Norman Day

IGBT

UPS IGBT

CE sat V_{th}

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$V_{CE\ sat}$	√	
V_{th}		√
	√	
V_{GE}	√	
V_f	√	
	√	√
R_g	√	
		√
		√

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GD300HFL120C2S 185kW

V_{CE_sat}

V_{th} GD300HFL120C2S 75A

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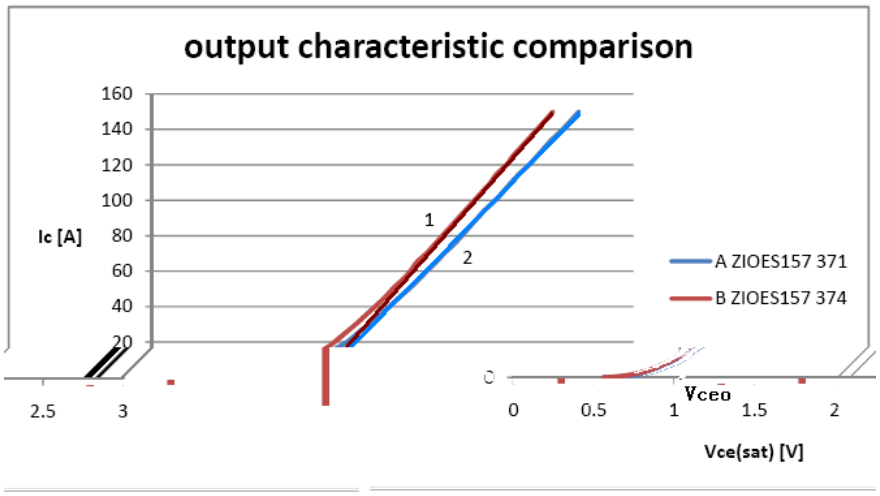


