



# HUF75344A3

## N-Channel UltraFET Power MOSFET

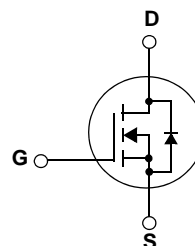
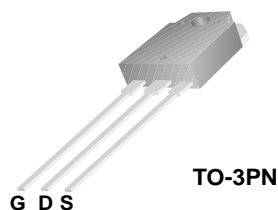
55V, 75A, 8mΩ

### Features

- $R_{DS(on)} = 6.5m\Omega$  (Typ.) @  $V_{GS} = 10V, I_D = 75A$
- RoHS compliant

### Description

- This N-channel power MOSFET is produced using Fairchild Semiconductor's innovative UltraFET process. This advanced process technology achieves the lowest possible on-resistance per silicon area, resulting in outstanding performance. This device is capable of withstanding high energy in the avalanche mode and the diode exhibits very low reverse recovery time and stored charge. It was designed for use in applications where power efficiency is important, such as switching regulators, switching converters, motor drives, relay drivers, low-voltage bus switches, and power management in portable and battery-operated products.



HUF75344A3 N-Channel UltraFET Power MOSFET

### MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Conditions	Ratings	Units
$V_{DSS}$	Drain to Source Voltage		55	V
$V_{GSS}$	Gate to Source Voltage		$\pm 20$	V
$I_D$	Drain Current	- Continuous ( $T_C = 130^\circ C$ )	75	A
$I_{DM}$	Drain Current	- Pulsed	300	A
$E_{AS}$	Single Pulsed Avalanche Energy	(Note 1)	1153	mJ
$P_D$	Power Dissipation	( $T_C = 25^\circ C$ )	288.5	W
		- Derate above $25^\circ C$	1.92	W/ $^\circ C$
$T_J, T_{STG}$	Operating and Storage Temperature Range		-55 to +175	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds		300	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.52	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	

**Package Marking and Ordering Information**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
HUF75344A3	HUF75344A3	TO-3PN	-	-	30

**Electrical Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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**Off Characteristics**

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$	55	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu\text{A}$ , Referenced to $25^\circ\text{C}$	-	0.07	-	V/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$ $V_{DS} = 45\text{V}, V_{GS} = 0\text{V}, T_J = 150^\circ\text{C}$	-	-	1 250	$\mu\text{A}$
$I_{GSS}$	Gate to Body Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	-	-	$\pm 100$	nA

**On Characteristics**

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2	-	4	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{V}, I_D = 75\text{A}$	-	6.5	8.0	$\text{m}\Omega$

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	3650	4855	pF	
$C_{oss}$	Output Capacitance		-	980	1305	pF	
$C_{rss}$	Reverse Transfer Capacitance		-	135	205	pF	
$Q_{g(tot)}$	Total Gate Charge at 20V	$V_{GS} = 0\text{V to } 20\text{V}$	$V_{DS} = 30\text{V}$ $I_D = 75\text{A}$ $I_g = 1\text{mA}$	-	160	208	nC
$Q_{g(10)}$	Total Gate Charge at 10V	$V_{GS} = 0\text{V to } 10\text{V}$		-	86	112	nC
$Q_{g(th)}$	Threshold Gate Charge	$V_{GS} = 0\text{V to } 2\text{V}$		-	7	9	nC
$Q_{gs}$	Gate to Source Gate Charge			-	17	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge			-	28	-	nC

**Switching Characteristics**

$t_{ON}$	Turn-On Time	$V_{DD} = 30\text{V}, I_D = 75\text{A}$ $V_{GS} = 10\text{V}, R_{GEN} = 3\Omega$	-	146	310	ns
$t_{d(on)}$	Turn-On Delay Time		-	19	48	ns
$t_r$	Turn-On Rise Time		-	126	262	ns
$t_{d(off)}$	Turn-Off Delay Time		-	61	130	ns
$t_f$	Turn-Off Fall Time		-	20	48	ns
$t_{OFF}$	Turn-Off Time		-	80	178	ns

