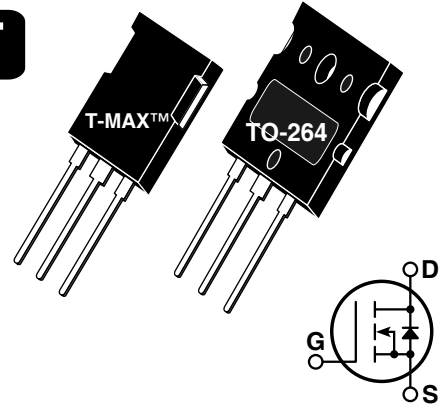


Super Junction MOSFET



- Ultra low $R_{DS(ON)}$
- Low Miller Capacitance
- Ultra Low Gate Charge, Q_g
- Avalanche Energy Rated
- Popular T-MAX™ or TO-264 Package



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

Symbol	Parameter	APT34N80B2C3G_LC3G	UNIT
V_{DSS}	Drain-Source Voltage	800	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	34	Amps
I_{DM}	Pulsed Drain Current ^①	102	
V_{GS}	Gate-Source Voltage Continuous	± 20	Volts
V_{GSM}	Gate-Source Voltage Transient	± 30	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	417	Watts
	Linear Derating Factor	3.33	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	
dv/dt	Drain-Source Voltage slope ($V_{DS} = 640\text{V}$, $I_D = 34\text{A}$, $T_J = 125^\circ\text{C}$)	50	V/ns
I_{AR}	Repetitive Avalanche Current ^⑦	17	Amps
E_{AR}	Repetitive Avalanche Energy ^⑦	0.5	mJ
E_{AS}	Single Pulse Avalanche Energy ^④	670	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0\text{V}$, $I_D = 500\mu\text{A}$)	800			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10\text{V}$, $I_D = 22\text{A}$)		0.125	0.145	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 800\text{V}$, $V_{GS} = 0\text{V}$)		1.0	50	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 800\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 150^\circ\text{C}$)			500	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$)			± 200	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 2\text{mA}$)	2.10	3	3.9	Volts

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

Microsemi Website - <http://www.microsemi.com>

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DYNAMIC CHARACTERISTICS

APT34N80B2C3G_LC3G

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1 MHz		4510		pF
C _{oss}	Output Capacitance			2050		
C _{rss}	Reverse Transfer Capacitance			110		
Q _g	Total Gate Charge ③	V _{GS} = 10V V _{DD} = 400V I _D = 34A @ 25°C		180	355	nC
Q _{gs}	Gate-Source Charge			22		
Q _{gd}	Gate-Drain ("Miller") Charge			90		
t _{d(on)}	Turn-on Delay Time	RESISTIVE SWITCHING V _{GS} = 10V V _{DD} = 400V I _D = 34A @ 125°C R _G = 2.5Ω		25		ns
t _r	Rise Time			15		
t _{d(off)}	Turn-off Delay Time			70	80	
t _f	Fall Time			6	9	
E _{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 25°C V _{DD} = 533V, V _{GS} = 15V I _D = 34A, R _G = 5Ω		675		μJ
E _{off}	Turn-off Switching Energy			580		
E _{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 125°C V _{DD} = 533V, V _{GS} = 15V I _D = 34A, R _G = 5Ω		1145		
E _{off}	Turn-off Switching Energy			670		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I _S	Continuous Source Current (Body Diode)			34	Amps
I _{SM}	Pulsed Source Current ① (Body Diode)			102	
V _{SD}	Diode Forward Voltage ② (V _{GS} = 0V, I _S = -34A)		1	1.2	Volts
t _{rr}	Reverse Recovery Time (I _S = -34A, di _S /dt = 100A/μs, V _R = 400V)		855		ns
Q _{rr}	Reverse Recovery Charge (I _S = -34A, di _S /dt = 100A/μs, V _R = 400V)		30		μC
dv/dt	Peak Diode Recovery dv/dt ⑤			6	V/ns

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
R _{θJC}	Junction to Case			.30	°C/W
R _{θJA}	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°C, L = 115.92mH, R_G = 25Ω, Peak I_L = 3.4A

⑤ I_S = -34A di_S/dt = 100A/μs V_R = 480V T_J = 125°C

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

⑦ Repetitive avalanche causes additional power losses that can be calculated as P_{AV} = E_{AR} * f

