Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FCH47N60_F133	FCH47N60_F133	TO-247	-	-	30
FCA47N60	FCA47N60	TO-3PN	-	-	30
FCA47N60	FCA47N60_F109	TO-3PN	-	-	30

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA, T_J = 25°C	600	--	--	V
		V_{GS} = 0V, I_D = 250μA, T_J = 150°C	--	650	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
BV_{DS}	Drain-Source Avalanche Breakdown Voltage	V_{GS} = 0V, I_D = 47A	--	700	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600V, V_{GS} = 0V V_{DS} = 480V, T_C = 125°C	-- --	-- --	1 10	μA μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30V, V_{DS} = 0V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30V, V_{DS} = 0V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	3.0	--	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 23.5A	--	0.058	0.07	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40V, I_D = 23.5A (Note 4)	--	40	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	--	5900	8000	pF
C_{oss}	Output Capacitance		--	3200	4200	pF
C_{rss}	Reverse Transfer Capacitance		--	250	--	pF
C_{oss}	Output Capacitance	V_{DS} = 480V, V_{GS} = 0V, f = 1.0MHz	--	160	--	pF
C_{oss} eff.	Effective Output Capacitance	V_{DS} = 0V to 400V, V_{GS} = 0V	--	420	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 300V, I_D = 47A R_G = 25Ω (Note 4, 5)	--	185	430	ns
t_r	Turn-On Rise Time		--	210	450	ns
$t_{d(off)}$	Turn-Off Delay Time		--	520	1100	ns
t_f	Turn-Off Fall Time		--	75	160	ns
Q_g	Total Gate Charge	V_{DS} = 480V, I_D = 47A V_{GS} = 10V (Note 4, 5)	--	210	270	nC
Q_{gs}	Gate-Source Charge		--	38	--	nC
Q_{gd}	Gate-Drain Charge		--	110	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	47	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	141	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 47A	--	--	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_S = 47A dI_F/dt =100A/μs (Note 4)	--	590	--	ns
Q_{rr}	Reverse Recovery Charge		--	25	--	μC

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} = 18A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 47A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature Typical Characteristics

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Typical Performance Characteristics

