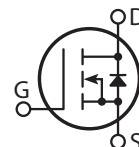
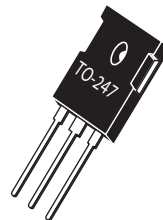


Super Junction MOSFET

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

Symbol	Parameter	APT36N90BC3G	UNIT
V_{DSS}	Drain-Source Voltage	900	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	36	Amps
	Continuous Drain Current @ $T_C = 100^\circ\text{C}$	23	
I_{DM}	Pulsed Drain Current ¹	96	
V_{GS}	Gate-Source Voltage Continuous	± 20	Volts
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	390	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	
dv/dt	Drain-Source Voltage slope ($V_{DS} = 400\text{V}$, $I_D = 36\text{A}$, $T_J = 125^\circ\text{C}$)	50	V/ns
I_{AR}	Avalanche Current ²	8.8	Amps
E_{AR}	Repetitive Avalanche Energy ² ($I_D = 8.8\text{A}$, $V_{DD} = 50\text{V}$)	2.9	mJ
E_{AS}	Single Pulse Avalanche Energy ($I_D = 8.8\text{A}$, $V_{DD} = 50\text{V}$)	1940	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{(DSS)}$	Drain-Source Breakdown Voltage ($V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$)	900			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ³ ($V_{GS} = 10\text{V}$, $I_D = 18\text{A}$)		0.10	0.12	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 900\text{V}$, $V_{GS} = 0\text{V}$)	-	-	100	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 900\text{V}$, $V_{GS} = 0\text{V}$, $T_C = 150^\circ\text{C}$)	-	50	-	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$)	-	-	100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 2.9\text{mA}$)	2.5	3	3.5	Volts

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

"COOLMOS™" comprise a new family of transistors developed by Infineon Technologies AG. "COOLMOS" is a trademark of Infineon Technologies AG."

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

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		7463		pF
C_{oss}	Output Capacitance			6827		
C_{rss}	Reverse Transfer Capacitance			167		
Q_g	Total Gate Charge ⁴	$V_{GS} = 10V$ $V_{DD} = 450V$ $I_D = 36A @ 25^\circ C$		252		nC
Q_{gs}	Gate-Source Charge			38		
Q_{gd}	Gate-Drain ("Miller") Charge			112		
$t_{d(on)}$	Turn-on Delay Time	INDUCTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 600V$ $I_D = 36A @ 25^\circ C$ $R_G = 4.3\Omega$		70		ns
t_r	Rise Time			20		
$t_{d(off)}$	Turn-off Delay Time			400		
t_f	Fall Time			25		
E_{on}	Turn-on Switching Energy ⁵	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 600V, V_{GS} = 15V$ $I_D = 36A, R_G = 4.3\Omega$		1500		μJ
E_{off}	Turn-off Switching Energy			750		
E_{on}	Turn-on Switching Energy ⁵	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 600V, V_{GS} = 15V$ $I_D = 36A, R_G = 4.3\Omega$		2130		
E_{off}	Turn-off Switching Energy			867		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)		36		Amps
I_{SM}	Pulsed Source Current ¹ (Body Diode)		96		Amps
V_{SD}	Diode Forward Voltage ³ ($V_{GS} = 0V, I_S = 18A$)		0.8	1.2	Volts
dv/dt	Peak Diode Recovery dv/dt ⁶			10	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -36A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	930		ns
		$T_J = 125^\circ C$	1230		
Q_{rr}	Reverse Recovery Charge ($I_S = -36A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	35		μC
		$T_J = 125^\circ C$	44		
I_{RRM}	Peak Recovery Current ($I_S = -36A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	70		Amps
		$T_J = 125^\circ C$	68		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.3	$^\circ C/W$
$R_{\theta JA}$	Junction to Ambient			31	

1 Repetitive Rating: Pulse width limited by maximum junction temperature

2 Repetitive avalanche causes additional power losses that can be calculated as $P_{AV} = E_{AR} \cdot f$. Pulse width tp limited by T_J max.