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

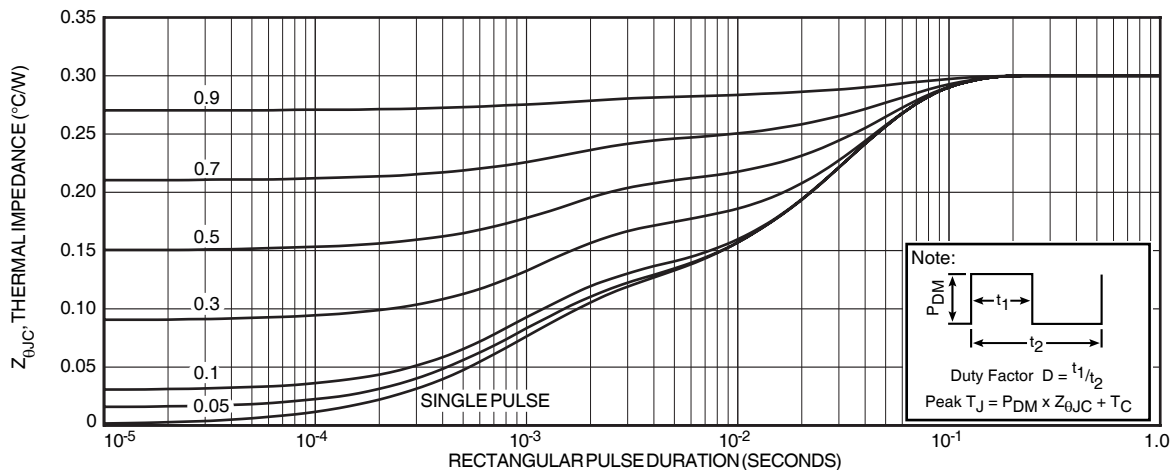


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT34N80B2C3G_LC3G

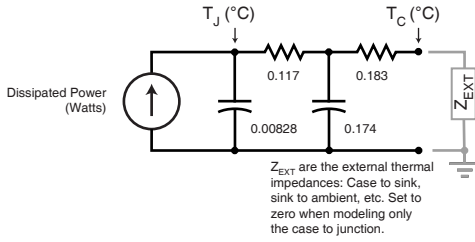


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

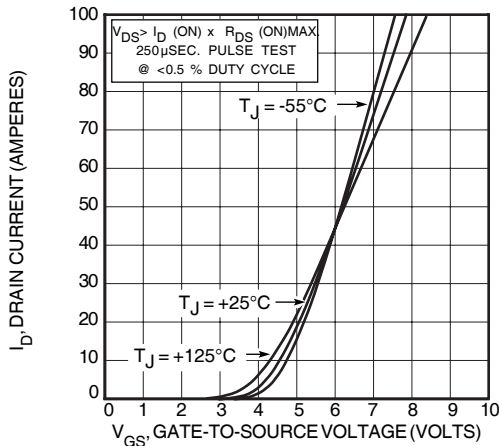


FIGURE 4, TRANSFER CHARACTERISTICS

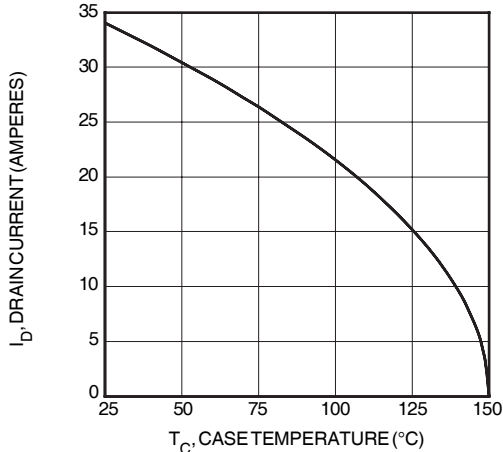


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

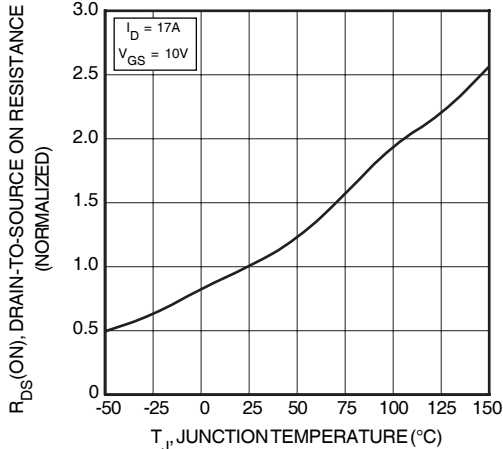