Figure 1. On-Region Characteristics

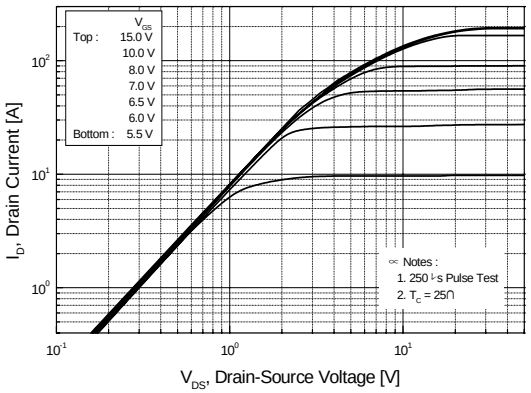


Figure 2. Transfer Characteristics

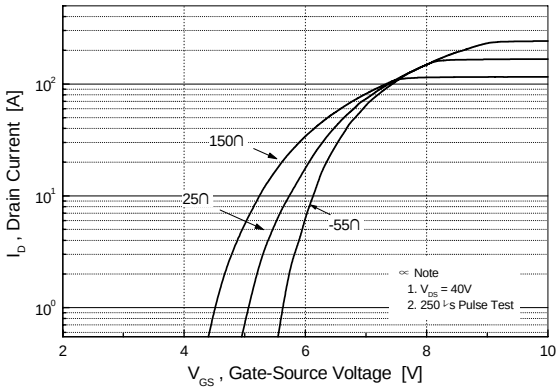


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

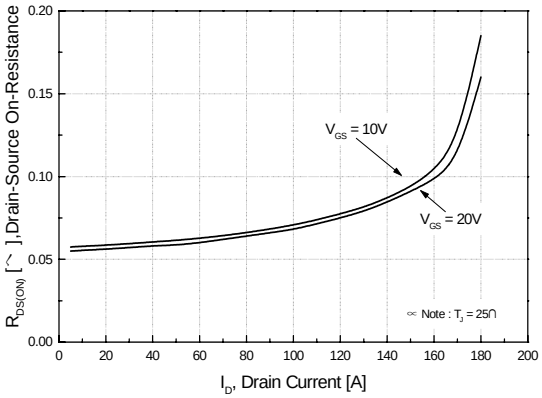


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperatue

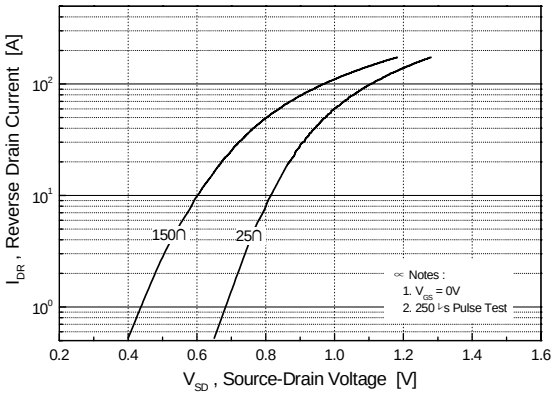


Figure 5. Capacitance Characteristics

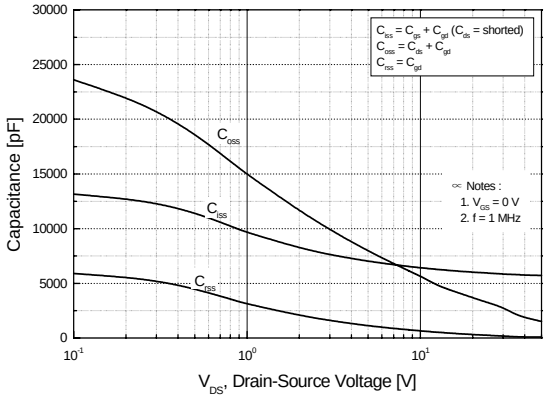
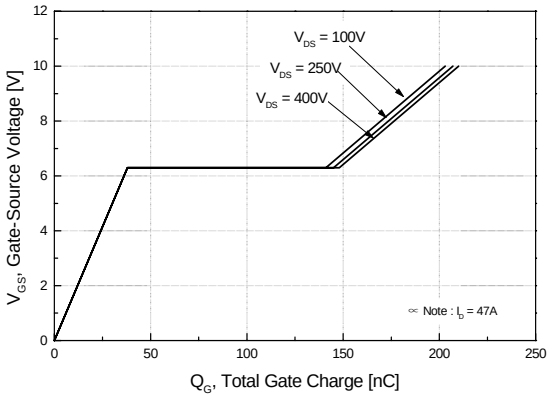


Figure 6. Gate Charge Characteristics



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Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