3 Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

4 See MIL-STD-750 Method 3471

5 Eon includes diode reverse recovery.

6 Maximum 125°C diode commutation speed = di/dt 600A/ μs

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

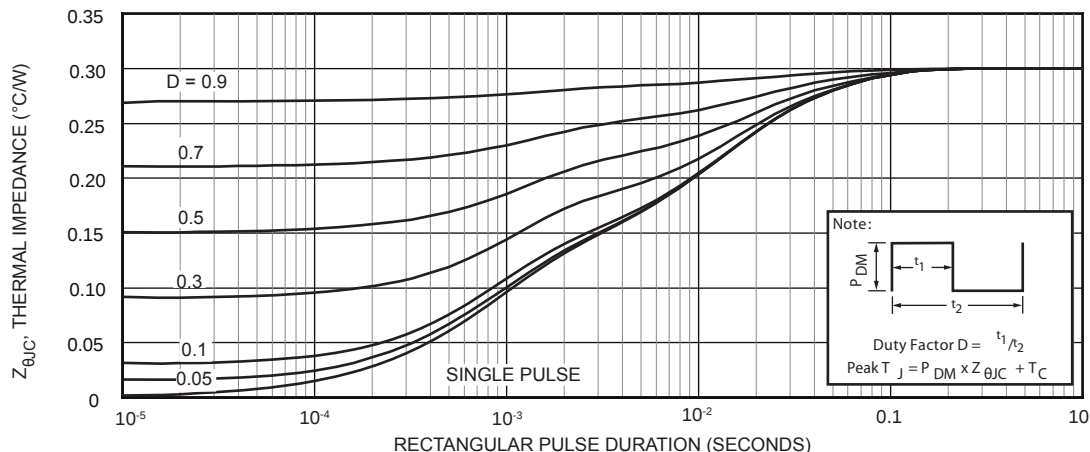


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

Typical Performance Curves

APT36N90BC3G

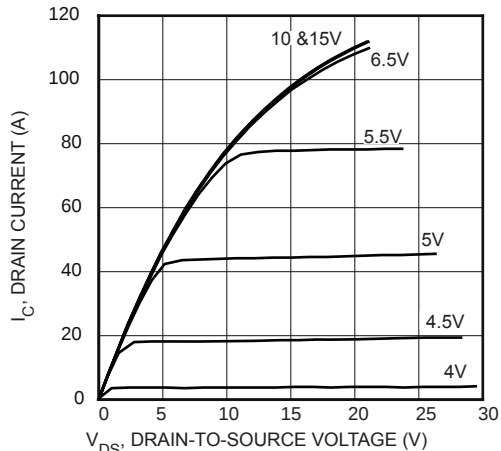