**Drain-Source Diode Characteristics**

$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_{SD} = 75\text{A}$	-	-	1.25	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0\text{V}, I_{SD} = 75\text{A}$	-	79	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di_F/dt = 100\text{A}/\mu\text{s}$	-	270	-	nC

**Notes:**

1:  $L = 0.41\text{mH}, I_{AS} = 75\text{A}, V_{DD} = 50\text{V}, V_{GS} = 10\text{V}, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

Typical Performance Characteristics

Figure 1. On-Region Characteristics

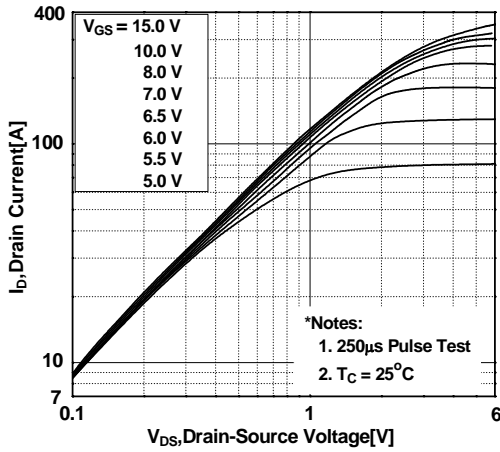


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

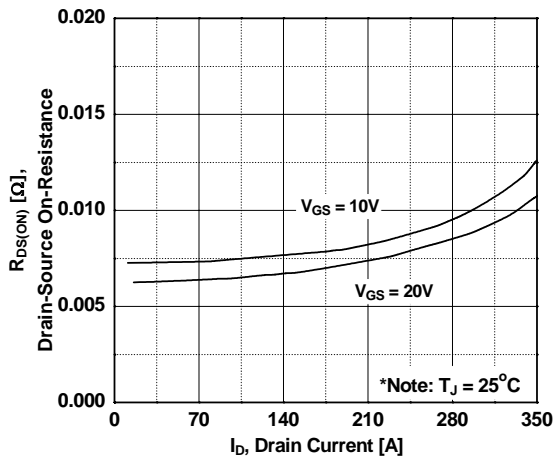


Figure 5. Capacitance Characteristics

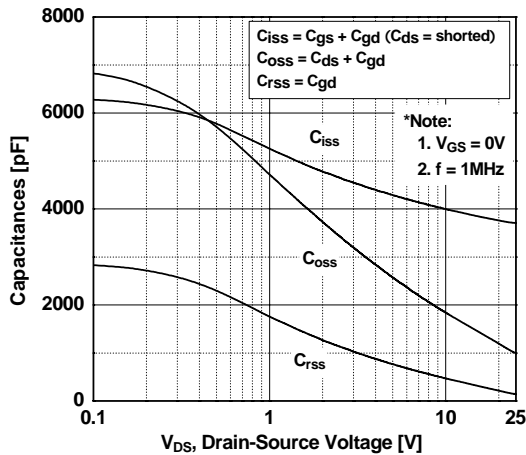


Figure 2. Transfer Characteristics

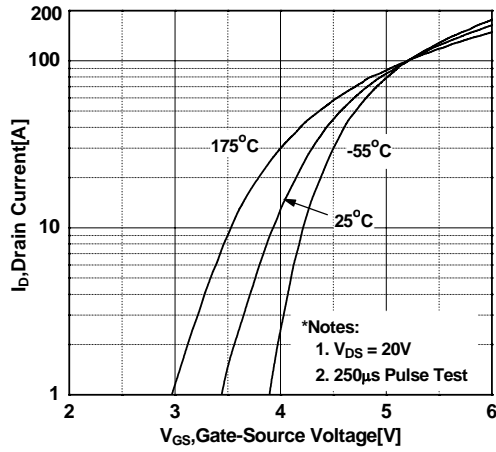


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

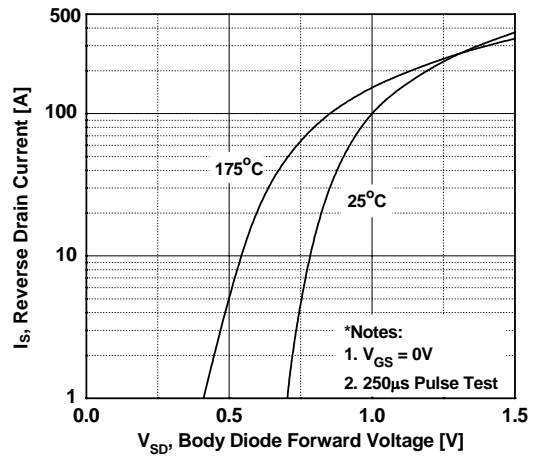
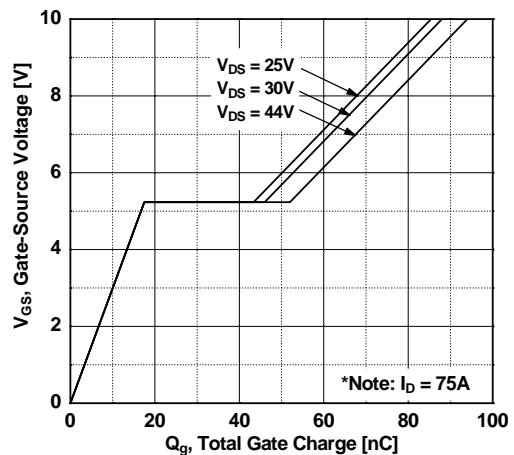