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

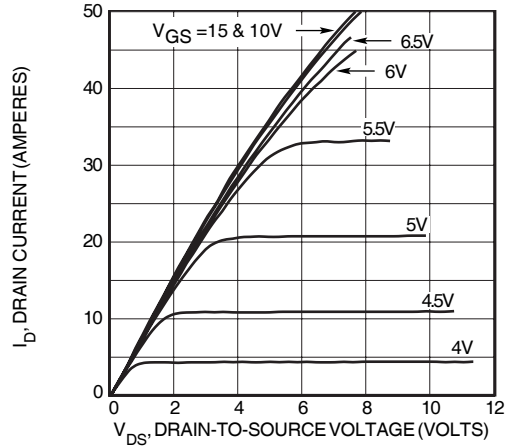


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

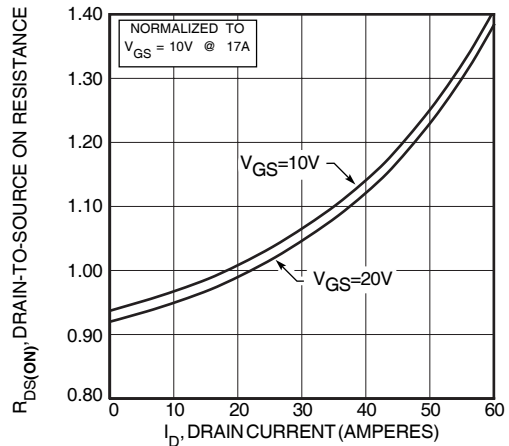


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

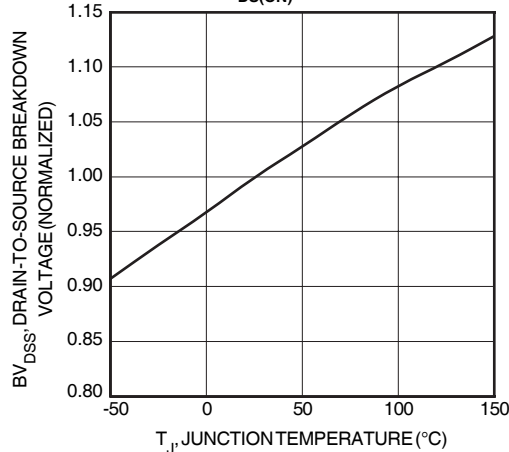


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

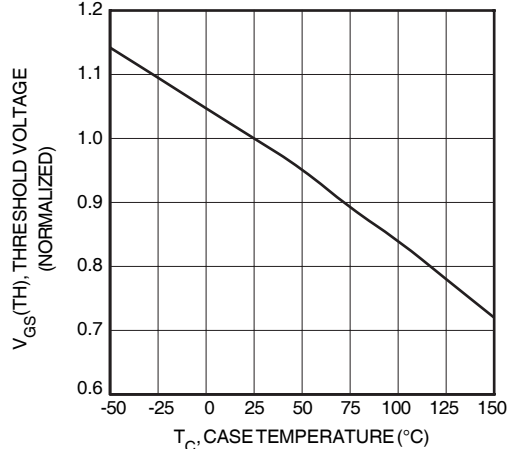


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

Typical Performance Curves

APT34N80B2C3G_LC3G

I_D , DRAIN CURRENT (AMPERES)