FIGURE 2, Low Voltage Output Characteristics

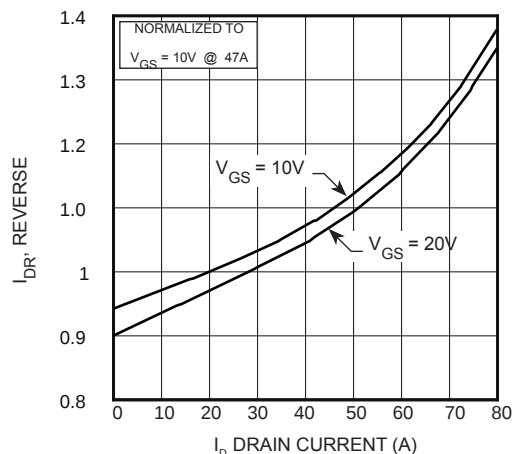


FIGURE 4, $R_{DS(ON)}$ vs Drain Current

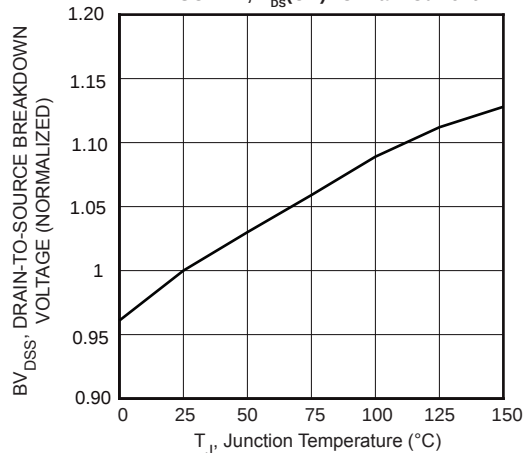


FIGURE 6, Breakdown Voltage vs Temperature

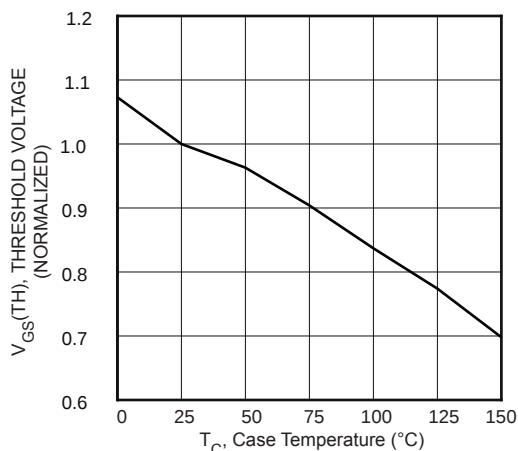


FIGURE 8, Threshold Voltage vs Temperature

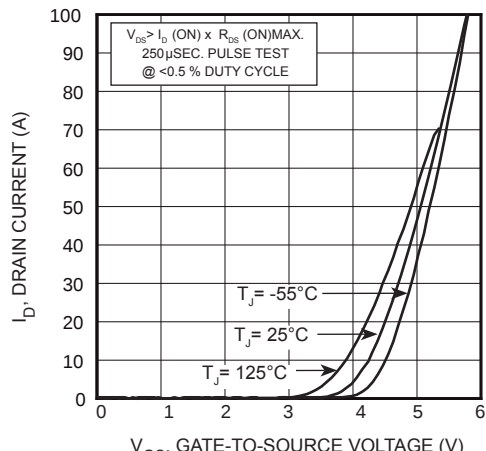


FIGURE 3, Transfer Characteristics

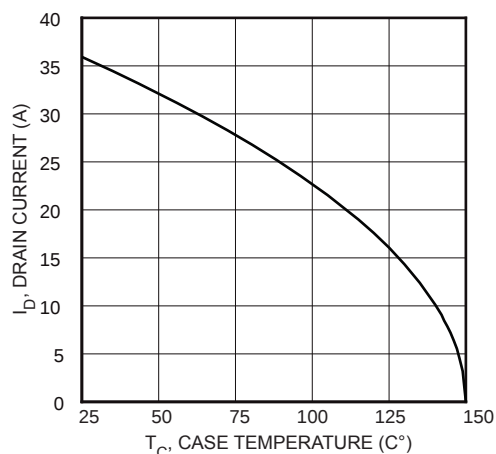


FIGURE 5, Maximum Drain Current vs Case Temperature