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

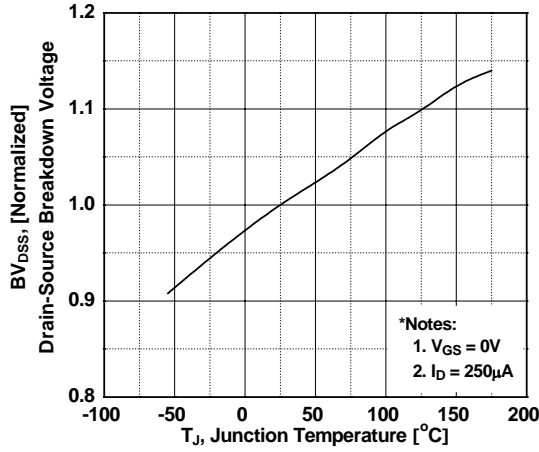


Figure 8. On-Resistance Variation vs. Temperature

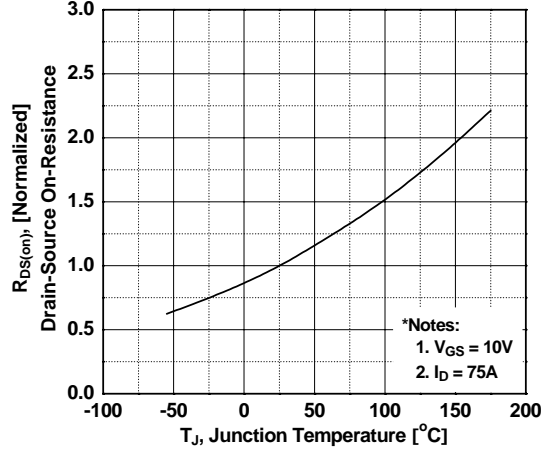


Figure 9. Maximum Safe Operating Area