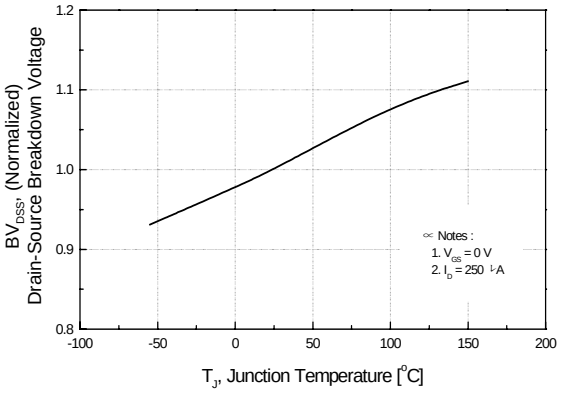


Figure 8. On-Resistance Variation vs. Temperature

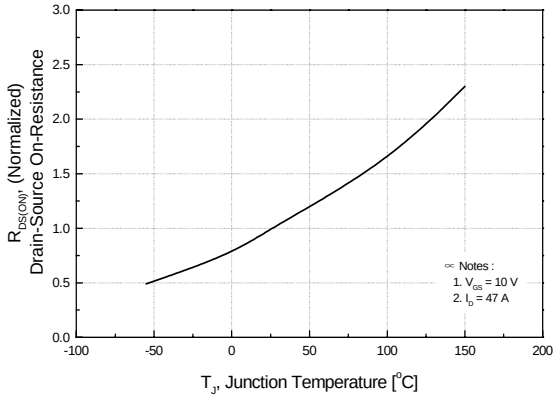


Figure 9. Safe Operating Area

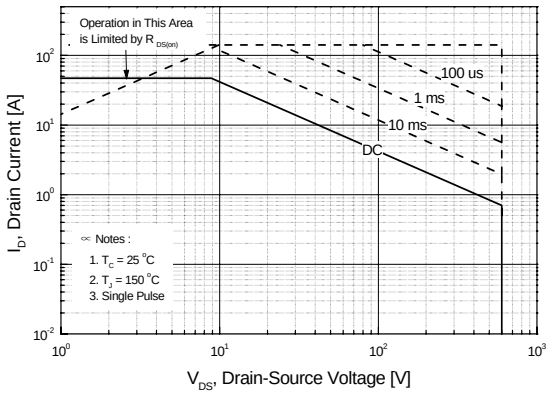


Figure 10. Maximum Drain Current vs. Case Temperature

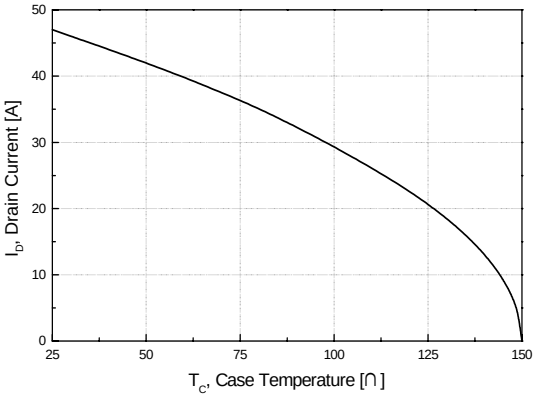
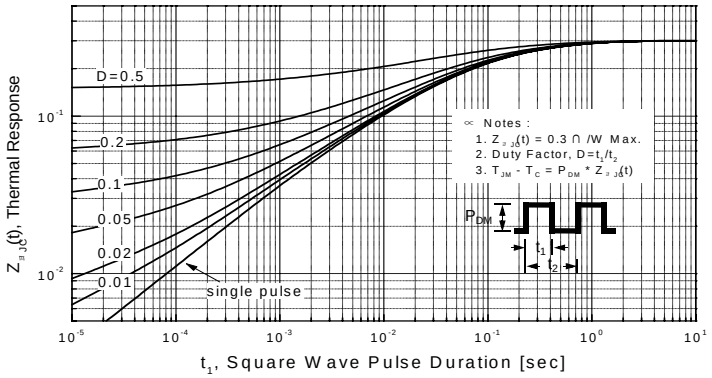


Figure 10. Transient Thermal Response Curve



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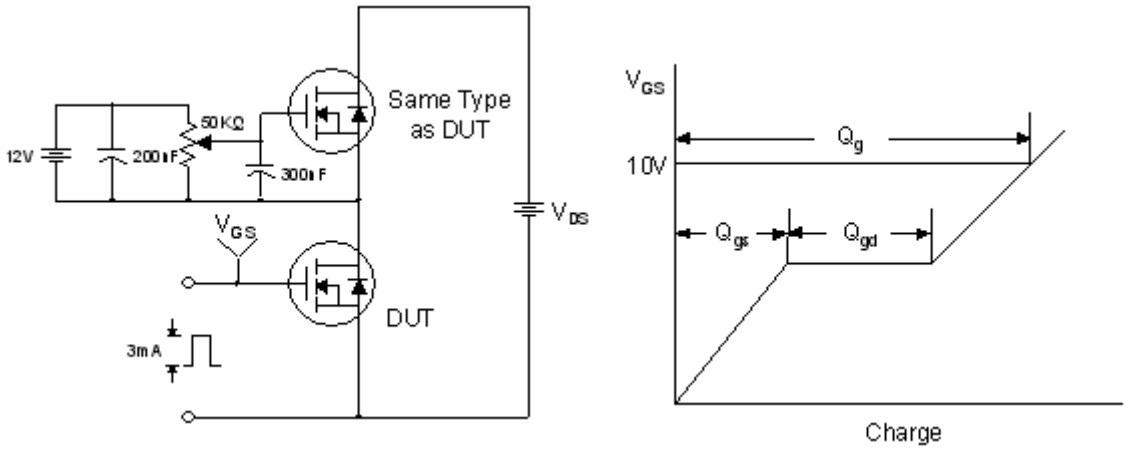
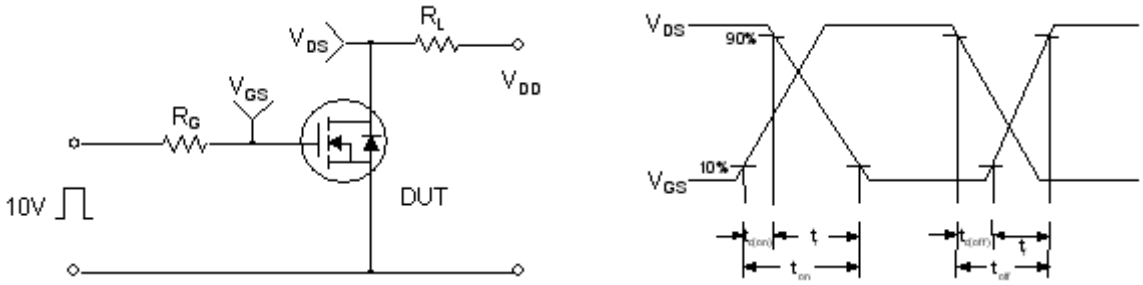
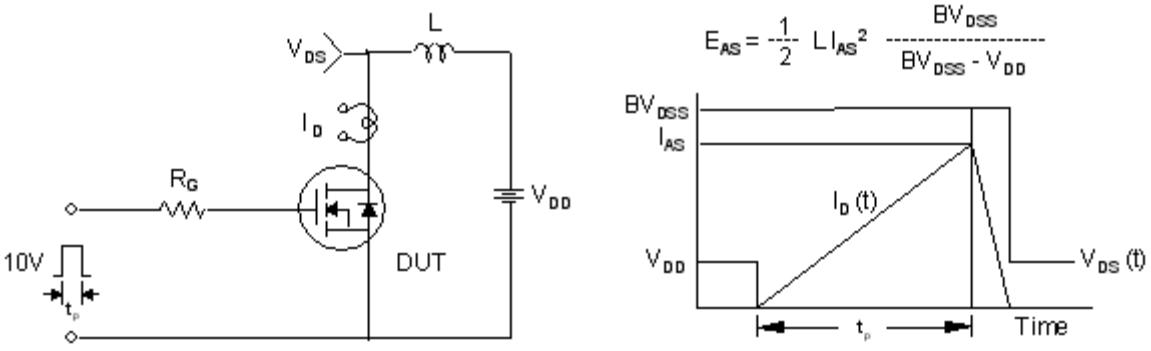
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