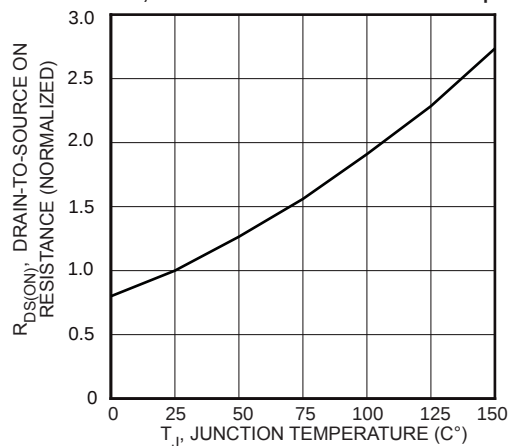


FIGURE 7, On-Resistance vs Temperature

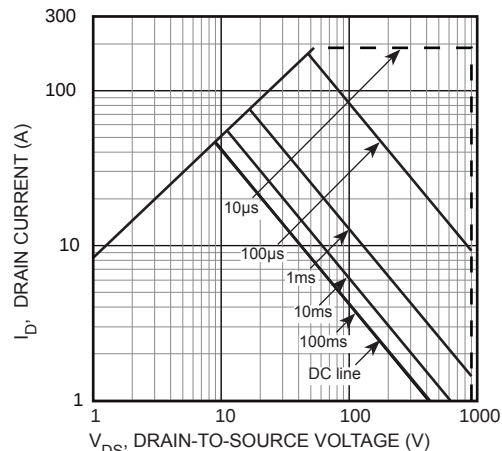
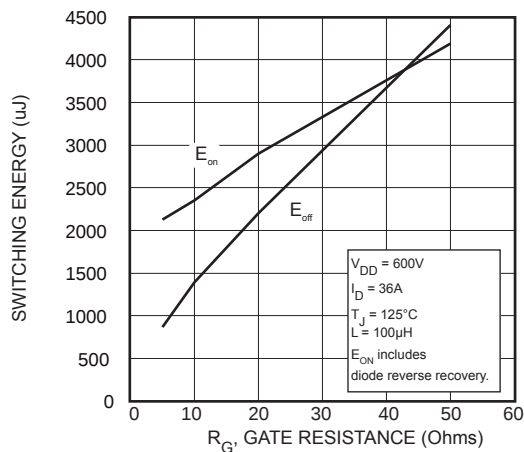
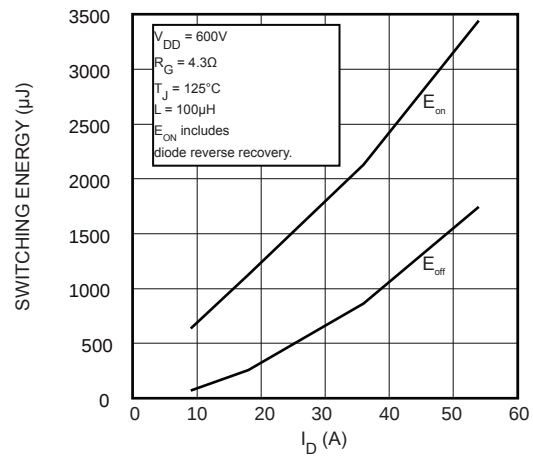
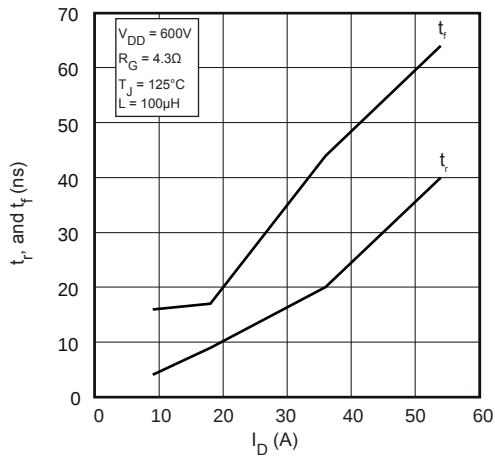
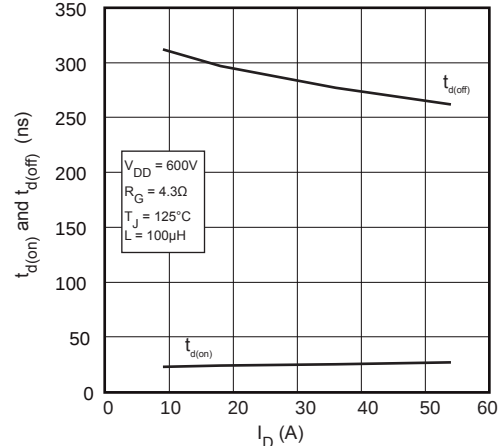
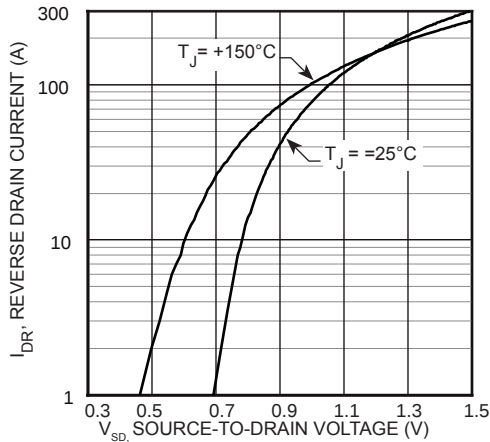
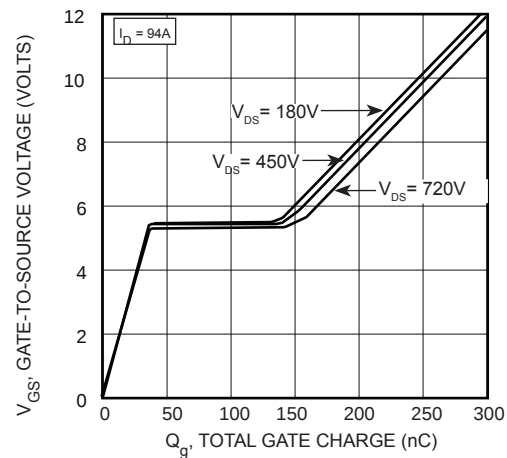
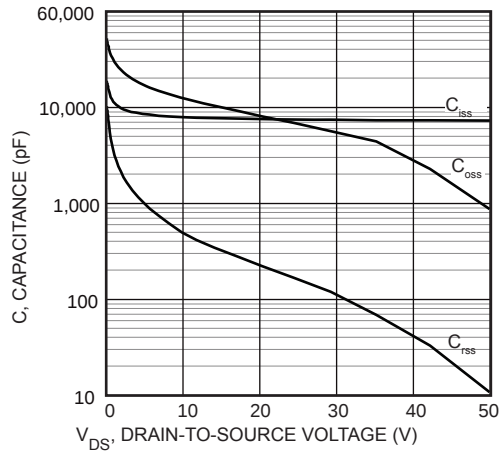


