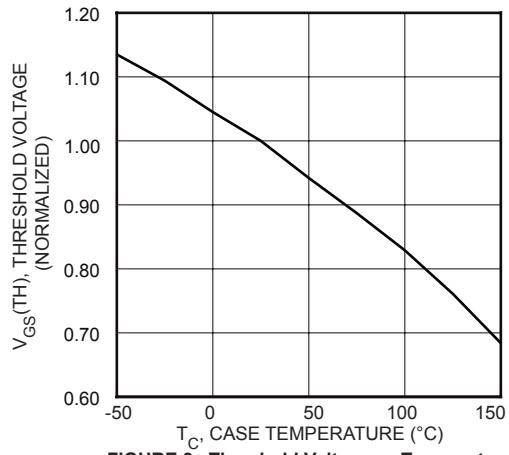


FIGURE 8, Threshold Voltage vs Temperature

## APT106N60B2\_LC6

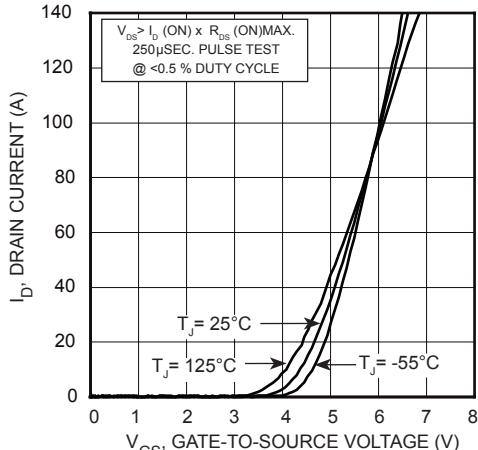


FIGURE 3, Transfer Characteristics

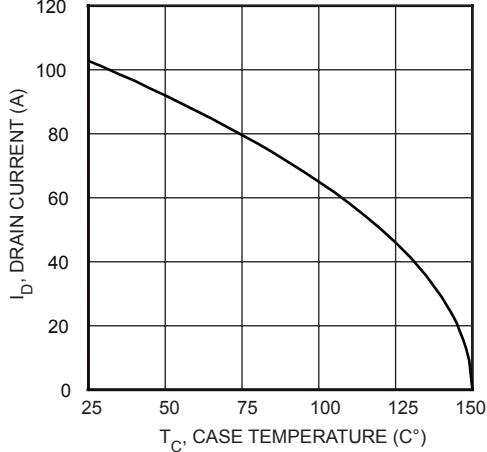


FIGURE 5, Maximum Drain Current vs Case Temperature

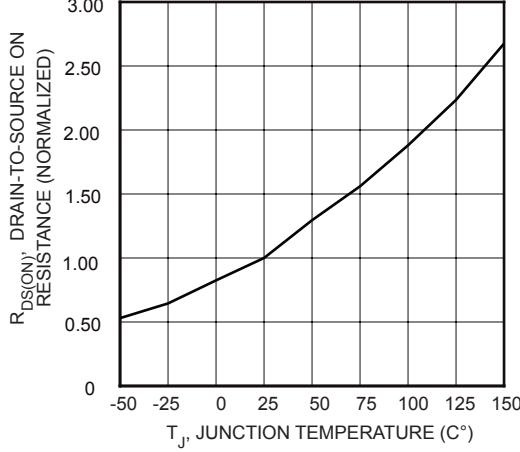


FIGURE 7, On-Resistance vs Temperature

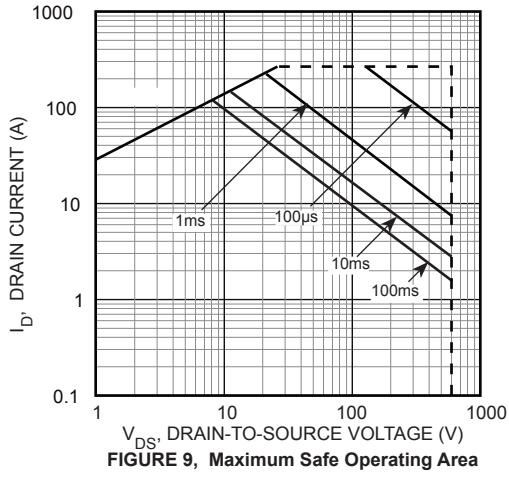