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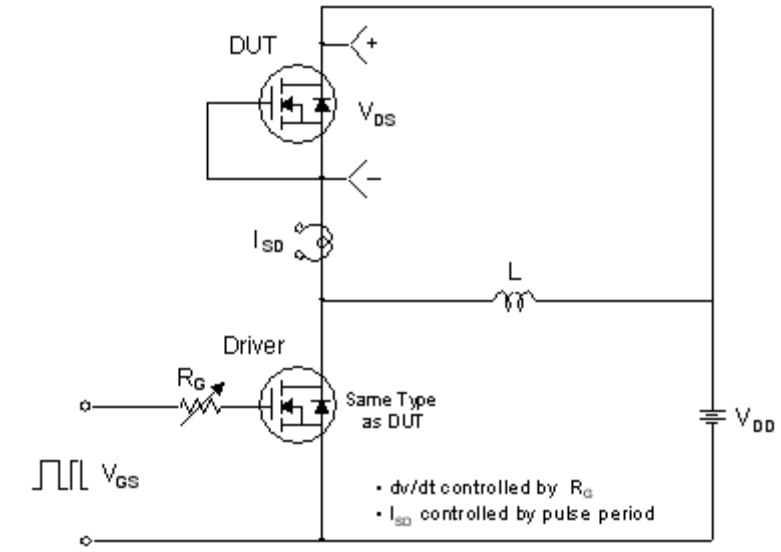
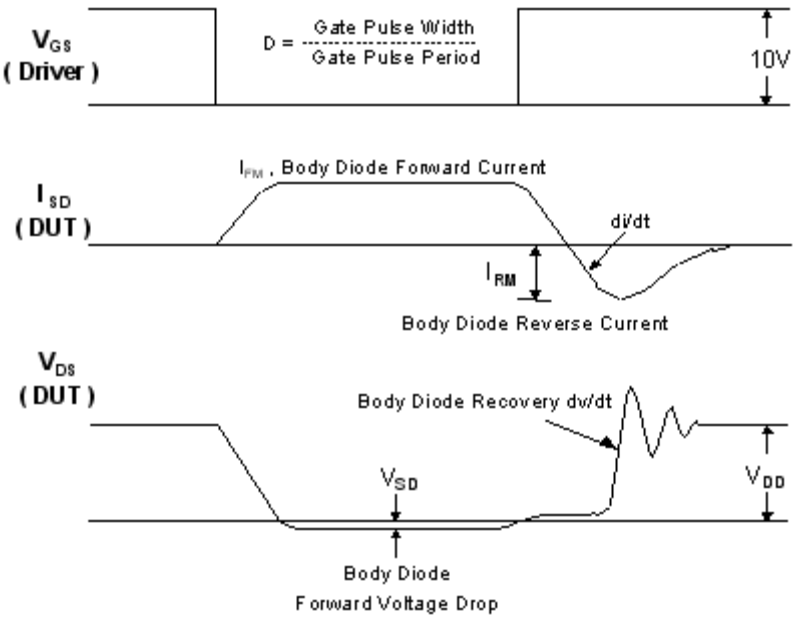
Peak Diode Recovery dv/dt Test Circuit & Waveforms