Graph removed

V_{DS} , DRAIN-TO-SOURCE VOLTAGE (VOLTS)
FIGURE 10, MAXIMUM SAFE OPERATING AREA

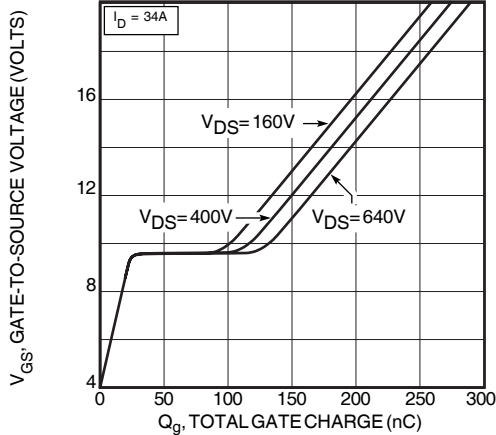


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

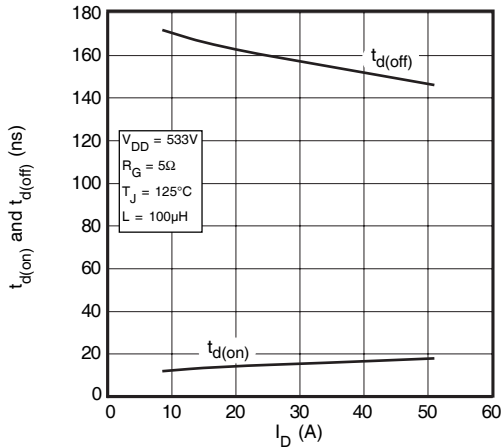


FIGURE 14, DELAY TIMES vs CURRENT

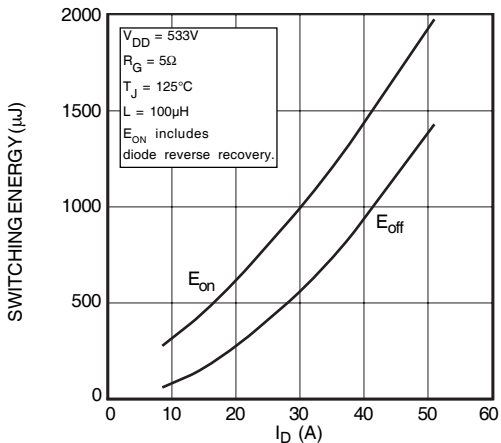


FIGURE 16, SWITCHING ENERGY vs CURRENT

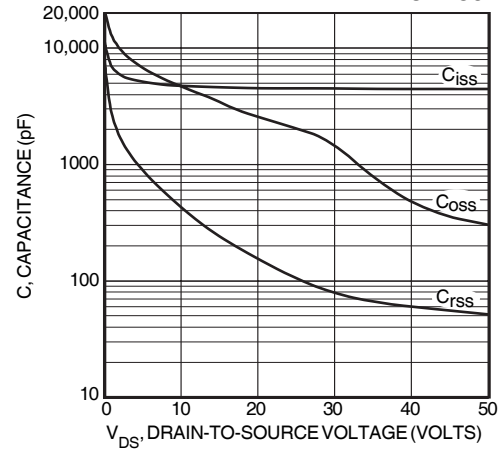


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

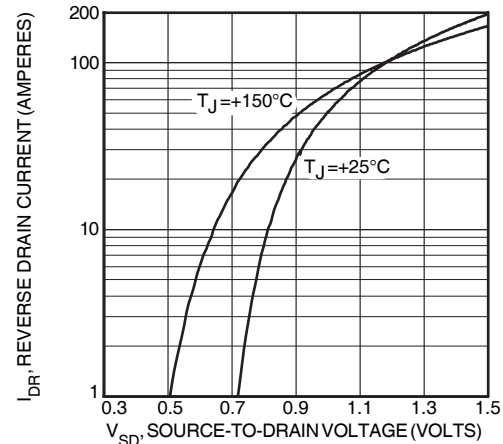


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

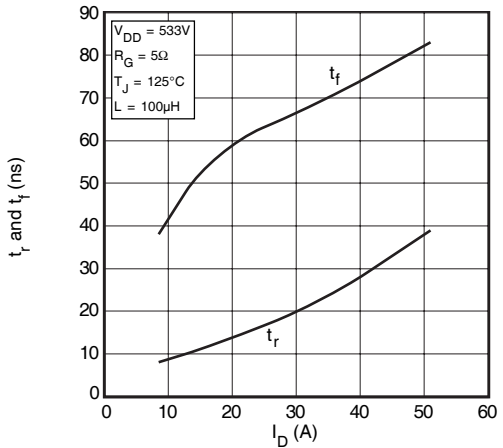


FIGURE 15, RISE AND FALL TIMES vs CURRENT