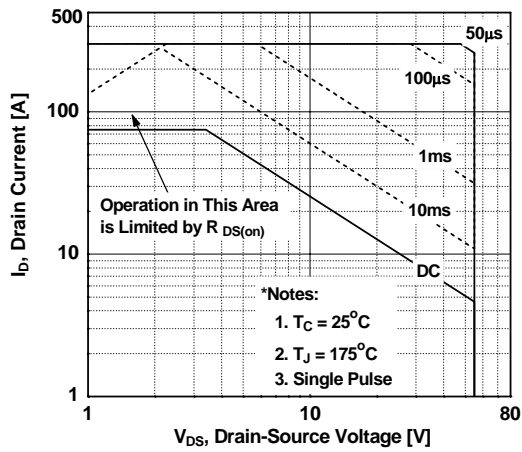


Figure 10. Maximum Drain Current vs. Case Temperature

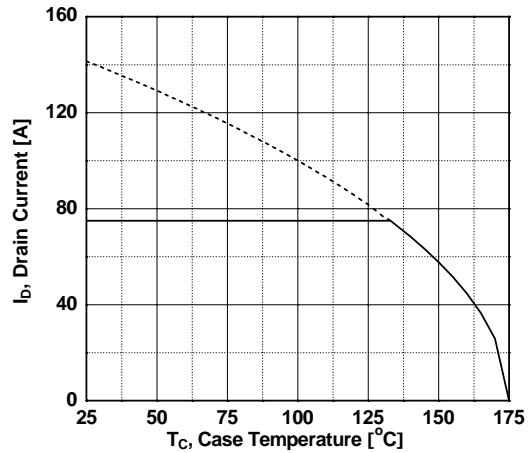
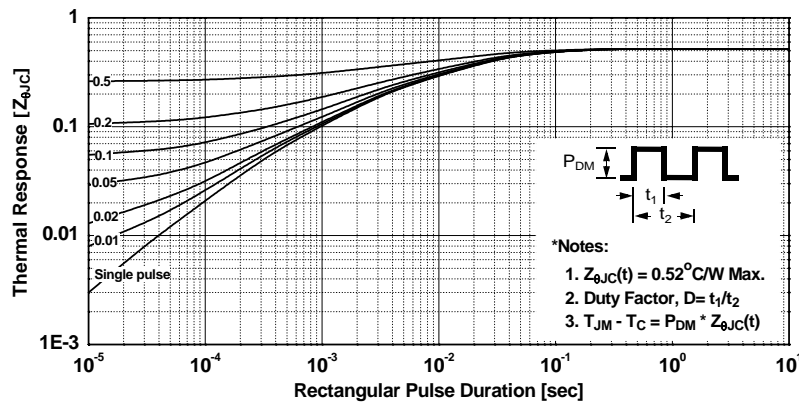
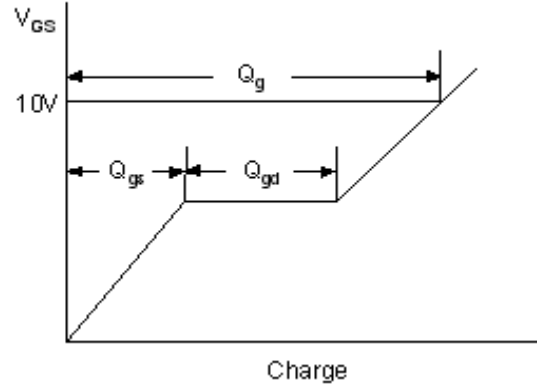
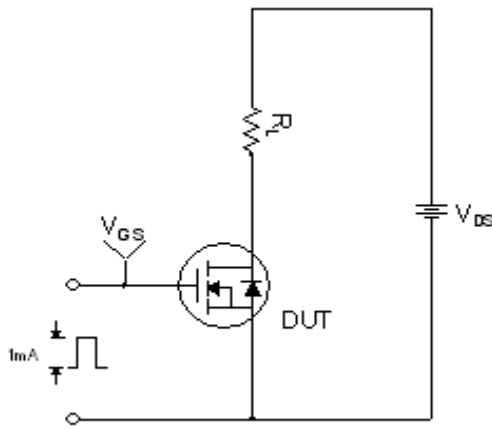