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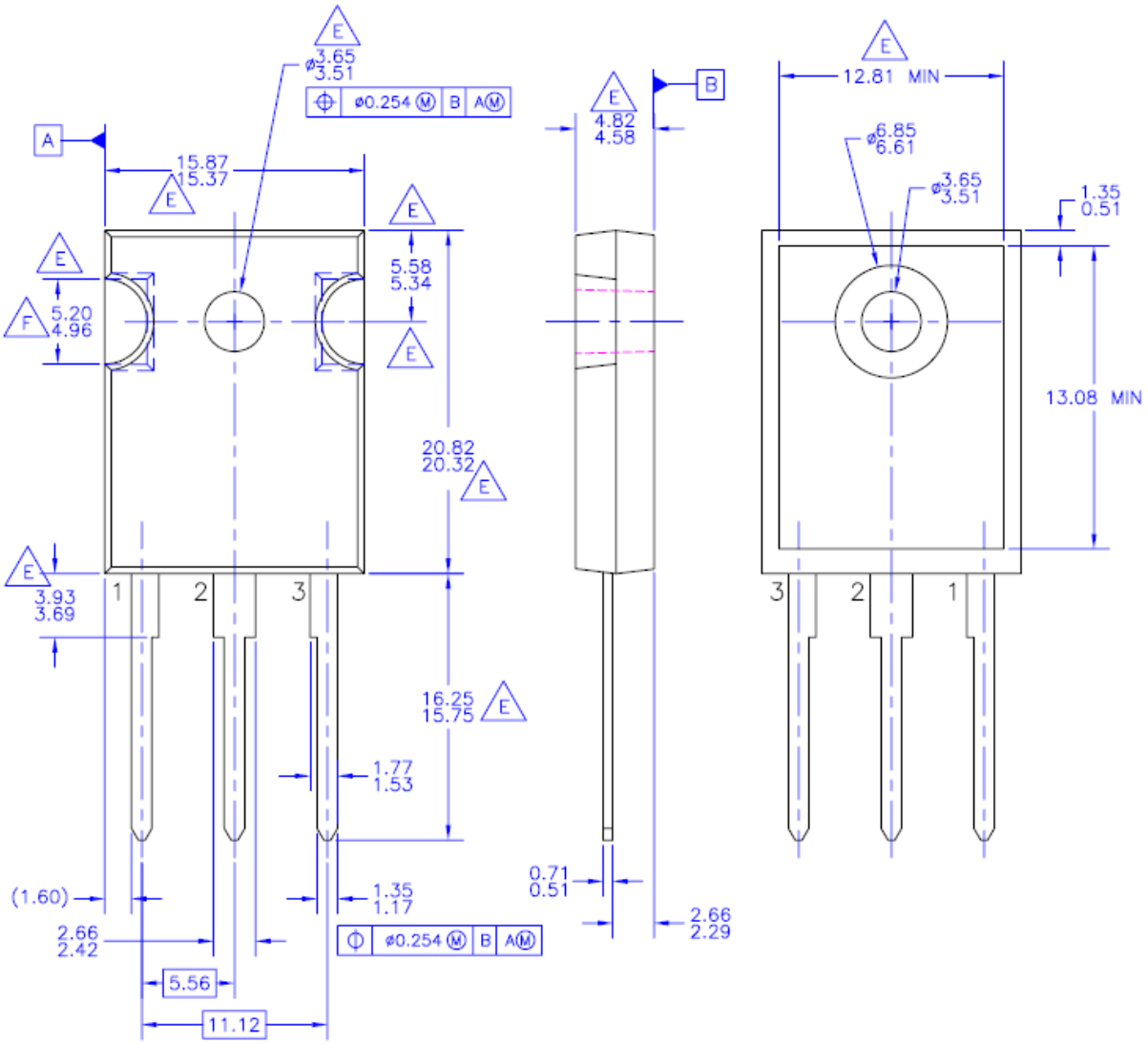
Mechanical Dimensions