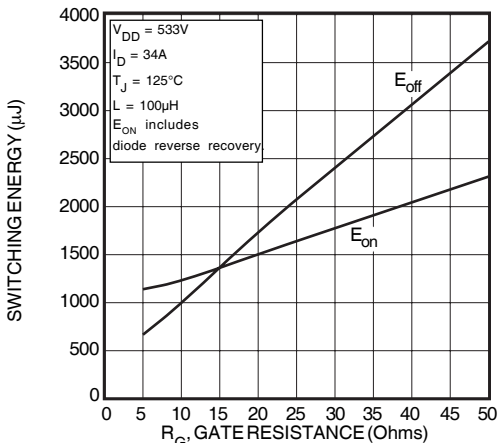


FIGURE 17, SWITCHING ENERGY VS. GATE RESISTANCE

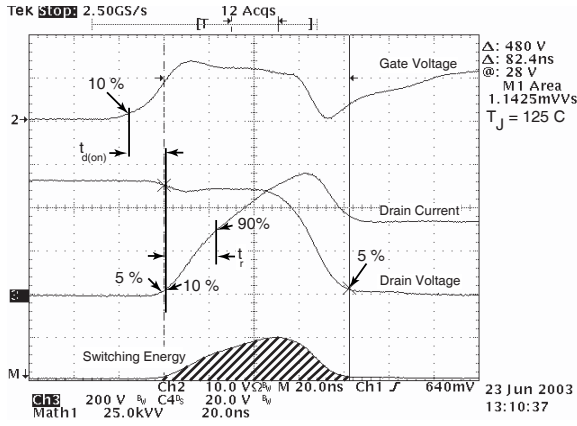


Figure 18, Turn-on Switching Waveforms and Definitions

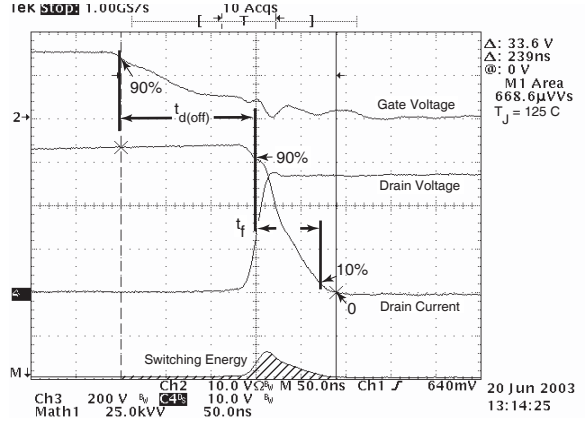


Figure 19, Turn-off Switching Waveforms and Definitions

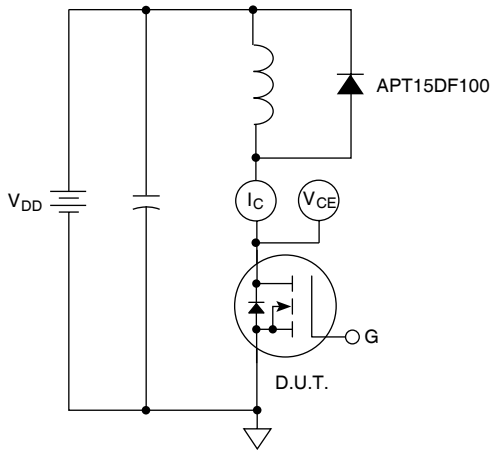
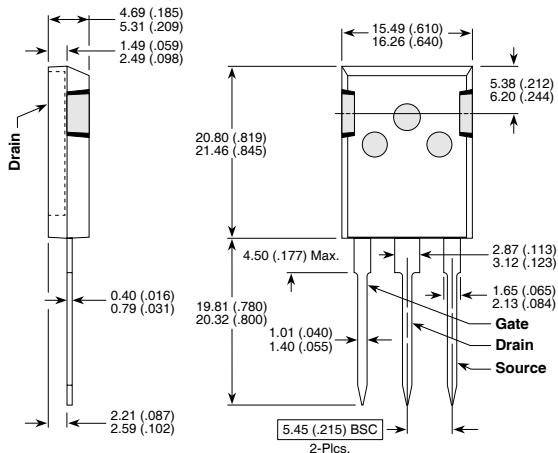


Figure 20, Inductive Switching Test Circuit

T-MAX™ (B2) Package Outline

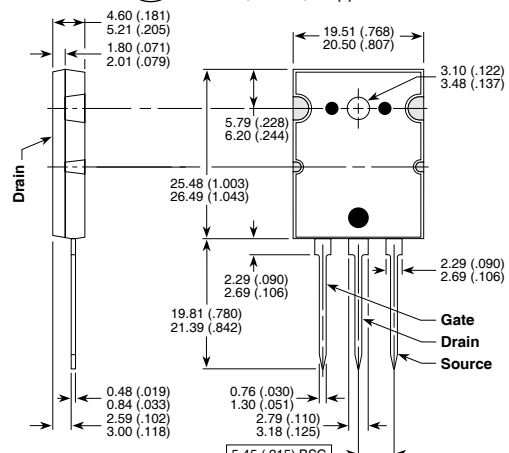
Ⓛ1 SAC: Tin, Silver, Copper



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

TO-264 (L) Package Outline

Ⓛ1 SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)