FIGURE 9, Maximum Safe Operating Area

## TYPICAL PERFORMANCE CURVES

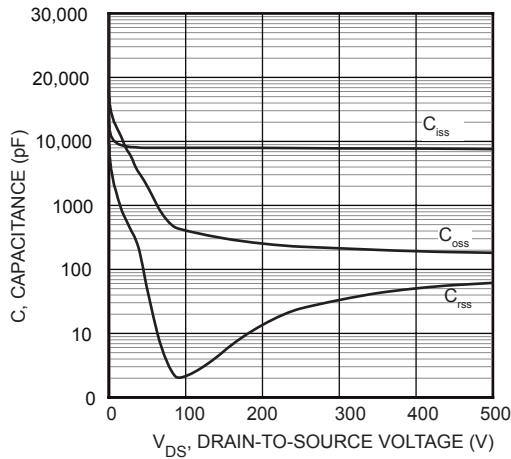


FIGURE 10, Capacitance vs Drain-To-Source Voltage

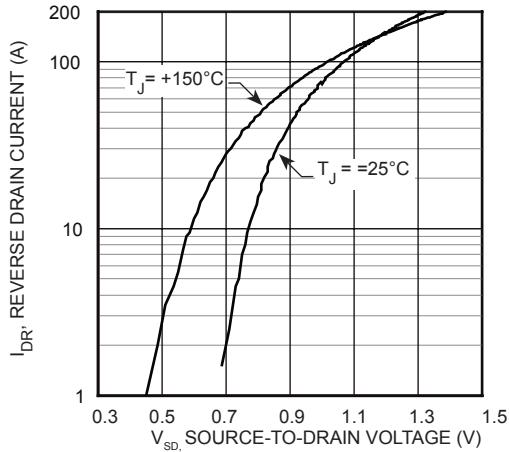


FIGURE 12, Source-Drain Diode Forward Voltage

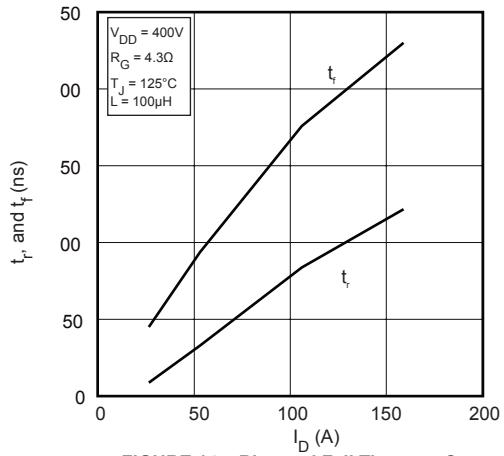


FIGURE 14, Rise and Fall Times vs Current

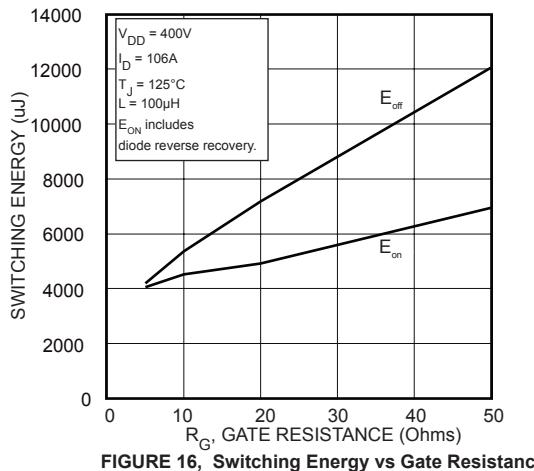


FIGURE 16, Switching Energy vs Gate Resistance