1 2

$$V_{ce} = V_{ce0} + r_{ce} \times I_C \quad (1)$$

V_{ce} Vce sat V_{ce0} I_C=0 r_{ce}

$$V_{ce1} = V_{ce01} + r_{ce1} \times I_{C1} \quad (2)$$

$$V_{ce2} = V_{ce02} + r_{ce2} \times I_{C2} \quad (3)$$

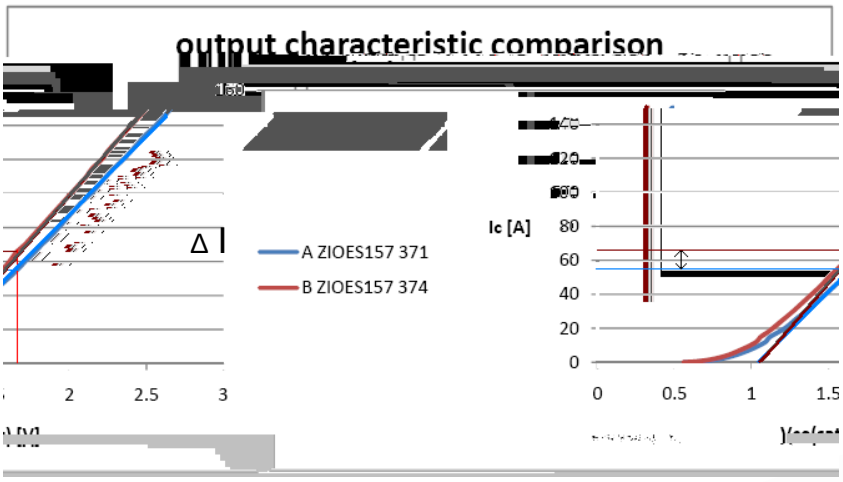
$$V_{ce01} = V_{ce02} \quad (4)$$

$$I_{C1} + I_{C2} = 120A \quad (5)$$

$$I_{C1} = \frac{r_{ce2}}{r_{ce1}} I_{C2} \quad (6)$$

$$I_{C1} + I_{C2} = 120A \quad (7)$$

$$I_{C1} = 65A, I_{C2} = 55A$$



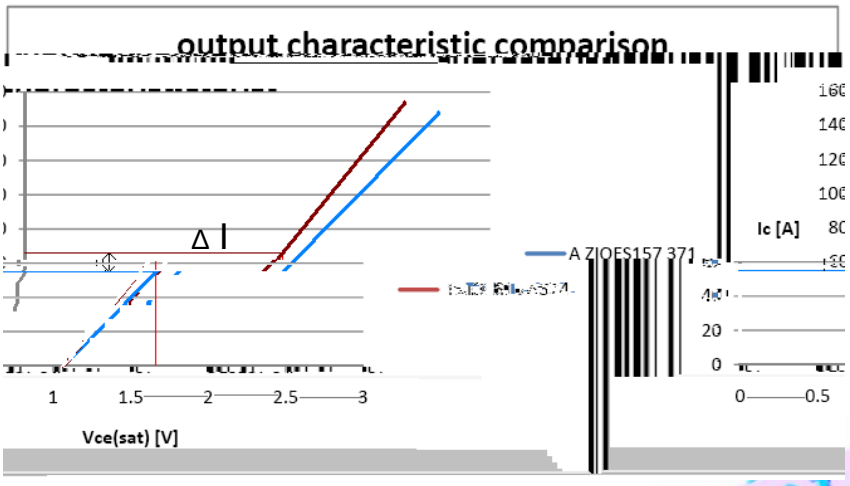
185kW 75A

Δ I

75A 75A

Δ I 10A

$$\alpha = \frac{I_{C1} - I_{C2}}{I_{C1} + I_{C2}} = \frac{65 - 55}{65 + 55} = 8.3\%$$



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IC Δ I

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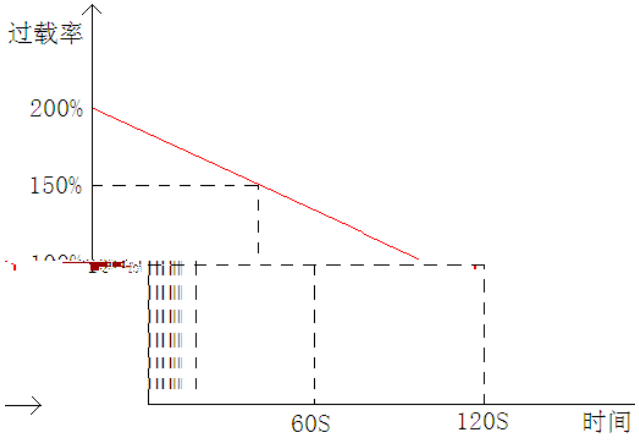
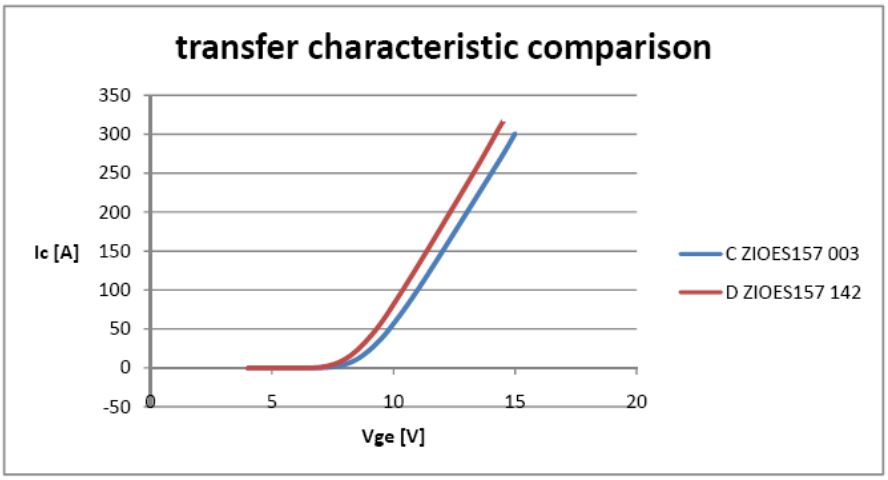