TO-247AB



Dimensions in Millimeters

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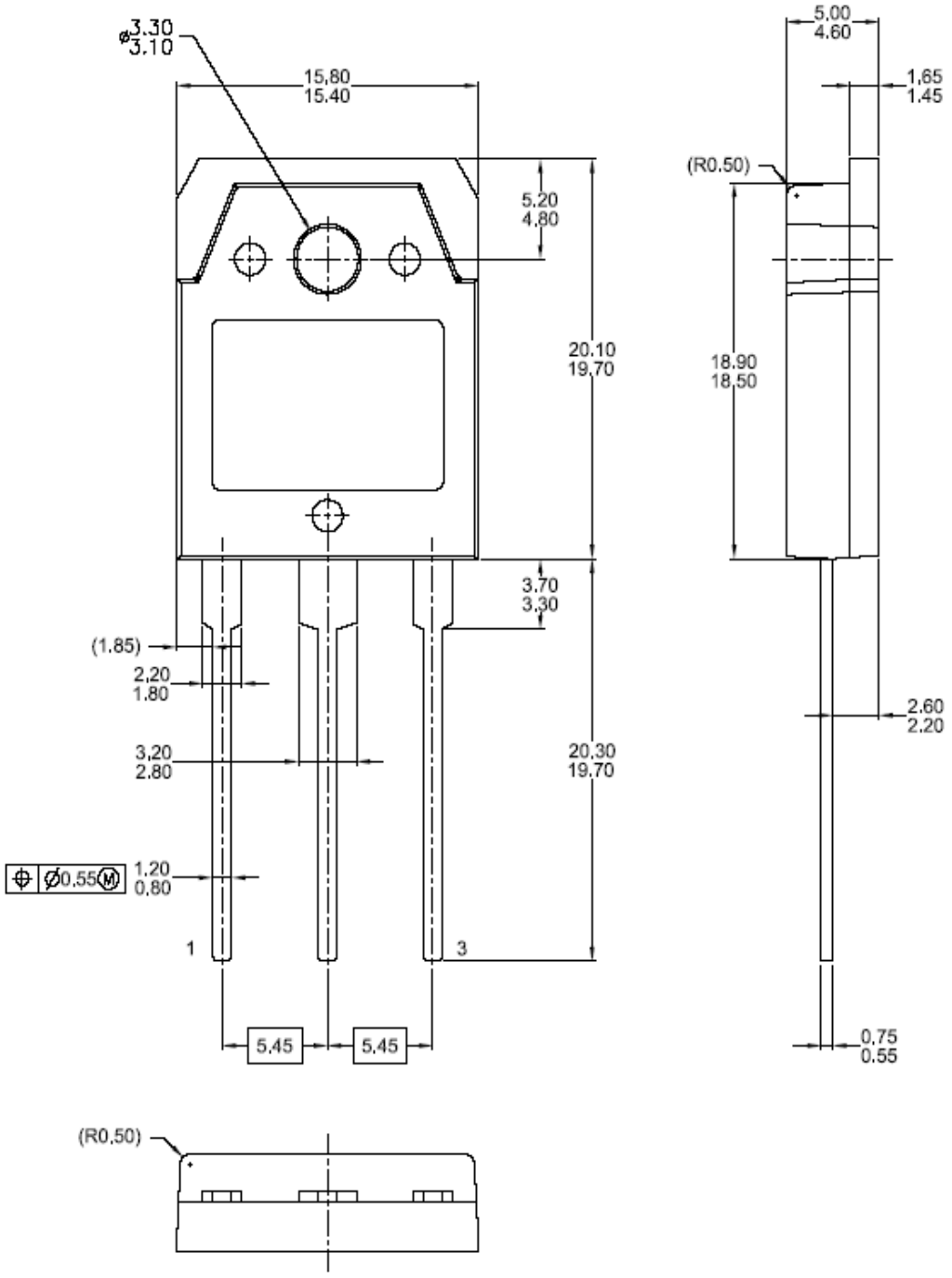
Mechanical Dimensions (Continued)

TO-3PN



Dimensions in Millimeters

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