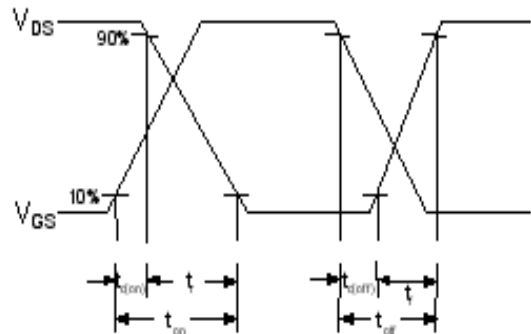
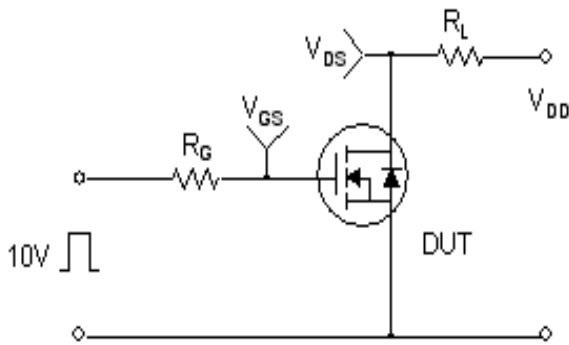
Figure 11. Transient Thermal Response Curve



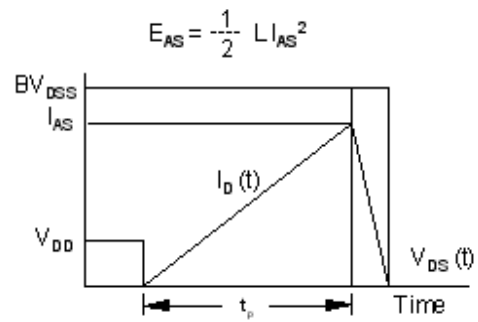
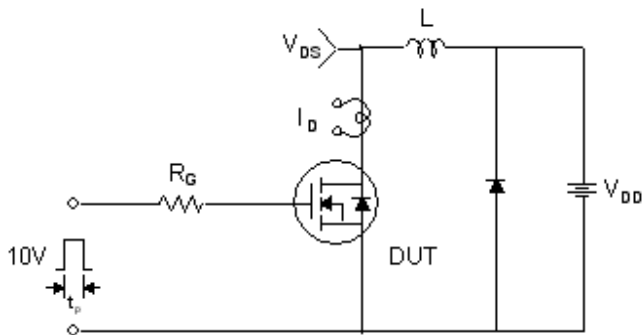
Gate Charge Test Circuit & Waveform



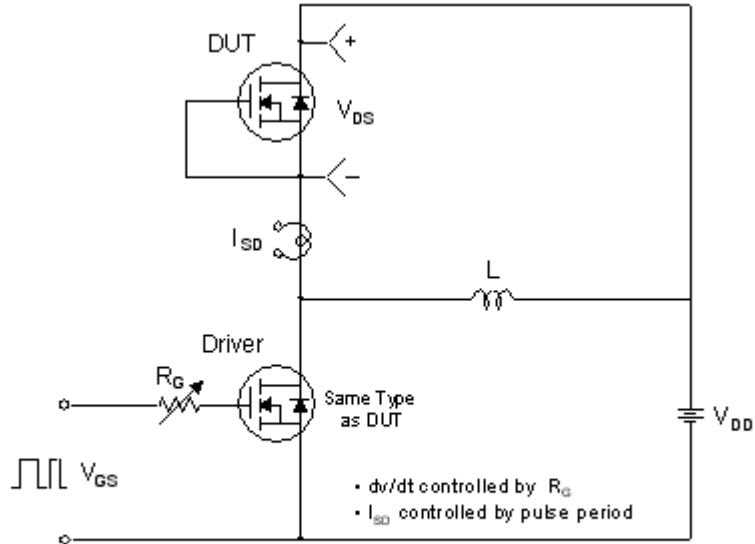
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