120A ΔI
20A

Vth



GD75HFL120C1S

GD300HFL120C2S 185kW

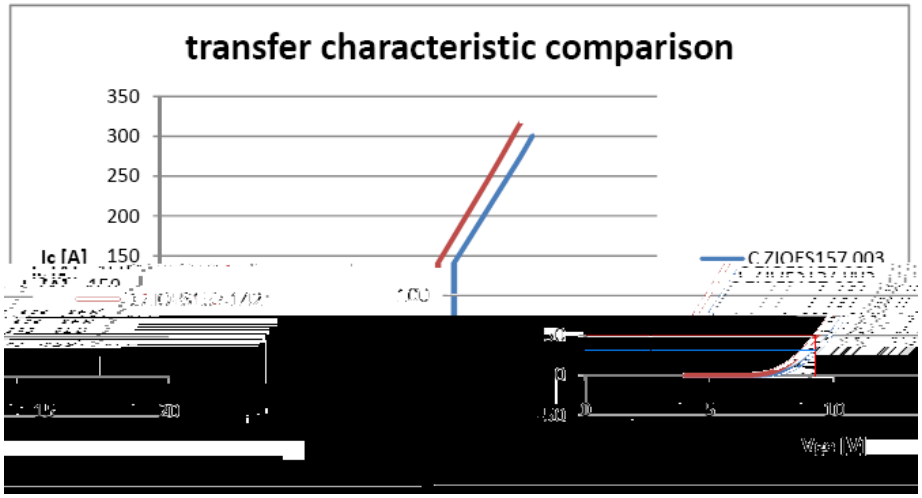
340A 75A

42.5A

$I_C = K(V_{ge} - V_{th})^2$ $I_{C1} + I_{C2} = 85$ $V_{ge1} = V_{ge2}$ $V_{th1} \approx V_{th2}$

I_{C1} I_{C2} K K

I_{C1} I_{C2}



185kW

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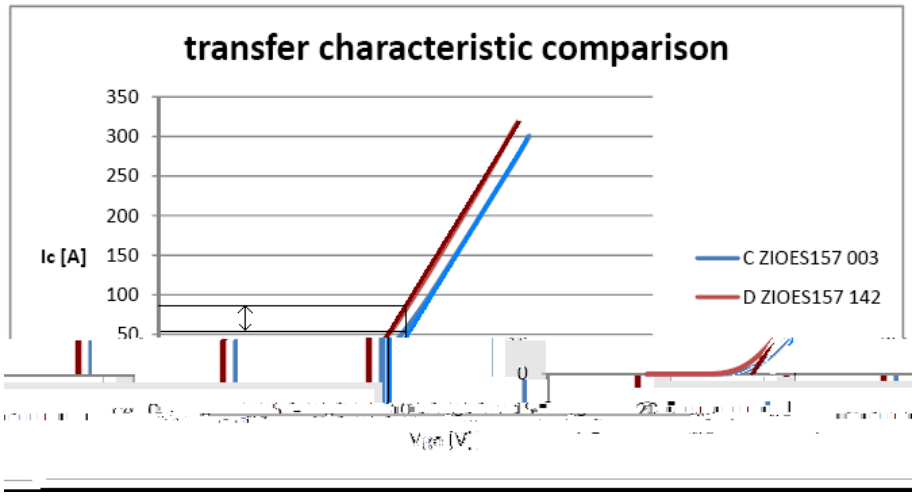

580A

10A

ΔI 35A 580A I_C 75

90A 55A

$$\alpha = \frac{I_{C1} - I_{C2}}{I_{C1} + I_{C2}} = \frac{90 - 55}{90 + 55} = 24.1\%$$

ΔI I_C

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