FIGURE 9, Maximum Safe Operating Area

Typical Performance Curves

APT36N90BC3G



Typical Performance Curves

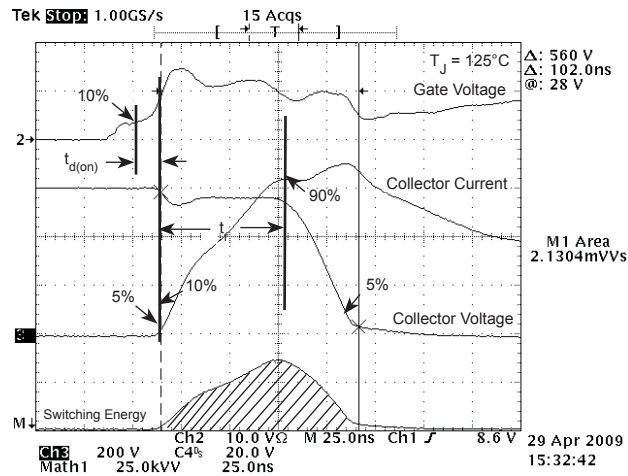


Figure 17, Turn-on Switching Waveforms and Definitions

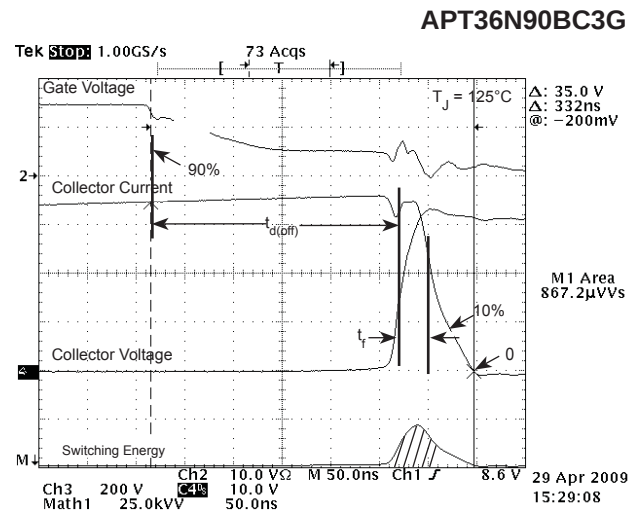


Figure 18, Turn-off Switching Waveforms and Definitions

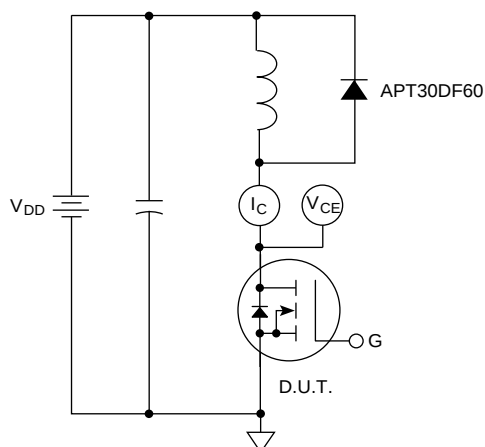


Figure 19, Inductive Switching Test Circuit

TO-247[®] Package Outline