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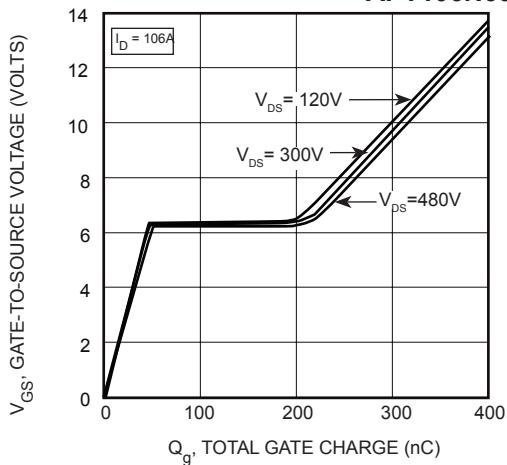


FIGURE 11, Gate Charges vs Gate-To-Source Voltage

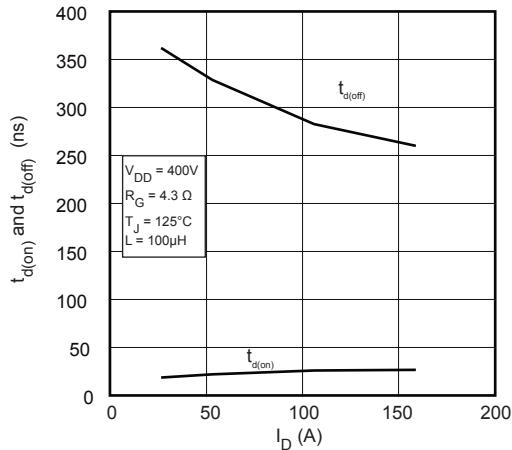


FIGURE 13, Delay Times vs Current

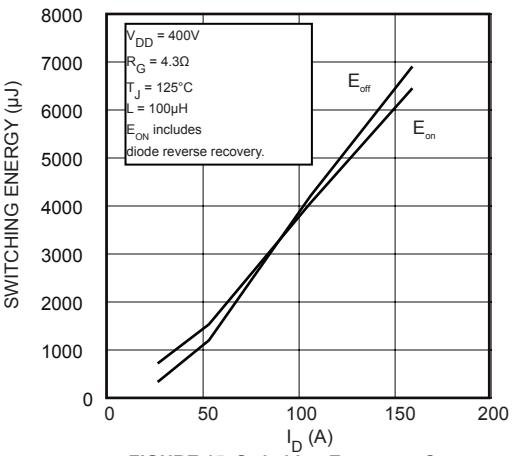


FIGURE 15, Switching Energy vs Current

## TYPICAL PERFORMANCE CURVES

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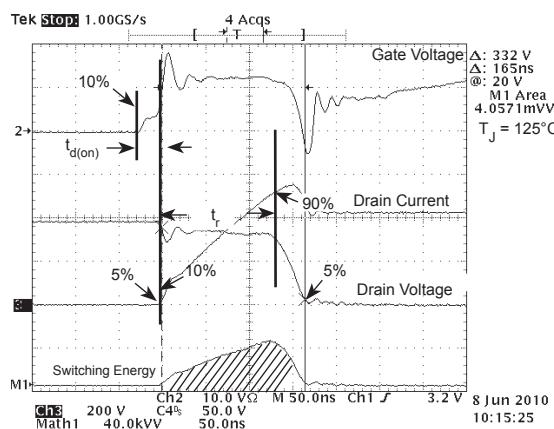