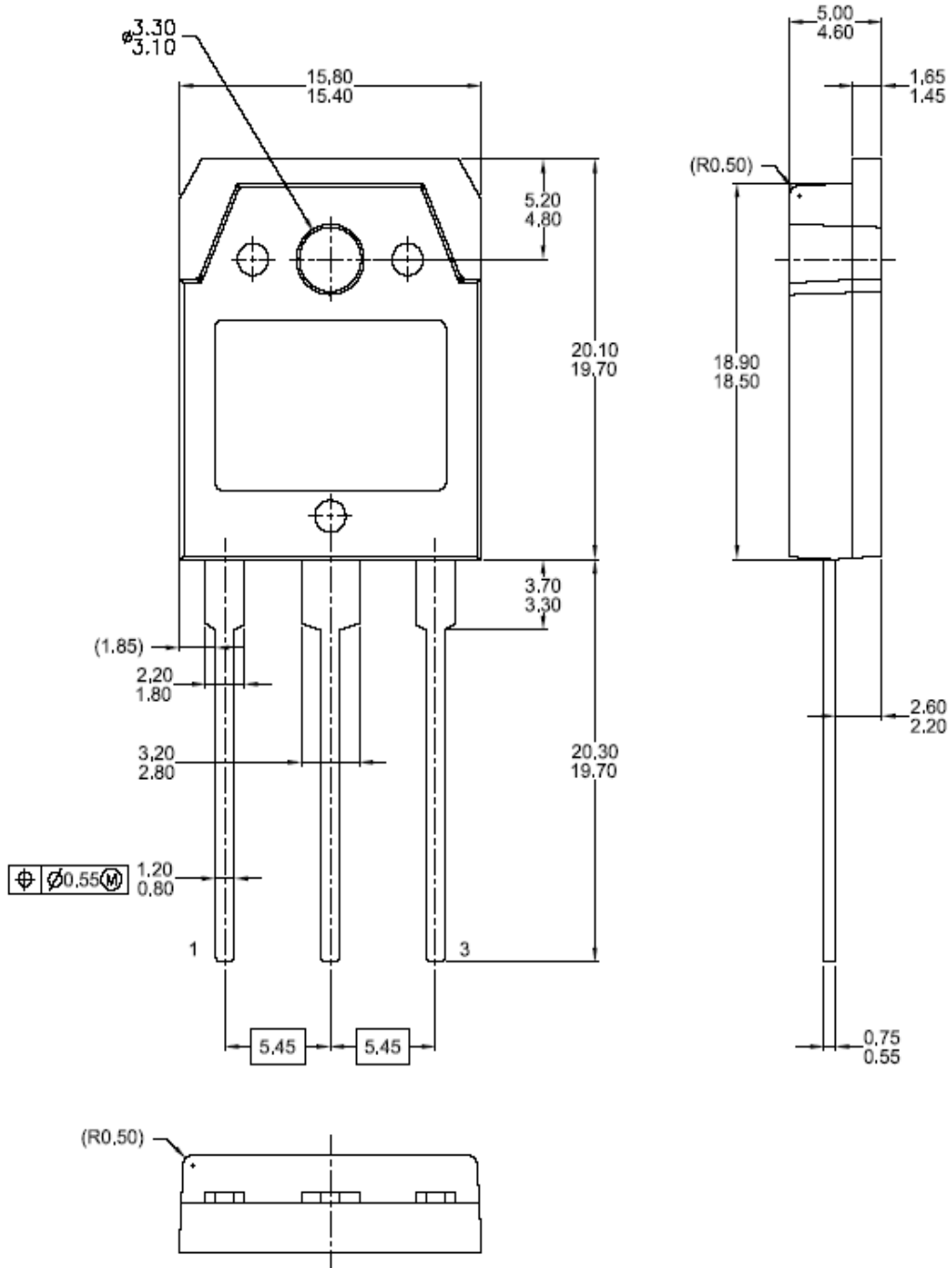


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions

TO-3PN




Dimensions in Millimeters



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