FIGURE 17, Turn-on Switching Waveforms and Definitions

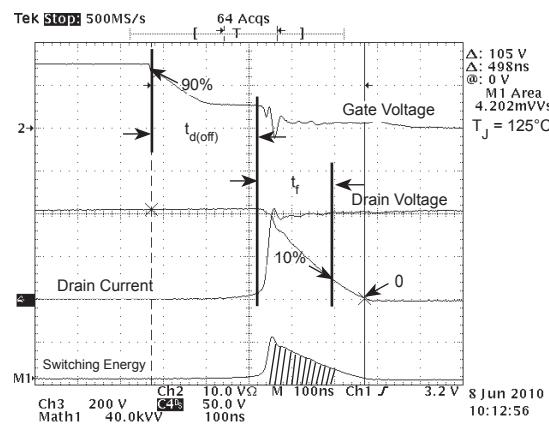


FIGURE 18, Turn-off Switching Waveforms and Definitions

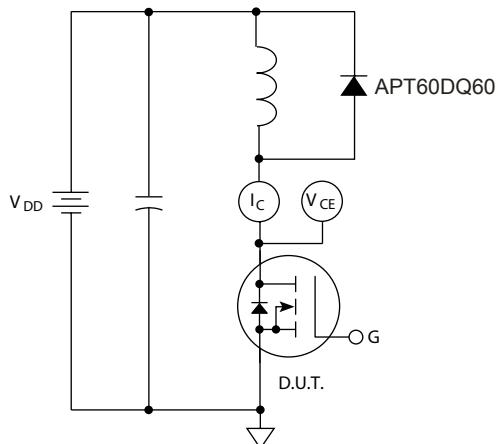
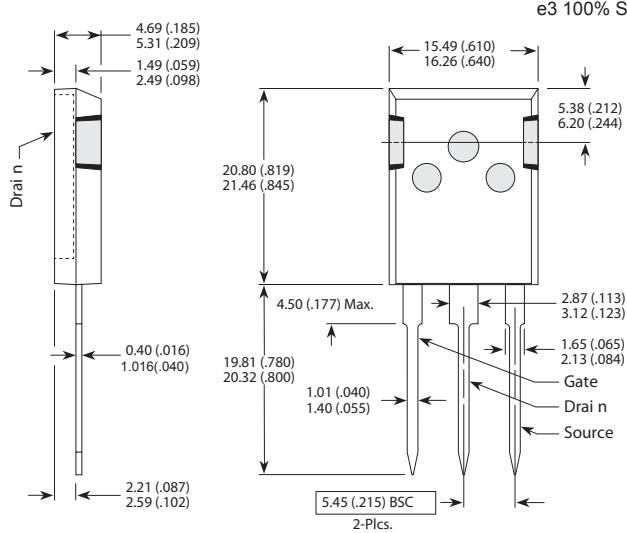


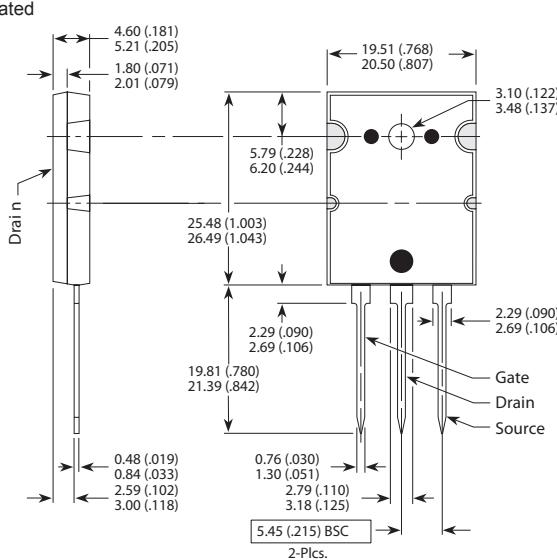
FIGURE 19, Inductive Switching Test Circuit

### T-MAX® (B2) Package Outline



These dimensions are equal to the TO-247 without the mounting hole.  
Dimensions in Millimeters and (Inches)

### TO-264 (L) Package Outline



Dimensions in Millimeters and (Inches)

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